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DRAFT TECHNICAL REPORT

Lower Duwamish Triad Sampling Event

Prepared for
US EPA Region 10

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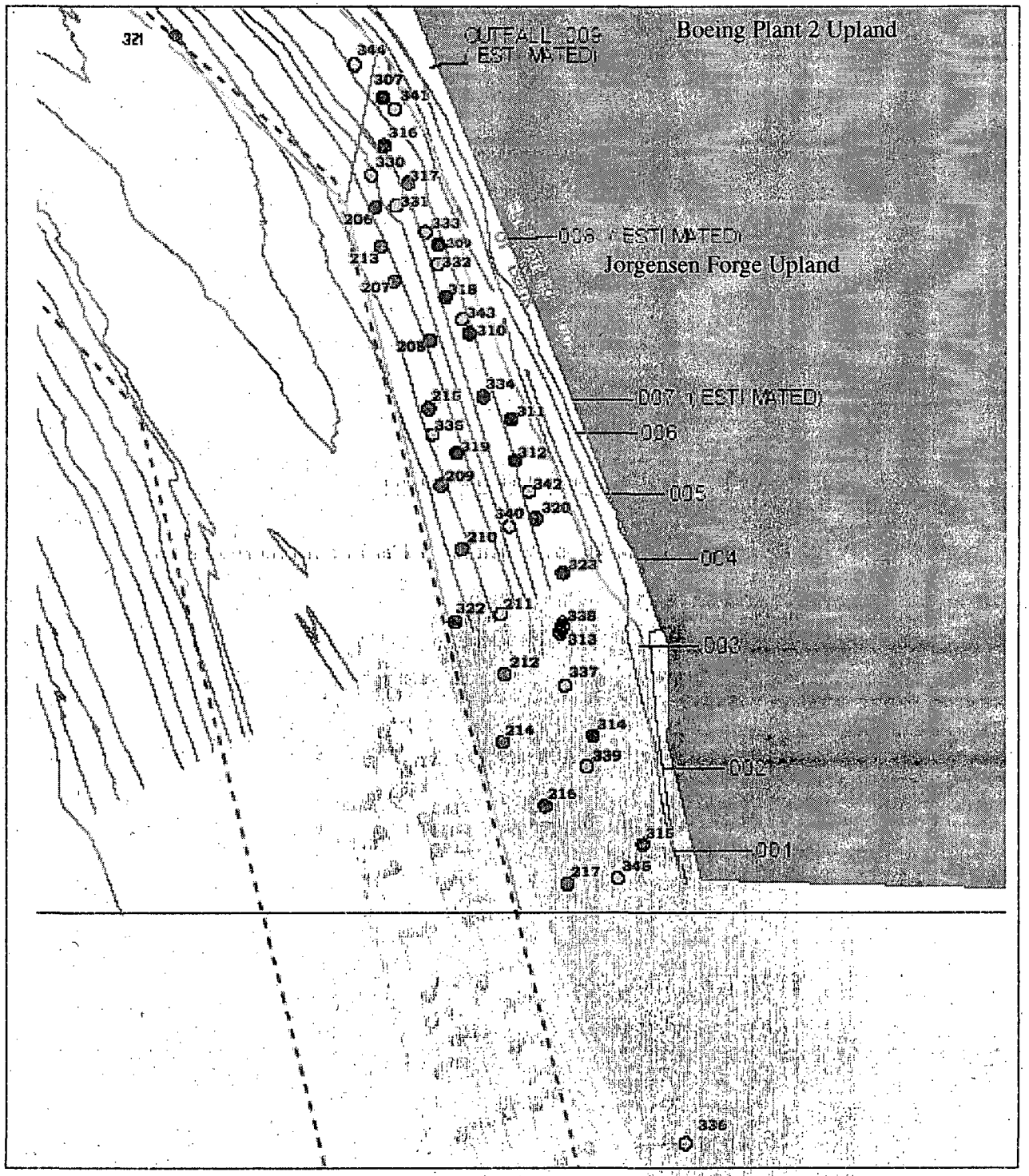
Introduction

This revised and expanded document describes field-related events and results from a 2004 investigation to define patterns and determine source(s) of polychlorinated biphenyls (PCBs) in a reach of the Lower Duwamish River, Seattle, Washington. These results are being used to guide Remedial Investigation/Feasibility Study (RI/FS) and Corrective Measures Study (CMS) decisions. The investigation is associated with two regulatory authorities, RCRA and CERCLA. A variety of parameters were analyzed, including grain-size, total organic carbon (TOC), semivolatile organic compounds (SVOC), metals, and PCB, in order to determine exceedances of Washington State Sediment Management Standards. The distribution of PCB up-river from a known source was not understood in relation to other potential sources. The PCB data are being used to resolve PCB patterns and to permit EPA to make a "boundary" decision concerning the influence of two different source areas. Immunoassay analyses of sediments from shallow borings were also used to direct placement of deeper cores. Samples were split into Aroclor samples (for off-site laboratory analysis) and immunoassay samples (for rapid-turnaround analysis at a Navy laboratory in San Diego, CA), resulting in a large collaborative data set (97 stations) that permitted a "Demonstration of Method Applicability" (DMA) for the immunoassay in a complex urban sediment mixture. That evaluation is reported elsewhere. (Section PCB results section for a link.)

Summary of Field Sampling Activities

Figure 1 shows a map of the reach near river mile 3.8 on the Lower Duwamish River, in Seattle, Washington. In the figure, the stations designated 200 and purple coded are stations previously sampled by the Boeing Company; stations coded 300 were sampled in this investigation as surface and subsurface cores. Yellow stations were surface sampled using an adaptive fill methodology to address areas of greatest uncertainty following evaluation using Visual Sample Plan version 3.0.

Figure 1. Sample Locations on the Lower Duwamish River, Near River Mile 3.8



Field sampling activities were performed by Herrera Environmental Consultants (Herrera) and staff from the Army Corps of Engineers (USACE) between August 16 and 27, 2004. Phase 1 (a comparison of a limited number of PCB samples to both immunoassay by Method 4020 and Method 8082-GC/ECD) was completed at an earlier date. Sediment sampling for this investigation was completed in two phases, as directed by the project specific Quality Assurance Project Plan (QAPP, USACE 2004):

- Phase 2 – Surface and subsurface sediment samples were collected at 16 station locations. These locations were identified as EPA bank/outfall locations, EPA "hot-spot" locations, and EPA spatial locations.

- Phase 3 – Adaptive ("Triad") surface sediment samples were collected at additional locations. These locations were identified as previous Boeing sample locations and "filler" sample locations between Phase 2 locations.

One of the purposes of the data collection activity was to increase the amount of data to better determine the correspondence between the two analyses, in order to determine the usefulness of the immunoassay in "guiding" future sampling for this suite of compounds.

Planned sampling activities are described in the QAPP; actual field activities are described below, and documented in log books and on sediment log sheets (Appendix A). Photographic documentation representing a subset of sediment samples is presented in Appendix B.

The site specific Health and Safety Plan (HASP) (Herrera 2004) was followed and no heath and safety concerns occurred during the field sampling event.

Surface and subsurface sediment samples were collected between the river bank and navigation channel using the vessel R/V Kittiwake to deploy sampling equipment. Surface sediment samples were collected using a single van Veen sampler and subsurface sediment samples were collected using a Vibracorer. Sampling equipment was deployed and retrieved from the stern of the boat using a winch.

Phase 2 surface sediment samples were collected during the first two days of field activity. Subsurface core samples were collected over two days following surface sample collection. An attempt was made to collect surface and subsurface samples at the same location. Due to subsurface debris, most core locations were shifted from the corresponding surface sample locations.

Sample locations were electronically recorded using an onboard differential global positioning system (DGPS) with an accuracy of ±2 meters. A comparison of actual (final) field station locations to planned station locations is presented in Table 1. Station locations were adjusted in the field if refusal was encountered at the planned station location coordinates. Thirteen surface station locations varied from planned station locations by greater than 1 meter, as shown in Table 1. Refusals occurred due to the presence of rocks and other debris or due to insufficient water depth for the boat to maneuver without disturbing the sediment surface. Final field locations for

subsurface core samples varied by greater than one meter from the corresponding final surface grab station locations due to refusal by subsurface debris 15 out of 16 times.

Planned and final station location coordinates are presented in Appendix C.

Table 1. Comparison of planned station location to final field station locations.

Station ID	Distance of Final Surface Grab Station Location from Planned Station Location	Distance of Final Subsurface Core Station Location from Final Surface Grab Station Location	Comments
Phase 2 stations			
SD-DUW-307	0.6 meters south	5.7 meters southwest	2 subsurface refusals
SD-DUW-309	0.3 meters north	5.9 meters southwest	
SD-DUW-310	0.3 meters southwest	4.1 meters southwest	1 surface refusal
SD-DUW-311	0.9 meters southeast	3.2 meters northwest	
SD-DUW-312	5.0 meters southwest	2.0 meters east	3 surface refusals
SD-DUW-313	8.2 meters northwest	4.3 meters southwest	5 surface and 2 subsurface refusals
SD-DUW-314	7.3 meters northwest	0.8 meters northwest	5 surface and 1 subsurface refusals
SD-DUW-315	0.3 meters northwest	1.4 meters south	1 surface refusal
SD-DUW-316	0.5 meters south	5.5 meters southwest	
SD-DUW-317	0.4 meters south	5.5meters northwest	1 subsurface refusal
SD-DUW-318	0.3 meters northwest	2.8 meters northeast	
SD-DUW-319	1.7 meters southwest	1.3 meters northwest	
SD-DUW-320	0.9 meters northeast	1.6 meters southwest	
SD-DUW-321	0.8 meters southeast	2.3 meters northeast	
SD-DUW-322	0.3 meters southwest	2.1 meters southwest	1 subsurface refusal
SD-DUW-323	2.2 meters southwest	2.3 meters southwest	1 surface refusal
Phase 3 stations			
SD-DUW-206	0.9 meters east	NA	
SD-DUW-207	0.3 meters south	NA	
SD-DUW-208	0.6 meters northeast	NA	
SD-DUW-209	3.4 meters southeast	NA	1 refusal
SD-DUW-210	0.2 meters south	NA	
SD-DUW-211	1.1 meters southwest	NA	
SD-DUW-212	0.6 meters east	NA	
SD-DUW-213	0.8 meters northeast	NA	
SD-DUW-214	0.5 meters southeast	NA	
SD-DUW-215	1.0 meters southeast	NA	
SD-DUW-216	0.6 meters northeast	NA	
SD-DUW-217	0.4 meters northwest	NA	
SD-DUW-330	0.7 meters northeast	NA	

Station ID	Distance of Final Surface Grab Station Location from Planned Station Location	Distance of Final Subsurface Core Station Location from Final Surface Grab Station Location	Comments
SD-DUW-331	0.8 meters southwest	NA	
SD-DUW-332	1.6 meters southeast	NA	
SD-DUW-333	2.9 meters southwest	NA	
SD-DUW-334	1.0 meters west	NA	
SD-DUW-335	0.8 meters northeast	NA	
SD-DUW-336	0.4 meters southeast	NA	
SD-DUW-337	0.0 meters	NA	
SD-DUW-338	14.5 meters northwest	NA	5 refusals
SD-DUW-339	12.4 meters northwest	NA	5 refusals
SD-DUW-340	0.6 meters southeast	NA	
SD-DUW-341	5.0 meters northwest	NA	2 refusals
SD-DUW-342	0.1 meters	NA	
SD-DUW-343	0.4 meters south	NA	
SD-DUW-344	6.4 meters northwest	NA	3 refusals
SD-DUW-345	0.1 meters west	NA	

[a] Coordinates are North American Datum (NAD) of 1983 State Plane Washington North.
NA Not applicable. (Phase 3 involved surface sampling only.)

All sample handling and custody procedures outlined in the QAPP were followed. Field activities and deviations from the QAPP for surface and subsurface sampling are discussed in more detail below.

Surface Sediment Sampling

Surface sediment samples for Phase 2 sampling were collected on August 16 and 17, 2004. Phase 3 surface sediment samples were collected on August 26 and 27, 2004. All samples were collected from the top 10 centimeters of sediment using a single van Veen sampler as described in the QAPP.

No deviations from the QAPP, other than station location adjustments due to rocks or debris at the sediment surface discussed above, were performed during field sampling activities.

Subsurface Sampling

Subsurface sediment samples were collected using a Vibrocorer on August 18 and 19, 2004. Samples were collected from all 16 stations identified for the Phase 2 sampling event.

Deviations from the QAPP for subsurface sediment field sampling activities included the following:

- Overlying water was decanted from the top opening of the core tubes rather than drilling holes through the core tube at the sediment/water interface. Because sediment was not collected for analysis from the 0 to 1 foot interval, any disturbance to the sediment surface caused by decanting from the top of the core tube did not affect sample quality.

- Cores were processed at Herrera's laboratory, where a walk-in cooler was not available. Core tubes were stored vertically, packed in ice, and wrapped in plastic until processed. Samples were not adversely affected.

- Adequate sediment core depth was not achieved at two sample stations due to refusal. Samples were not collected from the 2- to 3-foot depth at SD-DUW-318 and samples were not submitted for the 4- to 5- or 5- to 6-foot depths at SD-DUW-321.

- An additional (unplanned) subsurface sample was collected from station SD-DUW-313 because a sheen was observed in this core. The sample collected from the 1- to 2-foot sample interval was submitted to the EPA Region 10 Laboratory for analysis of semivolatile organic compounds, and results are presented later in this report. Deeper samples at this location could not be collected due to refusal and the sampling station was moved four meters to the west.

Accurate depth of penetration could not be measured, partly due to tubes bending as they were driven into the sediment and because physical indication of penetration depth was not always evident on the core tubes once they were retrieved. On the second day of coring activities, the 10-foot core tubes were cut down to 7-foot lengths prior to sampling. This prevented the tubes from bending, and the entire length of the tube could then penetrate the sediment.

The estimated and measured percent recovery for each station is presented on the sediment log forms (Appendix A). Sample collection depths (i.e., 1 to 2 feet, 2 to 3 feet, etc.) were not adjusted based on the calculated percent recovery. An "estimated" qualifier (E) was applied to percent recovery values associated with cores that did not fully penetrate the sediment and only physical indications (markings on the core tube) or Vibracorer cable payout estimates were used to calculate recoveries.

Investigation Derived Waste

All excess sediment was collected in 42 5-gallon buckets. Two representative samples were collected from the 5-gallon buckets containing sediment from stations identified in Table 2 and analyzed by the toxicity characteristic leaching procedure (TCLP) for lead to determine disposal requirements. Sample concentrations were below the Resource Conservation and Recovery Act

(RCRA) limit of 5 milligrams per liter (mg/L), indicating that the sediment does not need to be disposed of as hazardous waste.

Table 2. Investigation derived waste (IDW) lead results by toxicity characteristic leaching procedure (TCLP) for the Lower Duwamish Triad project.

Sample ID	Result (mg/L)	IDW bucket identification
WD01	0.4	SD-312 and SD-316
WD02	0.1 U	SD-210 and SD-211

mg/L milligrams per liter
U The material was analyzed for, but was not detected. The associated numerical value is the reporting limit.

Analytical Results

A total of 70 Phase 2 sediment samples, including five field duplicate samples and one rinsate sample, were submitted for laboratory analysis; a total of 31 Phase 3 sediment samples, including three field duplicate samples, were submitted for laboratory analysis (Appendix D, Tables D-1 and D-2).

Analytical Resources, Incorporated (ARI) analyzed sediment samples for total organic carbon (TOC), grain size distribution, semivolatile organic compounds (SVOCs), and mercury. ARI analytical results are presented in Appendix E; a data quality review is provided separately. Analytical results and associated data quality issues are discussed below.

The Environmental Division of the US Navy's SPAWARSYSCEN Laboratory analyzed 100 samples for PCBs by Method 4020 (immunoassay). Results are provided in Appendix F and Table 8.

The EPA Region 10 Manchester Laboratory analyzed 32 sediment samples plus two duplicate samples for the metals arsenic, cadmium, chromium, copper, lead, nickel, silver, and zinc.

Total Organic Carbon

ARI analyzed 99 sediment samples, including seven field duplicates for TOC using EPA method 9060 modified by PSEP for sediments (PSEP 1996). Analytical results are presented in Tables E-1 (Phase 2 samples) and E-2 (Phase 3 samples); no data quality issues were associated with the TOC analyses.

Surface sediment samples collected in both Phase 2 and Phase 3 resulted in TOC concentrations ranging from 1.45 to 2.78 percent. The highest TOC value occurred at station SD-DUW-214, located near the navigation channel; the lowest TOC value occurred at station SD-DUW-342, located along the river bank. In general, TOC concentrations for subsurface sediment samples were lower at stations located along the bank and higher concentrations were found at sample stations located closer to the navigation channel.

Seven field duplicate samples were analyzed for TOC (Table 3). All relative percent difference (RPD) values (ranging from 0.9 to 30.0 percent) met the control limit (less than 50 percent) established in the QAPP.

Table 3. Comparison of sample and field duplicate total organic carbon (TOC) results for the Lower Duwamish Triad project.

Sample ID	Field Duplicate ID	Sample Result (percent)	Field Duplicate Result (percent)	RPD
SD-314-0000	SD-325-0000	1.66	1.73	4.1
SD-320-0003	SD-328-0003	1.83	1.72	6.2
SD-321-0000	SD-324-0000	2.25	2.23	0.9
SD-323-0001	SD-326-0001	1.65	1.58	4.3
SD-207-0000	SD-433	2.11	1.56	30.0
SD-333-0000	SD-431	2.50	2.24	11.0
SD-338-0000	SD-432	1.81	1.92	5.9

RPD Relative percent difference

Mercury

ARI analyzed 19 sediment samples for mercury using EPA method 7471A (U.S. EPA 1986). Samples from 1-2 feet were eliminated during the planned number of samples due to resource decisions. Analytical results are presented in Table E-4 and Table 5, below. All samples were analyzed 11 to 22 days outside of the recommended holding time. Holding time exceedances for each sample are noted in Table E-4. Therefore, samples that had a detected concentration of mercury above the laboratory reporting limit were qualified as estimated (flagged J) to indicate that sample results may be biased low. Mercury was not detected in the sediment sample from station SD-DUW-341 at the laboratory reporting limit; the result was rejected (flagged R), in accordance with EPA data review guidelines (U.S. EPA 2004). Because the reported concentration is expected to be lower than the actual concentration (associated with the extended holding time prior to analysis), the presence or absence of the analyte cannot be verified.

Mercury concentrations in surface samples ranged from 0.09 to 0.39 mg/kg. The SQS criterion for mercury is 0.41 mg/kg and the CSL criterion for mercury is 0.59 mg/kg. No project samples exceeded SQS or CSL criteria.

Two field duplicates were analyzed for mercury (Table 4). The RPD values met the established control limit (less than 50 percent) established in the QAPP.

Table 4. Comparison of inorganic compounds laboratory duplicate results for the Lower Duwamish Triad project. (Note: there were no field duplicates analyzed.)

Compound	Sample ID	Field Duplicate ID: SD-	Sample Result (mg/kg)	Q	Field Duplicate Result (mg/kg)	Q	Relative Percent Difference
Ag	309-0001	309-0001D	1	U	0.99	U	0%
Ag	320-0001	320-0001D	1.3		1.3		0%
As	309-0001	309-0001D	11		12		4%
As	320-0001	320-0001D	20		21		2%
Cd	309-0001	309-0001D	1.2		1.4		8%
Cd	320-0001	320-0001D	2.02		1.74		7%
Cr	309-0001	309-0001D	35.2		34.7		1%
Cr	320-0001	320-0001D	86.1	J	83.2	J	2%
Cu	309-0001	309-0001D	55.1		57.1		2%
Cu	320-0001	320-0001D	86.1		88.8		2%
Hg	321-0000	324-0000	0.18	J	0.2	J	11%
Hg	314-0000	325-0000	0.23	J	0.2	J	14%
Ni	309-0001	309-0001D	29.5		28.7		1%
Ni	320-0001	320-0001D	35.5		34.1		2%
Pb	309-0001	309-0001D	44.8		45.9		1%
Pb	320-0001	320-0001D	433		421		1%
Zn	309-0001	309-0001D	127		125		1%
Zn	320-0001	320-0001D	351		328		3%

mg/kg milligrams per kilogram
RPD Relative percent difference
J The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample.

Other Inorganics

EPA Region 10's Manchester Laboratory results are provided in Appendix G and summarized in Table 5.

Table 5. Results for Inorganic Compounds

	Sediment Quality Standards[a] (SQS)	Cleanup Screening Levels Criteria[a] (CSL)	307-0000	307-0001	309-0000	309-0001	309-0001 Duplicate	310-0000	310-0001	311-0000	311-0001	312-0000	312-0001	313-0000
As	57	93	15	5.2	14	11	12	12	18	13	15	24.5	26.7	37
Cd	5.1	6.7	1.76	0.5 U	1.3	1.2	1.4	1.1	1.65	1	1.87	1.56	2.29	2.5 U
Cr	260	270	43.2	11.7	81.7	35.2	34.7	59.9	34.3	69.7	69.2	78.7	64	584
Cu	390	390	45.9	12.1	58	55.1	57.1	52.5	43.4	60.3	79.5	71	71.1	128
Pb	450	530	209	2.8	108	44.8	45.9	287	26.7	169	*500*	196	*514*	**637**
Ni	LAET = 140		50	9.07	48.3	29.5	28.7	37.9	22.8	58	51.1	53.1	28.4	129
Ag	6.1	6.1	1 U	1 U	0.99 U	1 U	0.99 U	0.99 U	1 U	0.99 U	1 U	1 U	0.99 U	5 U
Zn	410	960	**1380**	298	157	127	125	142	157	160	216	174	*457*	*529*
Hg	0.41	0.59	0.09 J	J	0.24 J			0.14 J		0.11 J		0.20 J		0.39 J

			313-0001	314-0000	314-0001	315-0000	315-0001	316-0000	316-0001	317-0000	317-0001	318-0000	318-0001	319-0000
As	57	93	13	24	4.5U	12	4.5 U	14	12	15	13	13	5.9	13
Cd	5.1	6.7	0.9	0.75	0.5 U	0.54	0.5 U	0.8	1.2	1.1	1.5	0.57	0.5U U	0.71
Cr	260	270	23.3	108	11.7	77.7	9.96	39.7	35.4	44.2	35.9	54.1	11.4J J	42.5
Cu	390	390	38.4	72	9.53	68.8	7.32	52.3	56.1	59.6	67.4	56.4	10.7	48.9
Pb	450	530	13.9	81.8	2.5U	67.6	2.5 U	59.00	57.5	69.1	81.7	82.6	2.5U U	204
Ni	LAET = 140		19	47.6	8.39	57.5	6.92	28.7	27	27.6	26.1	35.9	7.79	25.5
Ag	6.1	6.1	1 U	0.99 U	1 U	0.99 U	0.99 U	1 U	0.99 U	1 U	1 U	0.99 U	1 U	0.99 U
Zn	410	960	67.1	217	23.9	133	20.2	211	150	175	172	153	21	162
Hg	0.41	0.59	0.16 J	0.23 J		0.09 J		0.15 J		0.10 J		0.10 J		0.16 J

			319-0001	320-0000	320-0001	320-0001 Duplicate	321-0000	321-0001	322-0000	322-0001	323-0000	323-0001
As	57	93	21	20	20	21	12	13	14	12	32	22.8
Cd	5.1	6.7	1.1	0.78	2.02	1.74	0.58	1.1	0.5 U	0.78	2.5U	0.51
Cr	260	270	30.5	87.1 J	86.1 J	83.2 J	32.1	23.3	30.1	27.9	**1070**	32
Cu	390	390	39.1	72.7	86.1	88.8	53.1	29.2	53.1	46.2	123	53.7
Pb	450	530	23.6	211	433	421	28	14	25.5	37.7	**2350**	171
Ni	LAET = 140		20.3	48.9	35.5	34.1	23.2	16.6	22	19.8	**144**	31
Ag	6.1	6.1	0.99 U	1.1	1.3	1.3	0.99 U	0.99 U	0.99 U	0.99 U	5U	0.99 U
Zn	410	960	133	237	351	328	112	120	115	110	**1590**	189
Hg	0.41	0.59		0.21 J			0.18 J		0.14 J		0.20 J	

[a] Washington State Sediment Management Standards, Sediment Quality Standards (SQS) and Cleanup Screening Level (CSL), WAC Chapter 173-204. LAET = Lowest Apparent Effects Threshold. (LAET is not a regulatory standard.)

Italic and Underline: exceeds SQS

Bold: exceeds CSL or LAET

Semivolatile Organic Compounds

ARI analyzed 19 sediment samples, including two field duplicates, for SVOCs using EPA method 8270B (U.S. EPA 1986). SVOC analytical results are presented in Table E-3; no data quality issues were associated with the SVOC analyses, with the exceptions noted below.

Two field duplicate samples were analyzed for SVOCs (Table 6). The relative percent difference (RPD) was calculated for all detected compounds identified greater than five times the reporting limit (RL). The difference was calculated if the detected compound concentration was less than five times the RL in either the sample or field duplicate. A control limit of less than 50 percent RPD was established in the QAPP; a control limit of two times the RL was used to evaluate difference values. Several compounds exceeded the RPD or difference control limits for sample SD-314-0000 and field duplicate SD-325-0000. Because all RPD or difference values met the control limits for sample SD-321-0000 and field duplicate SD-324-0000, only samples SD-314-0000 and SD-325-0000 were qualified as estimated (flagged J) for compounds that exceeded the control limits, as shown in Table 6. It is probable that concentration differences were a result of matrix variability.

Surface sediment samples from all Phase 2 station locations and one subsurface sediment sample collected from 1 to 2 feet deep were analyzed for SVOCs. A comparison of SVOC concentrations found in project samples to Washington State Sediment Quality Standards (SQS) and Cleanup Screening Level (CSL) criteria (WAC 173-204) is presented in Table 7.

SQS criteria were exceeded in surface sediments for one or more SVOCs at eight of the 16 station locations. Stations with the most SQS exceedances were generally bank/outfall samples. The station with the most SQS exceedances was bank/outfall location SD-DUW-307. In general, this station also had the highest concentration of exceeded compounds.

Table 6 Comparison of sample and field duplicate semivolatile organic compound (SVOC) results for the Lower Duwamish Triad project.

Compound (results in µg/kg)	RL (µg/kg)	Sample SD-314-0000	Field Duplicate SD-325-0000	RPD or diff[a]	Sample SD-321-0000	Field Duplicate SD-324-0000	RPD or diff[a]
Phenol	20	160 J	560 J	**111.1**	130	140	7.4
4-Methylphenol	20	21	31	10.0	ND	ND	
Naphthalene	20	28 J	160 J	**132.0**	ND	ND	
2-Methylnaphthalene	20	27 J	100 J	**73.0**	ND	ND	
Acenaphthylene	20	20 U	22	2.0	ND	ND	
Acenaphthene	20	42 J	190 J	**148.0**	ND	ND	
Dibenzofuran	20	25	54	29.0	ND	ND	
Diethylphthalate	20	28	20 U	8.0	20 U	27	7.0
Fluorene	20	51 J	220 J	**169.0**	ND	ND	
Phenanthrene	20	400 J	1,400 J	**111.1**	81	68	13.0
Carbazole	20	69	67	2.0	ND	ND	
Anthracene	20	130 J	330 J	**87.0**	30	25	5.0
Di-n-Butylphthalate	20	30	42	12.0	ND	ND	
Fluoranthene	20	600 J	1,100 J	**58.8**	270	230	16.0
Pyrene	20	570 J	1,500 J	**89.9**	240	210	13.3
Butylbenzylphthalate	20	20 U	26	6.0	34	27	7.0
Benzo (a) anthracene	20	220 J	500 J	**77.8**	98	81	17.0
Bis (2-ethylhexyl) phthalate	20	150	140	6.9	240	200	18.2
Chrysene	20	290 J	550 J	**61.9**	140	110	24.0
Benzo (b) fluoranthene	20	260	430	49.3	180	150	18.2
Benzo (k) fluoranthene	20	210 J	420 J	**66.7**	140	130	7.4
Benzo (a) pyrene	20	230 J	510 J	**75.7**	110	97	13.0
Indeno (1,2,3-cd) pyrene	20	110 J	170 J	**42.9**	52	46	6.0
Dibenz (a,h) anthracene	20	32	72	40.0	ND	ND	
Benzo (g,h,i) perylene	20	88 J	150 J	**62.0**	44	39	5.0

µg/kg micrograms per kilogram
RL Laboratory reporting limit
RPD Relative percent difference
diff Difference between the sample result and field duplicate result
ND Not detected above the laboratory reporting limit; the RPD value or difference was not calculated.
[a] The relative percent difference was calculated if both the sample and field duplicate result were greater than five times the laboratory reporting limit (RL). If the sample or the field duplicate result was less than five times the RL, the difference between the two values was calculated. The control limit for RPD is 50 percent; the control limit for difference is two times the RL
U The material was analyzed for, but was not detected. The associated numerical value is the reporting limit.
J The associated numerical value is considered an estimate.
Bold values indicate that the RPD or difference control limit was exceeded.

Table 7. Comparison of Sediment Quality Standards and Cleanup Screening Levels to Semivolatile Organic Compounds.

Bold and shaded is > CSL, bold and unshaded is SQS<x<CSL, and values is < SQS and neither bolded nor shaded

Compound	Cleanup Screening Levels Criteria [a] (CSL)	Sediment Quality Standards [a] (SQS)	Results																
			SD-307-0000	SD-309-0000	SD-310-0000	SD-311-0000	SD-312-0000	SD-313-0000	SD-313-0001	SD-314-0000	SD-315-0000	SD-316-0000	SD-317-0000	SD-318-0000	SD-319-0000	SD-320-0000	SD-321-0000	SD-322-0000	SD-323-0000
Low molecular weight PAH	**mg/kg carbon [b]**	**mg/kg carbon [b]**	**mg/kg carbon [b]**																
LPAH	780	370	*490*	250	74	32	230	49	2.2	39 J	59	13	16	62	5.1	24	4.9	5.9	24
Naphthalene	170	99	0.91 U	22	1.6	3.4	6.6	9.9	1.1 U	1.7 J	1.3 U	0.84 U	0.78 U	2.2	1.1 U	1.5	0.89 U	0.99 U	0.88
Acenaphthylene	66	66	2.6	4.4	2.1	1.9	3.8	0.90 U	1.1 U	1.2 U	1.5	0.84 U	0.78 U	1.4	1.1 U	1.2 U	0.89 U	0.99 U	0.80 U
Acenaphthene	57	16	1.2	10	2.8	3.8	9.7	9.0	1.1 U	2.5 J	2.8	0.84 U	0.78	2.5	1.1 U	1.2	0.89 U	0.99 U	1.4
Fluorene	79	23	*68*	*37*	8.6	11	*36*	11	1.1 U	3.1 J	3.2	0.98	1.5	7.3	1.1 U	3.0	0.89 U	0.99 U	1.7
Phenanthrene	480	100	*220*	*150*	48	60	*150*	63	2.2	24 J	43	9.8	11	41	5.1	15	3.6	4.5	17
Anthracene	1,200	220	200	28	11	12	26	16	1.1 U	7.8 J	8.3	2.0	2.5	7.8	1.1 U	3.0	1.3	1.4	3.3
2-Methylnaphthalene	64	38	1.2	16	1.7	3.3	1.9	8.6	1.1 U	1.6 J	1.3 U	0.84 U	0.78 U	1.8	1.1 U	1.5	0.89 U	0.99 U	0.88
High molecular weight PAH	**mg/kg carbon [b]**	**mg/kg carbon [b]**	**mg/kg carbon [b]**																
HPAH	5,300	960	*1,600*	530	330	450	450	200	8.2	160 J	600	110	120	270	44	90	57	62	170
Fluoranthene	1,200	160	*455*	149	76	109	132	45	4.3	36 J	146	24	29	68	8.6	23	12	15	35
Pyrene	1,400	1,000	177	100	51	76	85	50	2.7	34 J	115	20	22	46	11	18	11	8.9	33
Benz(a)anthracene	270	110	*214*	50	29	38	43	20	1.1 U	13 J	42	8.9	9.3	24	3.4	7.4	4.4	4.9	14
Chrysene	460	110	*300*	54	37	46	47	22	1.2	17 J	61	12	16	31	4.3	9.9	6.2	7.4	18
Total benzofluoranthenes	450	230	*320*	92	73	100	75	33	1.1 U	28 J	130	27	28	53	9.9	17	14	14	41
Benzo(a)pyrene	210	99	91	45	31	42	38	19	1.1 U	14 J	50	10	10	25	4.0	8.0	4.9	5.4	16
Indeno(1,2,3-cd)pyrene	88	34	20	19	14	19	13	5.9	1.1 U	6.6 J	25	5.3	4.7	13	1.7	3.6	2.3	3.0	8.0
Dibenzo(a,h)anthracene	33	12	10	7.7	5.6	7.1	3.9	2.8	1.1 U	1.9 J	9.6	2.0	1.1	4.9	1.1 U	1.2 U	0.89 U	1.0	3.1
Benzo(g,h,i)perylene	78	31	12	13	11	14	9.7	5.4	1.1 U	5.3 J	19	4.3	3.5	9.3	1.4	2.6	2.0	2.2	6.0
Phthalates	**mg/kg carbon [b]**	**mg/kg carbon [b]**	**mg/kg carbon [b]**																
Dimethylphthalate	53	53	0.86 J	1.1	1.5	1.4	0.85	0.90 U	1.1 U	1.2 U	2.2	1.8	1.1	1.1	1.1 U	1.2 U	0.89 U	0.99 U	3.0
Diethylphthalate	110	61	0.91 U	0.90 U	1.0	1.1 U	3.5	0.90 U	1.1 U	1.7	1.3 U	0.84 U	4.7	4.6	1.1 U	3.0	0.89 U	7.4	0.80 U
Di-n-Butylphthalate	1,700	220	3.0	0.90 U	0.96 J	1.1 U	0.89	1.5	1.1 U	1.8	1.3 U	0.93	1.8	1.0	1.6	2.3	0.89 U	0.99 U	1.2
Butylbenzylphthalate	64	4.9	1.5	1.5	2.1	2.2	1.4	1.9	1.1 U	1.2 U	**8.9**	2.8	3.9	2.0	1.1 U	2.3	1.5	1.5	4.0
Bis(2-ethylhexyl)phthalate	78	47	6.4	10	14	21	8.5	4.5	1.1 U	9.0	39	13	14	14	5.4	6.8	11	11	16
Other semivolatile organic compounds	**mg/kg carbon [b]**	**mg/kg carbon [b]**	**mg/kg carbon [b]**																
Dibenzofuran	58	15	8.2	*19*	4.1	5.4	*18*	2.5	1.1 U	1.5	2.0	0.84 U	0.78	3.7	1.1 U	1.7	0.89 U	0.99 U	0.84
Ionizable organic compounds	**µg/kg dry weight**	**µg/kg dry weight**	**µg/kg dry weight**																
Phenol	1,200	420	*440*	290	270	*1,200*	*610*	*620*	20 U	160	28	310	*1,100*	*800*	32	410	130	290	*840*
4-Methylphenol	670	670	52	19 J	20 U	27	22	22	20 U	21	20 U	19 U	34	28	20 U	20 U	20 U	20 U	83

[a] Washington State Sediment Management Standards, Sediment Quality Standards (SQS) and Cleanup Screening Level (CSL), WAC Chapter 173-204.
[b] Units in mg/kg carbon represent concentrations in parts per million, normalized to organic carbon. To normalize to TOC, the dry weight concentration for each parameter is divided by the decimal fraction representing the percent TOC content of the sediment.
µg/kg micrograms per kilogram.
Italic and underlining indicates the sample result is greater than the SQS value.
U The material was analyzed for, but was not detected. The associated numerical value is the reporting limit.
J The associated numerical value is considered an estimated concentration.
LPAH represents the sum of the following "low molecular weight polynuclear aromatic hydrocarbon" compounds: naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
HPAH represents the sum of the following "high molecular weight polynuclear aromatic hydrocarbon" compounds: fluoranthene, pyrene, benz(a)anthracene, chrysene, total benzofluoranthenes, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
Total benzofluoranthenes represents the sum of the concentrations of the "b" and "k" isomers.

Grain Size Distribution

ARI analyzed 26 sediment samples for grain size distribution using the PSEP method (PSEP 1996). Analytical results are presented in Table E-5. USACE selected five additional sediment samples for grain size distribution analysis after the field sampling event was completed. These five samples were frozen prior to analysis and have been qualified as estimated (flagged J) since freezing may impact particle size distribution. No other data quality issues were associated with the grain size distribution analyses.

In general, station locations along the river bank had a greater percentage of sand and gravel in both surface and subsurface samples; station locations SD-DUW-321 and SD-DUW-322, which are located nearest to the navigation channel, contained a higher percentage of fine-grained material. The stations with a greater percentage of fine-grained material generally contained higher TOC concentrations and stations with a greater percentage of gravels and sands had lower TOC concentrations.

Two field duplicates were analyzed for grain size distribution (Table 7). The relative percent difference (RPD) was only calculated for the percent fines content (less than 62.5 microns) of the samples. The RPD values (0.8 and 5.4 percent) met the established control limit (less than 50 percent) established in the QAPP.

Table 8. Comparison of sample and field duplicate percent fines results for the Lower Duwamish Triad project.

Sample ID	Field Duplicate ID	Sample Result (percent fines[a])	Field Duplicate Result (percent fines[a])	RPD
SD-321-0000	SD-324-0000	77.7	78.3	0.8
SD-333-0000	SD-431	59.3	56.2	5.4

RPD Percent Relative Difference: (|A-B|/(A+B)) * 100%

[a] The percent fines content (less than 62.5 microns) was used to compare sample and field duplicate results.

PCBs

The Navy SPAWARSYSCEN Laboratory analyzed the samples using the EPA Method 4020 immunoassay. EPA sent Method 8082 (Aroclor) analyses to 3 EPA laboratories in Regions 6, 8, and 10. Table 9 shows the dry weight QC data for Method 4020. These results were judged acceptable in accordance with the QAPP. Table 10 shows results of field duplicate analyses using Method 8082, and indicates some heterogeneity in repeated sampling from the same grab. This shows that organic-carbon-normalized data. Tables 11 and 12 shows dry-weight results according to both methods. The organic-carbon normalized results are highlighted relative to the Washington State Sediment Management Standards (Sediment Quality Standard, SQS, and Cleanup Screening Level, CSL).

Table 9. Method 4020 PCB and QC Results, Dry Weight.

Field Station ID	SAMPLE LABEL	tPCB (µg/Kg)	Q	Stdev	%RSD
SD-307	SD-307-0000	2615		218	8.33%
SD-311	SD-311-0001	1200		324	27.04%
	SD-313-0002	33	U	6	17.35%
SD-316	SD-317-0000	349		7	2.12%
	SD-322-0002	1273		66	5.17%

Stdev: Standard Deviation from duplicate assay analyses (n=2);
% RSD: Percent Relative Standard Deviation [{stdev/mean} * 100%
Q: Data Qualifiers where; U =Non-Detect,

Table 10. Method 8082 Total PCB Field Duplicate Results

Field Station ID	SAMPLE LABEL	tPCB Dry Weight (mg/Kg)	Q	RPD	TOC%	tPCB mg/kg OC	RPD
SD-207	SD-207-0000	145.6	JE	20.0%	2.11	6.9	15.0%
	SD-207-0000(FD)	97	U		1.56	6.2	
SD-323	SD-323-0001	284.7		47.1%	1.65	17.3	2.4%
	SD-323-0001(FD)	792.3			1.73	45.8	
SD-309	SD-309-0002	538.6		1%	1.32	40.8	1%
	SD-309-0002(FD)	550.8			1.32	41.7	
SD-314	SD-314-0000	670		12%	1.66	40.4	10%
	SD-314-0000(FD)	850			1.73	49.1	
SD-333	SD-333-0000	1000		53%	2.24	44.6	54%
	SD-333-0000(FD)	303.4			2.24	13.5	

RPD =Percent Relative Difference: (|A-B |/(A +B)) * 100%

Table 11. Total PCB Results from Method 4020, Dry-weight and OC-normalized

Italic and underlined is > CSL, **Bolded and Shaded** is SQS<x<CSL, and Values < SQS are Normal Text

Field Station ID	Sample Label	tPCB (ug/Kg)	Q	TOC (fraction)	PCB (mg/kgOC)
SD-206	SD-206-0000	298		0.0234	*12.7*
SD-207	SD-207-0000	259		0.0211	*12.3*
SD-208	SD-208-0000	443		0.0146	*30.3*
SD-209	SD-209-0000	210		0.0271	7.7
SD-210	SD-210-0000	187		0.0265	7.1
SD-211	SD-211-0000	248		0.0216	11.5
SD-212	SD-212-0000	204		0.0233	8.8
SD-213	SD-213-0000	291		0.0217	*13.4*
SD-214	SD-214-0000	165		0.0278	5.9
SD-215	SD-215-0000	515		0.0164	*31.4*
SD-216	SD-216-0000	195		0.0202	9.7
SD-217	SD-217-0000	705		0.0184	*38.3*
SD-307	SD-307-0000	2615		0.022	**118.9**
	SD-307-0001	56	U	0.008	7
	SD-307-0002	97	J	0.00226	*42.9*
	SD-307-0003	191		0.00317	*60.3*
SD-309	SD-309-0000	420		0.0221	*19*
	SD-309-0001	682		0.0177	*38.5*
	SD-309-0002	486		0.0132	*36.8*
	SD-309-0002(FD)	435		0.0166	26.2
	SD-309-0003	173		0.00941	*18.4*
SD-310	SD-310-0000	889		0.0198	*44.9*
	SD-310-0001	365		0.0154	*23.7*
	SD-310-0002	200		0.015	*13.3*
	SD-310-0003	73	U	0.00986	7.4
SD-311	SD-311-0000	461		0.0184	*25.1*
	SD-311-0001	1200		0.0106	**113.2**
	SD-311-0002	5072		0.0145	**349.8**
	SD-311-0003	2003		0.00725	**276.3**

Field Station ID	Sample Label	tPCB (ug/Kg)	Q	TOC (fraction)	PCB (mg/kgOC)
	SD-312-0000	510		0.0258	19.8
SD-312	SD-312-0001	761		0.0109	**69.8**
	SD-312-0002	66	U	0.00134	*49.3*
	SD-312-0003	14	U	0.0013	*10.8*
	SD-312-0003(FD)	149	J	0.0172	8.7
SD-313	SD-313-0000	432		0.0222	*19.5*
	SD-313-0001	75	J	0.0181	4.1
	SD-313-0002	33	U	0.00947	3.5
	SD-313-0003	17	U	0.0118	1.4
SD-314	SD-314-0000	505		0.0166	*30.4*
	SD-314-0001	12	U	0.0244	0.5
	SD-314-0002	6	U	0.00237	2.5
	SD-314-0003	3	U	0.00428	0.7
SD-315	SD-315-0000	183		0.0157	11.7
	SD-315-0001	0.3	U	0.00218	0.1
	SD-315-0002	3	U	0.00305	1
	SD-315-0003	0.04	U	0.00183	0
SD-316	SD-316-0000	405		0.0225	**18**
	SD-316-0001	564		0.0166	**34**
	SD-316-0002	671		0.0187	*35.9*
	SD-316-0003	3089		0.0153	**201.9**
SD-317	SD-317-0000	349		0.0258	*13.5*
	SD-317-0001	823		0.02	*41.2*
	SD-317-0002	6485		0.0211	**307.3**
	SD-317-0003	898		0.00816	**110**
SD-318	SD-318-0000	408		0.0205	*19.9*
	SD-318-0001	16	U	0.00824	1.9
SD-319	SD-319-0000	1754		0.0174	**100.8**
	SD-319-0001	167		0.018	9.3
	SD-319-0002	122	J	0.0222	5.5
	SD-319-0003	109	J	0.0181	6
SD-320	SD-320-0000	2143		0.0162	**132.3**
	SD-320-0001	745		0.0224	*33.3*
	SD-320-0002	368		0.0239	*15.4*
	SD-320-0003	116	J	0.0183	6.3

Field Station ID	Sample Label	tPCB (ug/Kg)	Q	TOC (fraction)	PCB (mg/kgOC)
SD-321	SD-321	217		0.0225	9.6
	SD-321-0001	425		0.0169	*25.1*
	SD-321-0002	224		0.0196	*11.4*
SD-322	SD-321-0003	145	J	0.0174	8.3
	SD-322-0000	186		0.0202	9.2
	SD-322-0001	583		0.019	*30.7*
	SD-322-0002	1273		0.0263	*48.4*
	SD-322-0003	514		0.0272	*18.9*
	SD-322-0004	138	J	0.0144	9.6
	SD-322-0005	81	J	0.00852	9.5
SD-323	SD-323-0000	2043		0.0249	**82**
	SD-323-0001	266		0.0165	*16.1*
	SD-323-0002	63	U	0.0221	2.9
	SD-323-0003	43	U	0.0131	3.3
SD-330	SD-330-0000	359		0.0215	*16.7*
SD-331	SD-331-0000	446		0.0243	*18.4*
SD-332	SD-332-0000	425		0.0224	*19*
SD-333	SD-333-0000	783		0.025	*31.3*
SD-334	SD-334-0000	305		0.0155	*19.7*
SD-335	SD-335-0000	238		0.0198	*12*
SD-336	SD-336-0000	449		0.0155	*29*
SD-337	SD-337-0000	1200		0.0192	*62.5*
SD-338	SD-338-0000	474		0.0181	*26.2*
SD-338	SD-338-0000FD	393		0.0181	*21.7*
SD-339	SD-339-0000	263		0.017	*15.5*
SD-340	SD-340-0000	415		0.0161	*25.8*
SD-341	SD-341-0000	3186		0.0268	**118.9**
SD-342	SD-342-0000	704		0.0145	*48.6*
SD-343	SD-343-0000	761		0.0196	*38.8*
SD-344	SD-344-0000	216		0.0258	8.4
SD-345	SD-345-0000	526		0.0124	*42.4*

Table 12. Total PCB Results from Method 8082, Dry-weight and OC-normalized

Italic and Underlined is SQS<x<CSL; **Bold and Shaded** is > CSL, and values < SQS are Normal Text; FD=Field Duplicate

Field Station ID	Sample Label	tPCB (ug/Kg dry)	Q	TOC%	tPCB (mg/kg OC)	Q
SD-206	SD-206-0000	280		2.34	12	
SD-207	SD-207-0000	145.6	E	2.11	6.9	E
	SD-207-0000(FD)	97	U	1.56	6.2	U
SD-208	SD-208-0000	340.7	E	1.46	*23.3*	
SD-209	SD-209-0000	77.7	JE	2.71	2.9	J
SD-210	SD-210-0000	130		2.65	4.9	
SD-211	SD-211-0000	610		2.16	*28.2*	
SD-212	SD-212-0000	48.9	E	2.33	2.1	E
SD-213	SD-213-0000	610	J	2.17	*28.1*	J
SD-214	SD-214-0000	8.7	J	2.78	0.3	J
SD-215	SD-215-0000	880		1.64	*53.7*	
SD-216	SD-216-0000	360	J	2.02	*17.8*	J
SD-217	SD-217-0000	292.7	JE	1.84	*15.9*	E
SD-307	SD-307-0000	2600		2.2	**118.2**	
	SD-307-0001	81.8	E	0.8	10.2	
	SD-307-0002	162.1	E	0.22	**73.7**	
	SD-307-0003	70.4	E	0.31	*22.7*	
SD-309	SD-309-0000	570		2.21	*25.8*	
	SD-309-0001	253.1	E	1.77	*14.3*	
	SD-309-0002	538.6		1.32	*40.8*	
	SD-309-0002(FD)	550.8		1.32	*41.7*	
	SD-309-0003	127.2		0.94	*13.5*	
SD-310	SD-310-0000	560		1.98	*28.3*	
	SD-310-0001	274		1.54	*17.8*	
	SD-310-0002	159.7		1.5	10.6	
	SD-310-0003	65.2	E	0.98	6.7	
SD-311	SD-311-0000	3300	J	1.84	**179.3**	J
	SD-311-0001	1586	E	1.06	**149.6**	
	SD-311-0002	5789	E	1.45	**399.2**	
	SD-311-0003	4446	E	0.72	**617.5**	
SD-312	SD-312-0000	1200		2.58	46.5	
	SD-312-0001	1869	E	1.09	**171.5**	
	SD-312-0002	6.3	J	0.13	4.8	J
	SD-312-0003	0.52	J	0.13	0.4	J

Field Station ID	Sample Label	tPCB (ug/Kg dry)	Q	TOC%	tPCB (mg/kg OC)	Q
	SD-313-0000	1150	JE	2.22	*51.8*	J
	SD-313-0001	64.2		1.81	3.5	
	SD-313-0002	12	U	0.94	1.3	U
SD-313	SD-313-0003	120	U	1.18	10.2	U
	SD-314-0000	670	E	1.66	*40.4*	
	SD-314-0000(FD)	850		1.73	*49.1*	
	SD-314-0001	20	U	2.44	0.8	U
	SD-314-0002	580	U	0.23	**252.2**	U
SD-314	SD-314-0003	224	J	0.42	*53.3*	J
	SD-315-0000	260	J	1.57	*16.6*	J
	SD-315-0001	22.6	U	0.21	10.8	U
	SD-315-0002	91	U	0.3	*30.3*	U
SD-315	SD-315-0003	67	U	0.18	*37.2*	U
SD-316	SD-316-0000	940		2.25	*41.8*	
	SD-316-0001	735		1.66	*44.3*	
	SD-316-0002	779	E	1.87	*41.7*	E
	SD-316-0003	3065		1.53	**200.3**	
SD-317	SD-317-0000	800		2.58	*31*	
	SD-317-0001	1529		2	**76.5**	
	SD-317-0002	10438		2.11	**494.7**	
	SD-317-0003	1635		0.81	**201.9**	
SD-318	SD-318-0000	930	J	2.05	45.4	J
	SD-318-0001	13	U	0.82	1.6	U
SD-319	SD-319-0000	3100		1.74	**178.2**	
	SD-319-0001	120		1.8	6.7	
	SD-319-0002	132.9	E	2.22	6	E
	SD-319-0003	13	U	1.81	0.7	U
SD-320	SD-320-0000	8864		1.62	**547.2**	
	SD-320-0001	1481.2		2.24	*66.1*	
	SD-320-0002	1234.1		2.39	*51.6*	
	SD-320-0003	238.9		1.83	*13.1*	
SD-321	SD-321-0000	510	J	2.25	*22.7*	J
	SD-321-0000 (FD)	630	J	2.5	*25.2*	J
	SD-321-0001	751.5		1.69	*44.5*	
	SD-321-0002	358.4		1.96	*18.3*	
	SD-321-0003	292	E	1.74	*16.8*	E

Field Station ID	Sample Label	tPCB (ug/Kg dry)	Q	TOC%	tPCB (mg/kg OC)	Q
	SD-322-0000	110		2.02	5.4	
SD-322	SD-322-0001	963.2	E	1.9	*50.7*	E
	SD-322-0002	2773		2.63	**105.4**	
	SD-322-0003	1391		2.72	*51.1*	
	SD-322-0004	126.1		1.44	8.8	
	SD-322-0005	231.8	E	0.85	*27.3*	E
SD-323	SD-323-0000	9400	J	2.49	**377.5**	J
	SD-323-0001	284.7		1.65	*17.3*	
	SD-323-0001(FD)	792.3	E	1.73	*45.8*	
	SD-323-0003	1.2	J	1.31	0.1	J
SD-324	SD-324-0000	630	J	2.5	*25.2*	J
SD-325	SD-325-0000	850		2.23	*38.1*	
SD-326	SD-326-0002	550.8		1.58	*34.9*	
SD-330	SD-330-0000	680	J	1.72	*39.5*	J
SD-331	SD-331-0000	361.2	E	2.15	*16.8*	E
SD-332	SD-332-0000	361.2	E	2.24	*16.1*	E
SD-333	SD-333-0000	1000		2.24	*44.6*	
	SD-333-0000(FD)	303.4	E	2.24	*13.5*	
SD-334	SD-334-0000	290		1.55	*18.7*	
SD-335	SD-335-0000	400		1.98	*20.2*	
SD-336	SD-336-0000	251	J	1.55	*16.2*	J
SD-337	SD-337-0000	1238	JE	1.92	*64.5*	E
SD-338	SD-338-0000	430		1.81	*23.8*	
SD-339	SD-339-0000	480		1.7	*28.2*	
SD-340	SD-340-0000	230		1.61	14.3	
SD-341	SD-341-0000	1398	E	2.68	*52.2*	E
SD-342	SD-342-0000	3639	JE	1.45	**251**	E
SD-343	SD-343-0000	260	J	1.96	*13.3*	J
SD-344	SD-344-0000	11000		2.58	**426.4**	
SD-345	SD-345-0000	182.1	E	1.24	*14.7*	E

The E qualifier notes that QC records were not available for inspection from EPA Region 8 Laboratory, so that the data are of unknown quality and should be used with caution. See text and Appendix G.

Ninety-nine PCB samples were measured by both methods. Seventeen samples in the 8082 results exceeded CSL; twelve samples in the 4020 results exceeded CSL. For a detailed comparison of data between Methods 4020 and 8082 (i.e., the Demonstration of Method Applicability), see the following URL:
http://www.triadcentral.org/user/includes/dsp_profile.cfm?Project_ID=23

Thoroughness of documentation for Method 8082 varied by laboratory, as described in Appendix G. For Region 10 Laboratory, good documentation was available, and the review was thorough and qualilfiers were applied appropriately. A number of samples had elevated detection limits, and a number had surrogate recoveries that were somewhat out of range. The data evaluation concludes that the data are usable.

The Region 6 case narrative is also thorough, although the evaluation report states inaccurately that the samples were received past holding time, and mis-states that some sample delivery group results were outside Aroclor recovery advisory limits although they were not out of the limits stated in the QAPP. Some high bias from Aroclor 1248 was noted. The data are usable as qualified.

The Region 8 case narrative is lacking detail, and it was not possible to recover the records despite considerable help from the EPA Region 10 Manchester Laboratory staff. The narrative incorrectly reports surrogate recoveries for the samples as Aroclors. The surrogate advisory limits for the DCBP surrogate were not exceeded (see Appendix G) as stated in the narrative. These data are not of known quality due to the lack of documentation, and have been flagged "E" (a non-standard flag) suggesting that they should be used with extreme caution for that reason. The "J" qualifier has been removed, as discussed in Appendix G.

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Appendix A: Sediment Sample Records

HERRERA ENVIRONMENTAL CONSULTANTS
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SEDIMENT SAMPLE RECORD

PROJECT NAME: **Lower Duwamish Triad** DATES: **8/16/04 – 8/19/04, 8/26/04-8/27/04**

LOCATION: **Duwamish River – offshore of Boeing Plant 2** CREW: **JW, RZ, RB, AS, GC, BC, VH** GEAR: **Van Veen (surface sampling) Vibrocorer (subsurface sampling)**

STATION LOCATION	DATE	TIME	REP. NO.	WATER DEPTH (ft)	% REC	SAMPLE INTERVAL [a] (ft)	CHARACTERISTICS (COLOR, TYPE, DEBRIS, ODOR)
SD-307	8/16/04	17:04	A	11.5	NA	0 – 0.33	Medium brown surface. Red/rusty brown fine to medium SAND with silt from 0 to 0.13 ft. Dark gray/black SILT with trace sand from 0.13 to 0.33 ft. Some twigs and roots throughout, concentrated in bottom layer.
	8/19/04	09:00	C	13.1	65 E	1 – 2	Very dark gray fine to medium SAND. Sample not solidly packed in core tube. Limited sample volume.
						2 – 3	Very dark gray fine SAND.
						3 – 4	Very dark gray fine SAND.
SD-309	8/16/04	17:23	A	11.8	NA	0 – 0.33	Slight sheen on water. Medium brown silty SAND with patches of rusty red from 0 to 0.07 ft. Dark gray/black sandy SILT with some angular rocky pieces, possibly slag, from 0.07 to 0.33 ft.
	8/19/04	11:15	A	10.5	100	1 – 2	Black clayey SILT with trace gravel.
						2 – 3	Black clayey SILT with trace gravel to 2.75 ft. Black silty SAND with woody debris from 2.75 to 3 ft.
						3 – 4	Black silty SAND with woody debris.
SD-310	8/16/04	16:43	B	11.8	NA	0 – 0.33	Medium brown surface with algae. Dark gray SILT with some sand subsurface. Concrete or slag debris.
	8/19/04	11:45	A	8.17	81	1 – 2	Very dark gray/black alternating layers of fine-grained SAND, organic SILT, and clayey SILT.
						2 – 3	Very dark gray/black alternating layers of fine-grained SAND, organic SILT, and clayey SILT.
						3 – 4	Very dark gray/black alternating layers of fine-grained SAND, organic SILT, and clayey SILT to 3.3 ft. Very dark gray fine-grained SAND with some medium-grained sand with mica flakes from 3.3 to 4.0 ft.
SD-311	8/16/04	17:40	on Artificial	12.5	NA	0 – 0.33	Clam shell and mud shrimp on surface. Medium to light brown SILT from 0 to 0.13 ft. Dark gray/black SILT with some woody debris and rocks from 0.13 to 0.33 ft. Rock caught in sampler jaws.
	8/19/04	16:45	A	7.9	100	1 – 2	Black clayey SILT with gravel.
						2 – 3	Black clayey SILT with gravel. Brick fragment at 3 ft.
						3 – 4	Black silty SAND.
SD-312	8/16/04	18:23	D	13.5	NA	0 – 0.33	Algae layer on surface. Medium brown SILT from 0 to 0.13 ft. Gray to black silty fine SAND with woody debris (creosote rich) from 0.13 to 0.33 ft. Slight hydrogen sulfide odor and sheen present in bottom layer.
	8/19/04	17:00	A	7.7	64	1 – 2	Black sandy SILT with woody debris (4" and smaller).
						2 – 3	Black silty SAND with 1" dark black layer at 2.7 ft.
						3 – 4	Black silty SAND.

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SEDIMENT SAMPLE RECORD

PROJECT NAME: **Lower Duwamish Triad** DATES: **8/16/04 – 8/19/04, 8/26/04-8/27/04**

LOCATION: **Duwamish River – offshore of Boeing Plant 2** CREW: **JW, RZ, RB, AS, GC, BC, VH** GEAR: **Van Veen (surface sampling) Vibrocorer (subsurface sampling)**

STATION LOCATION	DATE	TIME	REP. NO.	WATER DEPTH (ft	% REC	SAMPLE INTERVAL [a] (ft)	CHARACTERISTICE (COLOR, TYPE, DEBRIS, ODOR)
SD-313	8/16/04	19:02	G	13.8	NA	0 – 0.33	Brick on surface. Medium brown SILT with iron granules and shell fragments from 0 to 0.13 ft. Dark gray to black SILT with some sand and gravel (possibly slag) from 0.13 to 0.33 ft.
	8/19/04	19:58	C	14.4	56	1 – 2	Black clayey SILT.
						2 – 3	Black clayey SILT to 2.3 ft. Black silty SAND from 2.3 to 3 ft.
						3 – 4	Black silty SAND.
SD-314	8/17/04	16:45	F	12.5	NA	0 – 0.33	Olive brown fine sand on surface. Dark gray clayey SILT with some small and large rocks to 0.33 ft. Chunks of asphalt present throughout sample.
	8/18/04	18:07	B	13.8	60 E	1 – 2	Brown silty CLAY from 1.0 to 1.1 ft. Dark brown silty SAND from 1.1 to 2.0 ft.
						2 – 3	Light gray clayey SILT from 2.0 to 2.1 ft. Dark gray/black fine to medium SAND from 2.1 to 3.0 ft.
						3 – 3.3	Dark brown silty SAND.
SD-315	8/17/04	17:46	B	11.8	NA	0 – 0.33	Light brown SAND on surface. Dark grayish brown SILT with some sand, clay and fine woody debris.
	8/19/04	18:52	A	10.9	71	1 – 2	Dark brownish gray sandy SILT with trace woody debris from 1.0 to 1.2 ft. Black silty SAND from 1.2 to 2.0 ft.
						2 – 3	Black silty SAND.
						3 – 4	Black silty SAND.
SD-316	8/16/04	15:57	B	9.8	NA	0 – 0.33	Light brown surface with algae cover. Dark gray SILT with trace fine sand and woodchips.
	8/19/04	10:40	A	11.25	100	1 – 2	Black silty CLAY.
						2 – 3	Black silty CLAY.
						3 – 4	Black silty CLAY from 3.0 to 3.2 ft. Black silty SAND with trace clay and 2" piece of asphalt-like material from 3.2 to 4.0 ft.
SD-317	8/16/04	16:26	A	11.5	NA	0 – 0.33	Brown surface with algae cover. Dark gray sandy SILT with trace wood chips. No odor or sheen.
	8/19/04	09:55	B	11.75	78 E	1 – 2	Black silty CLAY from 1.0 to 1.4 ft. Black sandy SILT with trace clay from 1.4 to 2.0 ft.
						2 – 3	Black sandy SILT with trace clay.
						3 – 4	Black sandy SILT with gravel.

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SEDIMENT SAMPLE RECORD

PROJECT NAME: **Lower Duwamish Triad** DATES: **8/16/04 – 8/19/04, 8/26/04-8/27/04**

LOCATION: **Duwamish River – offshore of Boeing Plant 2** CREW: **JW, RZ, RB, AS, GC, BC, VH** GEAR: **Van Veen (surface sampling) Vibrocorer (subsurface sampling)**

STATION LOCATION	DATE	TIME	REP. NO.	WATER DEPTH (ft)	% REC	SAMPLE INTERVAL [a] (ft)	CHARACTERISTICE (COLOR, TYPE, DEBRIS, ODOR)
SD-318	8/16/04	16:12	A	10.2	NA	0 – 0.33	Light brown surface with algae. Dark gray SILT with trace sand and wood debris. No odor or sheen.
	8/18/04	17:00	B	9.2	67 E	0 – 1.5	Very dark gray SAND with mica. No debris.
SD-319	8/16/04	15:17	A	13.8	NA	0 – 0.33	Drab olive brown surface. Dark gray sandy (fine to medium) SILT with some small woodchips. No shells, odor, sheen, or debris.
	8/18/04	16:10	A	28.9	77 E	1 – 2	Black clayey SILT.
						2 – 3	Black clayey, sandy SILT with black sandy layer from 2.4 to 2.5 ft.
						3 - 4	Black clayey SILT from 3.0 to 3.5 ft. Black silty SAND from 3.5 to 4.0 ft.
SD-320	8/16/04	18:47	A	12.8	NA	0 – 0.33	Large, barnacle-covered rock (4") and algae on surface. Medium brown SILT with iron granules from 0 to 0.07 ft. Dark gray to black SILT with some sand, woody debris, and medium to large rocks from 0.07 to 0.33 ft. Isopod found in sediment.
	8/19/04	17:33	A	9.0	83	1 – 2	Black clayey SILT with brick, slag, and plastic wire debris to 1.2 ft. Black clayey SILT with some sand from 1.2 to 2.0 ft.
						2 – 3	Black clayey SILT with some sand.
						3 – 4	Black clayey SILT with some sand.
SD-321	8/16/04	14:23	A	19.0	NA	0 – 0.33	Drab olive brown surface. Dark gray SILT to 0.33 ft. Worm in sediment. No odor or sheen. Field duplicate collected (SD-324-0000).
	8/18/04	15:25	A	23.0	69 E	1 – 2	Black clayey SILT from 1.0 to 1.1 ft. Black silty SAND from 1.1 to 1.8 ft. Black clayey silt from 1.8 to 2.0 ft.
						2 – 3	Black clayey SILT with some sand.
						3 – 3.8	Black silty SAND.
SD-322	8/16/04	14:55	A	17.75	NA	0 – 0.33	Brown surface with dark gray SILT to 0.33 ft. Worms in sediment. No odor or sheen.
	8/18/04	11:20	C	21.25	73 E	1 – 2	Black silty CLAY.
						2 – 3	Black silty CLAY with woody debris.
						3 – 4	Black silty SAND with woody debris from 3 to 3.5 ft.
						4 – 5	Black silty SAND.
						5 – 6	Black silty SAND.

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SEDIMENT SAMPLE RECORD

PROJECT NAME: Lower Duwamish Triad

DATES: 8/16/04 – 8/19/04, 8/26/04-8/27/04

LOCATION: Duwamish River – offshore of Boeing Plant 2

CREW: JW, RZ, RB, AS, GC, BC, VH

GEAR: Van Veen (surface sampling) Vibrocorer (subsurface sampling)

STATION LOCATION	DATE	TIME	REP. NO.	WATER DEPTH (ft)	% REC	SAMPLE INTERVAL [a] (ft)	CHARACTERISTICE (COLOR, TYPE, DEBRIS, ODOR)
SD-323	8/17/04	16:30	B	7.8	NA	0 – 0.33	Medium brown on surface. Dark brown sandy silt with roots.
	8/19/04	18:27	A	11.35	60	1 – 2	Black sandy SILT with gravel.
						2 – 3	Black sandy SILT from 2.0 to 2.1 ft. Black silty CLAY with trace amounts of organic debris from 2.1 to 2.5 ft. Black silty CLAY with large pieces of woody debris from 2.5 to 3.0 ft.
						3 – 4	Black silty CLAY with large prices of woody debris from 3.0 to 2.1 ft. Black silty SAND from 3.1 to 4.0 ft.

REP. NO. Replicate number represents the sequential attempt at each station (Rep B is the second attempt).
% REC Percent recovery of subsurface core. Value was determined by dividing the total depth of sediment in core tube by the total depth of core tube penetration and multiplying by 100.
NA Not applicable.
E Percent recovery should be considered an estimate. Depth of core tube penetration was not based on actual measurement but was estimated based on physical indications on the core tube.
[a] Sample intervals were not adjusted based on percent recovery of the cores. The top of the sediment in each core tube was considered zero in measuring sample interval depth.

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SEDIMENT SAMPLE RECORD

PROJECT NAME: **Lower Duwamish Triad** DATES: **8/26/04 and 8/27/040**

LOCATION: **Duwamish River – offshore of Boeing Plant 2** CREW: **BC, AS** GEAR: **Van Veen (surface sampling)**

STATION LOCATION	DATE	TIME	REP. NO.	WATER DEPTH (ft)	% REC	SAMPLE INTERVAL (ft)	CHARACTERISTICE (COLOR, TYPE, DEBRIS, ODOR)
SD-206	8/26/04	12:30	A	13.8	NA	0 – 0.33	Light brown sandy SILT on surface (top 0.5 in). Black clayey SILT with small wood chips to 0.33 ft.
SD-207	8/26/04	13:12	A	17.7	NA	0 – 0.33	Light brown sandy SILT on surface (top 0.5 in). Black clayey SILT with organic material to 0.33 ft.
SD-208	8/26/04	13:35	A	18.4	NA	0 – 0.33	Light brown sandy SILT (top 1 in). Black clayey SILT with organic material to 0.33 ft.
SD-209	8/26/04	13:55	B	24.6	NA	0 – 0.33	Light brown sandy SILT (top 0.5 in). Black clayey SILT to 0.33 ft. Red worm found in sample.
SD-210	8/27/04	10:00	A	11.8	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Dark gray clayey SILT with some worms to 0.33 ft.
SD-211	8/27/04	10:20	A	9.8	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Dark gray clayey SILT with some worms and benthic shrimp to 0.33 ft.
SD-212	8/27/04	10:45	A	11.8	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Dark gray clayey SILT with worms to 0.33 ft.
SD-213	8/27/04	11:00	A	9.2	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Dark gray sandy SILT with woody debris and worms to 0.33 ft.
SD-214	8/27/04	11:20	A	14.4	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Dark gray clayey SILT with some woody debris and worms to 0.33 ft.
SD-215	8/27/04	12:35	A	15.7	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Black clayey SILT with organic material to 0.33 ft.
SD-216	8/26/04	18:25	A	23.6	NA	0 – 0.33	Light brown silty SAND (top 0.5 in). Dark brown clayey SILT to 0.33 ft.
SD-217	8/26/04	18:10	A	22.3	NA	0 – 0.33	Light brown silty SAND (top 0.5 in). Dark brown sandy SILT with woody debris to 0.33 ft.
SD-330	8/27/04	13:08	A	11.8	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Black clayey SILT with worms to 0.33 ft.
SD-331	8/27/04	13:25	A	12.5	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Black clayey SILT with woody debris to 0.33 ft.
SD-332	8/26/04	18:55	A	14.4	NA	0 – 0.33	Light brown silty SAND (top 0.5 in). Black clayey SILT with organic matter to 0.33 ft.
SD-333	8/27/04	15:45	E	14.6	NA	0 – 0.33	Brown silty SAND (top 1 in). Gray sandy SILT with organic matter and some gravel to 0.33 ft.
SD-334	8/26/04	17:11	A	16.4	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Dark gray silty SAND with trace gravel and trace organic debris to 0.33 ft.
SD-335	8/27/04	12:50	A	15.7	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Black clayey SILT with organic material to 0.33 ft.
SD-336	8/27/04	13:40	A	11.2	NA	0 – 0.33	Brown silty SAND (top 1 in). Dark gray sandy SILT some woody debris and gravel to 0.33 ft.
SD-337	8/27/04	14:07	C	11.8	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Black sandy SILT with minor gravel to 0.33 ft.
SD-338	8/26/04	16:50	F	13.8	NA	0 – 0.33	Brown silty SAND (top 1 in). Black clayey SILT with worms, some organic matter and small fragments of woody debris to 0.33 ft.
SD-339	8/26/04	16:15	F	14.4	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Dark gray silty CLAY to 0.33 ft.
SD-340	8/26/04	18:38	A	15.7	NA	0 – 0.33	Light brown silty SAND (top 0.5 in). Dark brown clayey SILT to 0.33 ft.
SD-341	8/26/04	15:15	C	13.1	NA	0 – 0.33	Brown gravelly SAND with silt, woody debris. Macrophytic algae on surface.

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SEDIMENT SAMPLE RECORD

PROJECT NAME: **Lower Duwamish Triad** DATES: **8/26/04 and 8/27/04**

LOCATION: **Duwamish River – offshore of Boeing Plant 2** CREW: **BC and AS** GEAR: **Van Veen (surface sampling)**

STATION LOCATION	DATE	TIME	REP. NO.	WATER DEPTH (ft)	% REC	SAMPLE INTERVAL (ft)	CHARACTERISTICE (COLOR, TYPE, DEBRIS, ODOR)
SD-342	8/27/04	14:36	A	2.6	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Black clayey SILT with some woody debris to 0.33 ft.
SD-343	8/27/04	14:57	A	13.1	NA	0 – 0.33	Brown silty SAND (top 1 in). Black sandy SILT with large woody debris fragments and some gravel to 0.33 ft. Sulfur odor present.
SD-344	8/26/04	15:00	D	13.8	NA	0 – 0.33	Homogenous brown-orange gravelly SAND with rust mottling, silt, sticks, woody debris metal fork.
SD-345	8/26/04	17:30	B	14.4	NA	0 – 0.33	Brown silty SAND (top 0.5 in). Dark gray silty SAND to 0.33 ft.

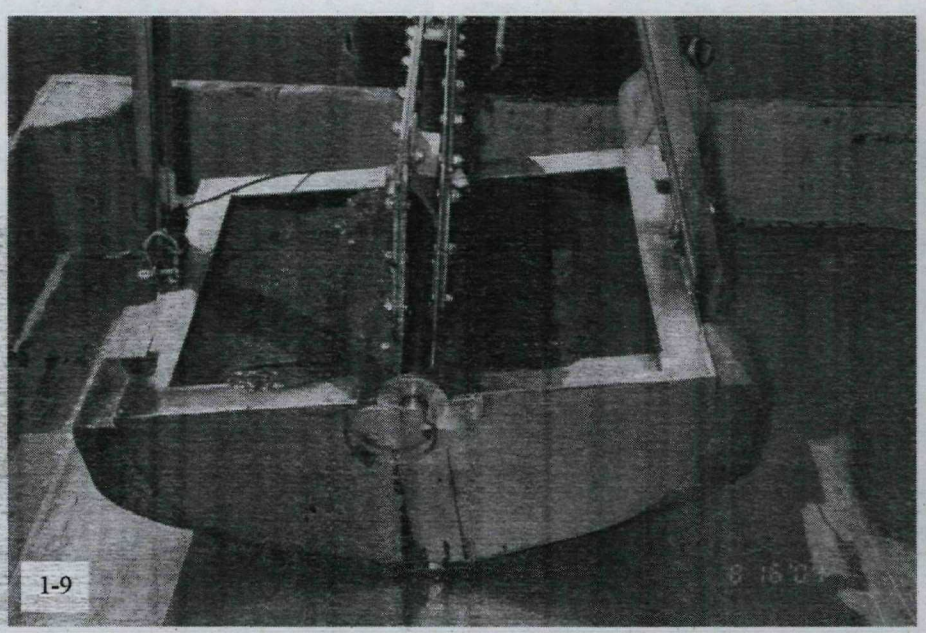
REP. NO. Replicate number represents the sequential attempt at each station (Rep B is the second attempt).
% REC Percent recovery of subsurface core. Value was determined by dividing the total depth of sediment in core tube by the total depth of core tube penetration and multiplying by 100.
NA Not applicable.

Appendix B: Summary Photographic Documentation

Lower Duwamish Triad Sampling Event
Seattle, Washington
Summary Photographic Log

Photo Number	Photo Description
1-9	Van Veen surface sample grab at station SD-322, replicate A.
1-10	Homogenized sample SD-322-0000 in stainless steel bowl.
1-17	Van Veen surface sample at station SD-318, replicate A, with both access doors open.
1-18	Homogenized sample SD-318-0000 in stainless steel bowl.
1-19	Van Veen surface sample at station SD-317, replicate A.
1-20	Homogenized sample SD-317-0000 in stainless steel bowl.
1-23	Van Veen surface sample at station SD-307, replicate A.
1-24	Sediment layers in sample SD-307-0000.
2-1	Van Veen surface sample at station SD-309, replicate A.
2-2	Homogenized sample SD-309-0000 in stainless steel bowl.
2-13	Van Veen surface sample at station SD-314, replicate F.
2-14	Homogenized sample SD-314-0000 (Rep F) in stainless steel bowl.
2-18	Sediment core from station SD-322- depths as shown.
2-19	Sediment core from station SD-322- depths as shown.
2-20	Observed sheen on ship deck from bottom of sediment core at station SD-313 (rep A).
2-33	Processed sediment core from location SD-314. Photos 2-33 to 2-34 taken from top to bottom of core.
2-34	Processed sediment core from location SD-314. Photos 2-33 to 2-34 taken from top to bottom of core.
2-35	Sample SD-314-0001 homogenized in stainless steel bowl.
2-36	Sample SD-314-0002 homogenized in stainless steel bowl.
2-37	Sample SD-314-0003 homogenized in stainless steel bowl.
4-5	Processed sediment core from location SD-309. Photos 4-5 through 4-7 taken from top to bottom of core.
4-6	Processed sediment core from location SD-309. Photos 4-5 through 4-7 taken from top to bottom of core.
4-7	Processed sediment core from location SD-309. Photos 4-5 through 4-7 taken from top to bottom of core.
4-8	Sample SD-309-0001 homogenized in stainless steel bowl.
4-9	Sample SD-309-0002 homogenized in stainless steel bowl.

Photo Number	Photo Description
4-10	Sample SD-309-0003 homogenized in stainless steel bowl.
4-15	Processed sediment core from location SD-317. Photos 4-15 through 4-17 taken from top to bottom of core.
4-16	Processed sediment core from location SD-317. Photos 4-15 through 4-17 taken from top to bottom of core.
4-17	Processed sediment core from location SD-317. Photos 4-15 through 4-17 taken from top to bottom of core.
4-18	Sample SD-317-0001 homogenized in stainless steel bowl.
4-19	Sample SD-317-0002 homogenized in stainless steel bowl.
4-20	Sample SD-317-0003 homogenized in stainless steel bowl.
6-3	Van Veen surface sample at station SD-344.
6-4	Homogenized sample SD-344-0000 in stainless steel bowl.
7-6	Van Veen surface sample at station SD-211.
7-7	Homogenized sample SD-211-0000 in stainless steel bowl.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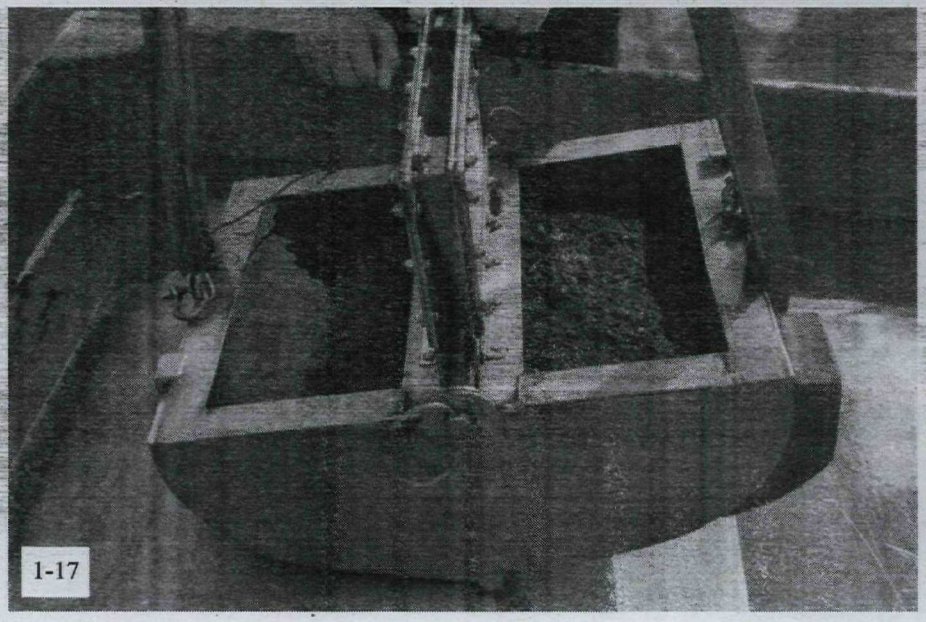
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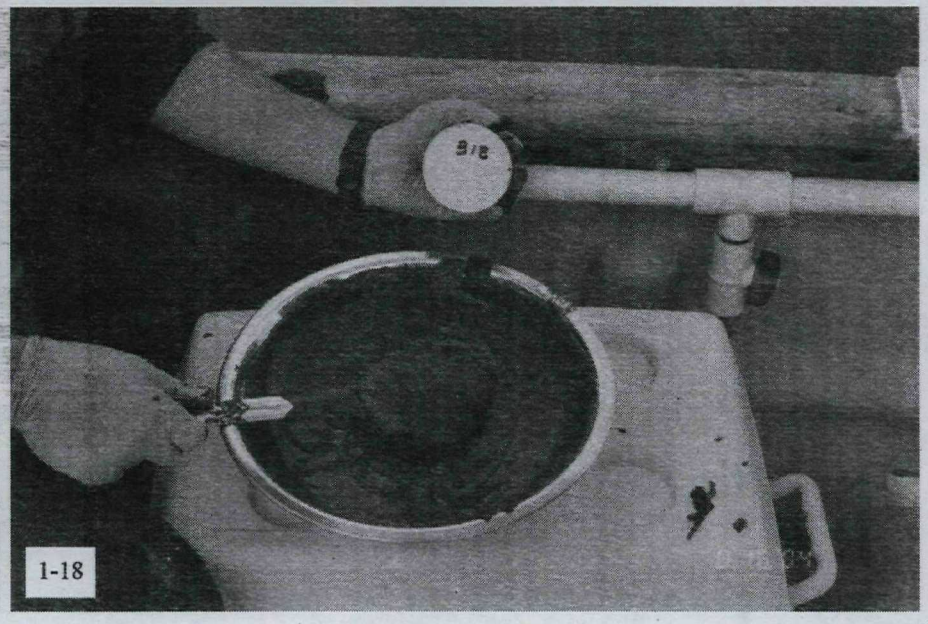
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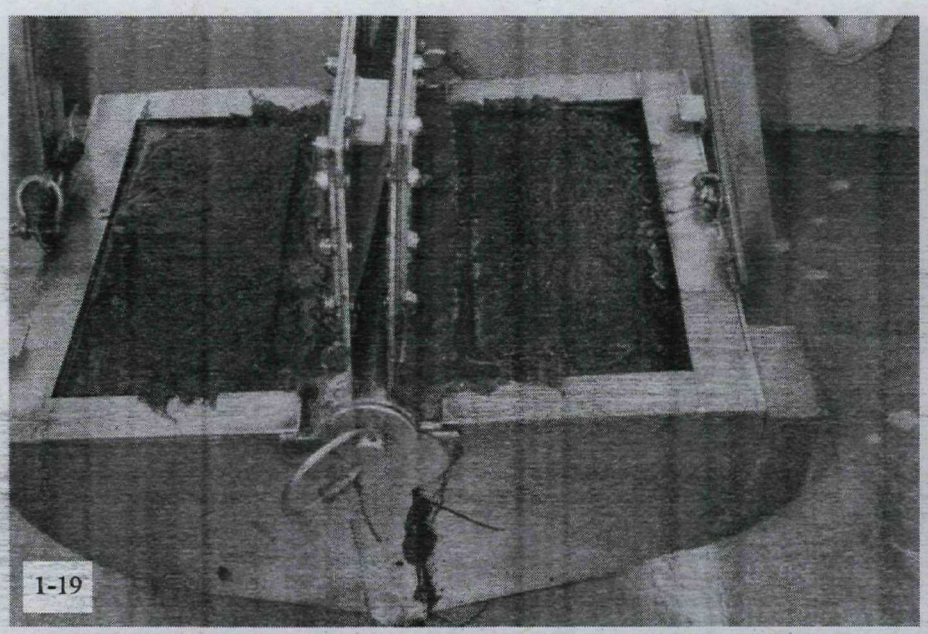
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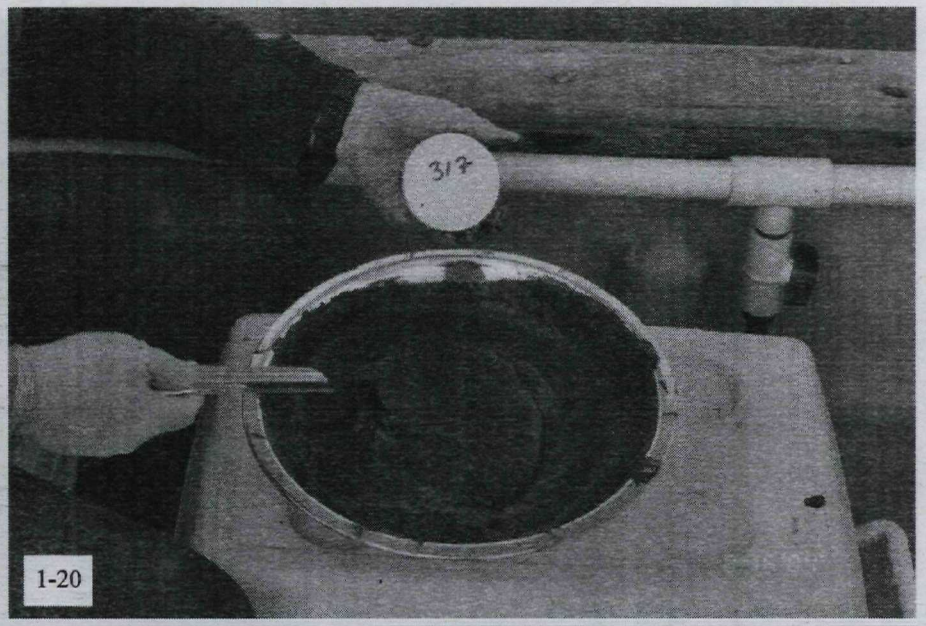
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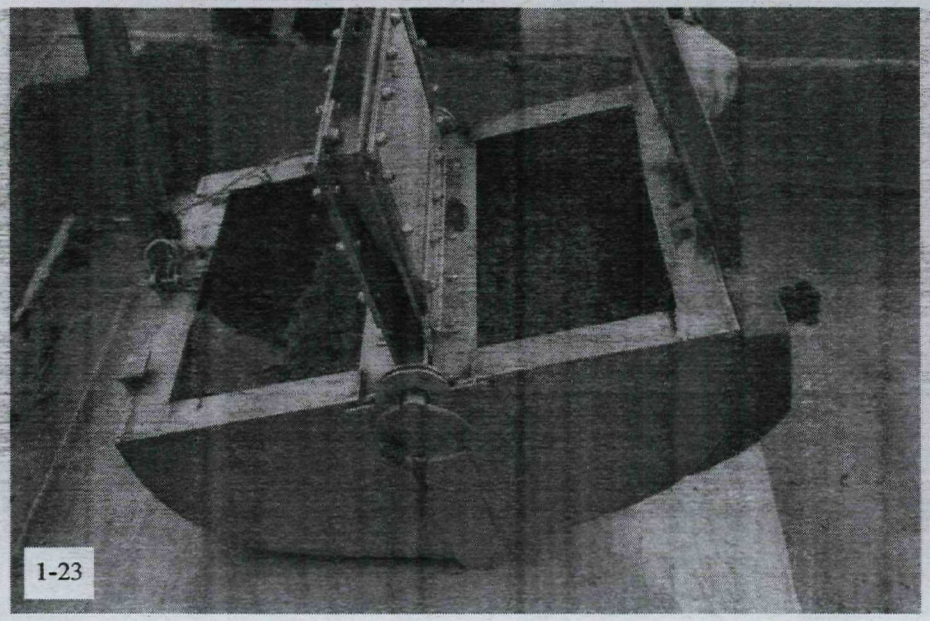
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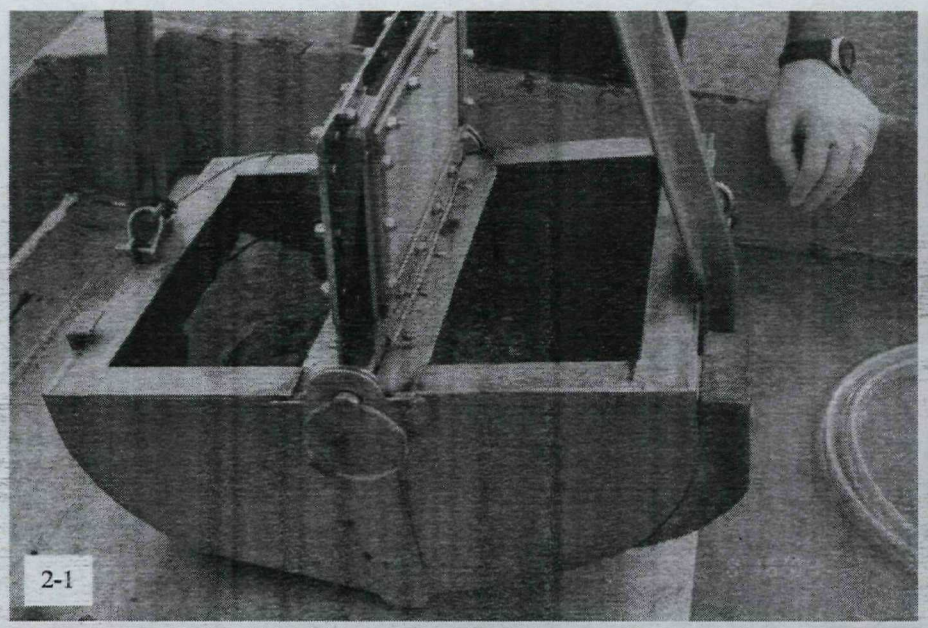

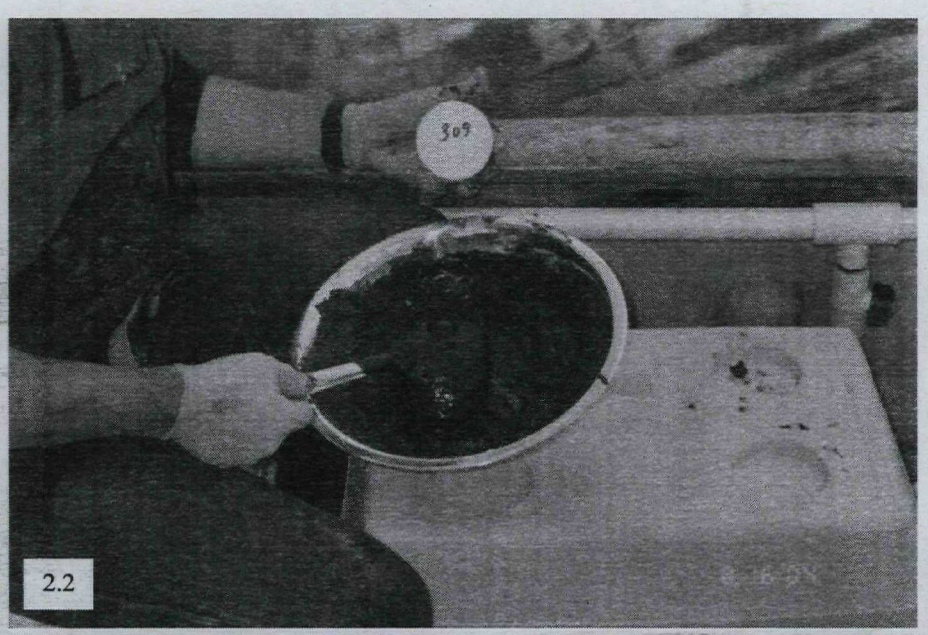

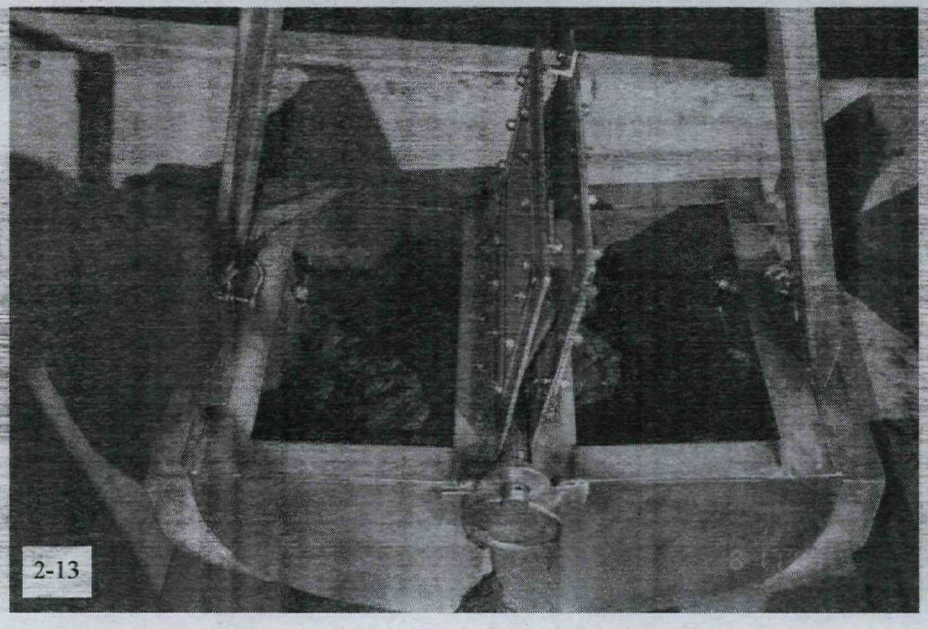

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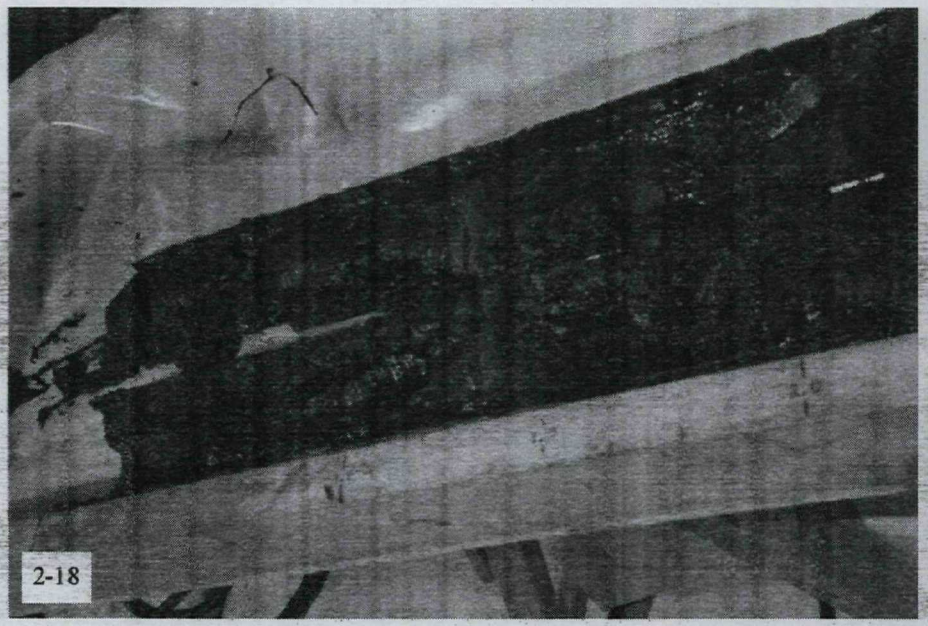
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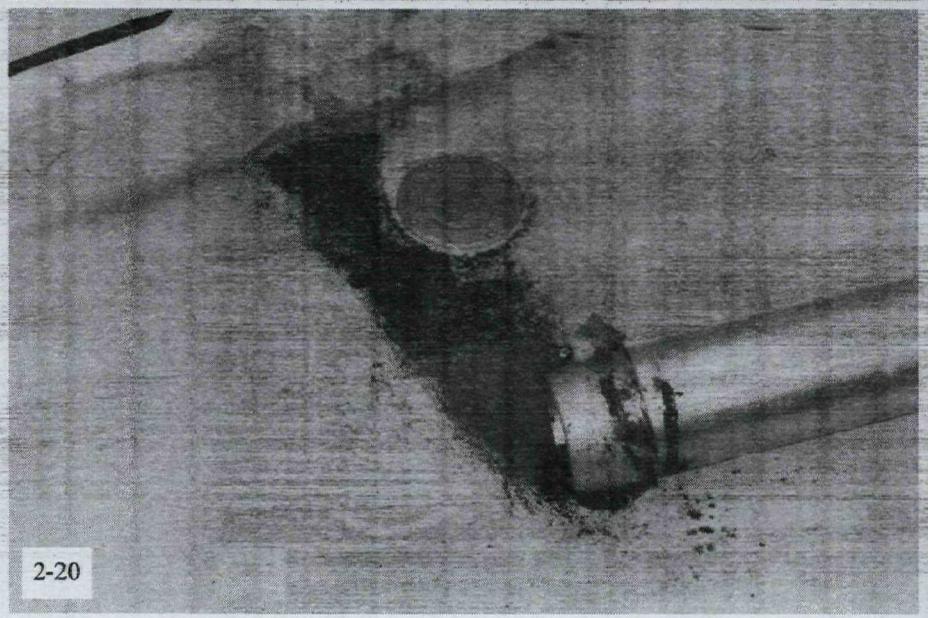
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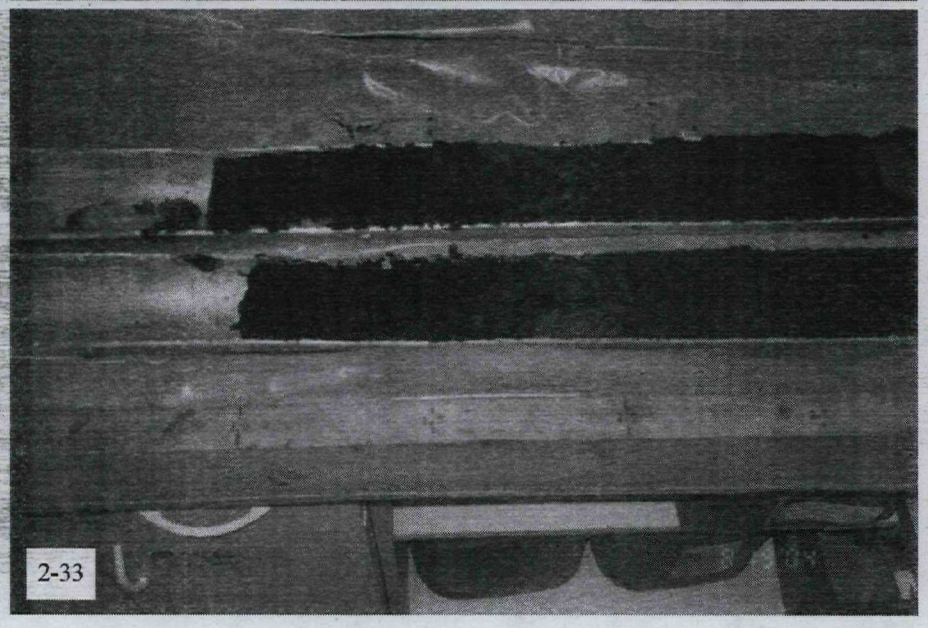
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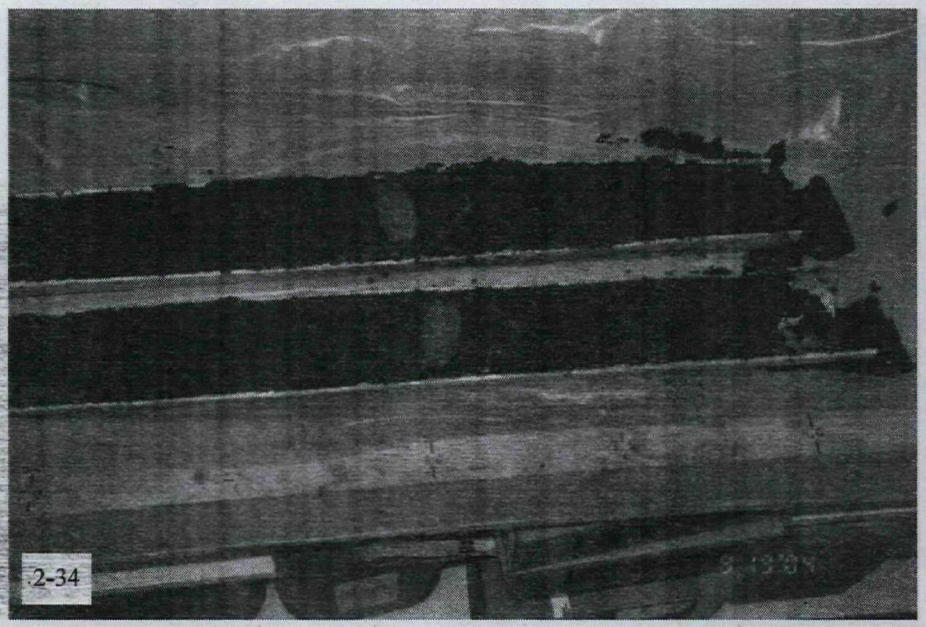
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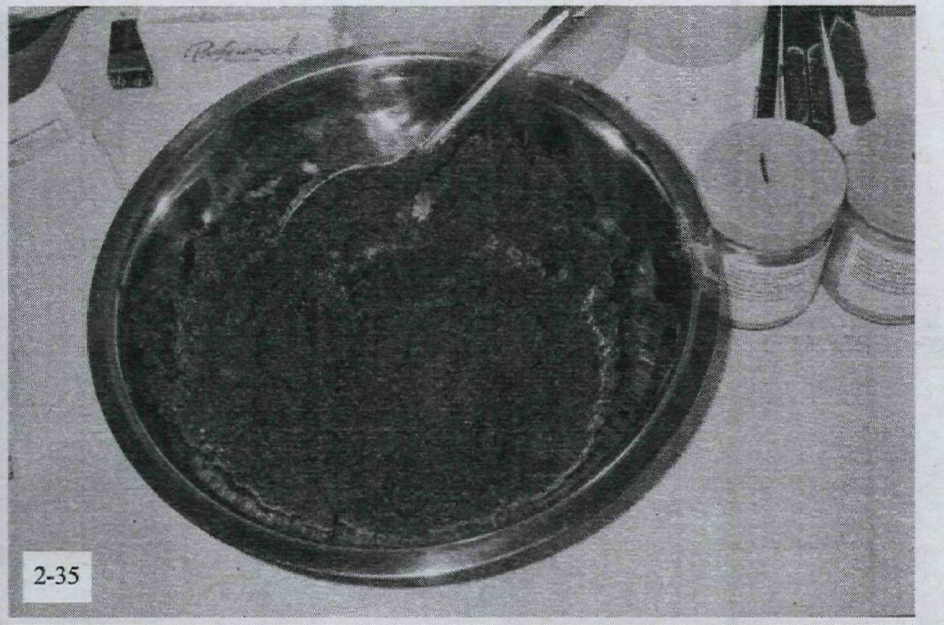
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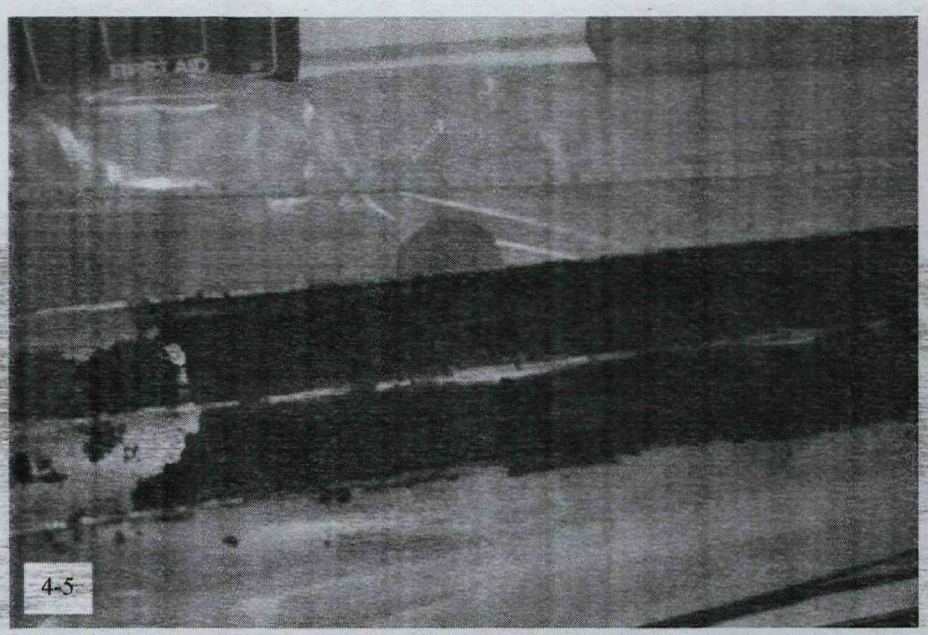

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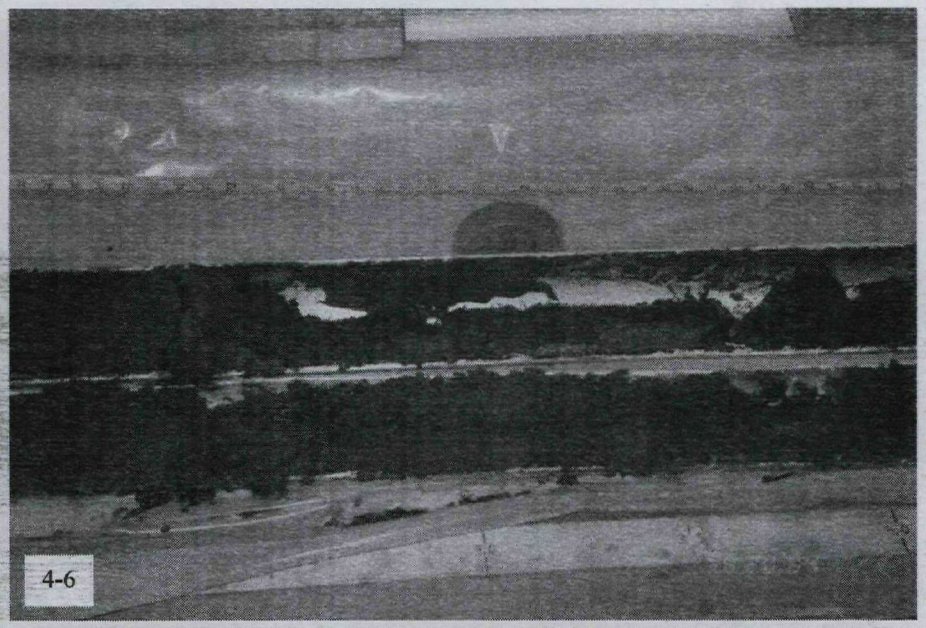

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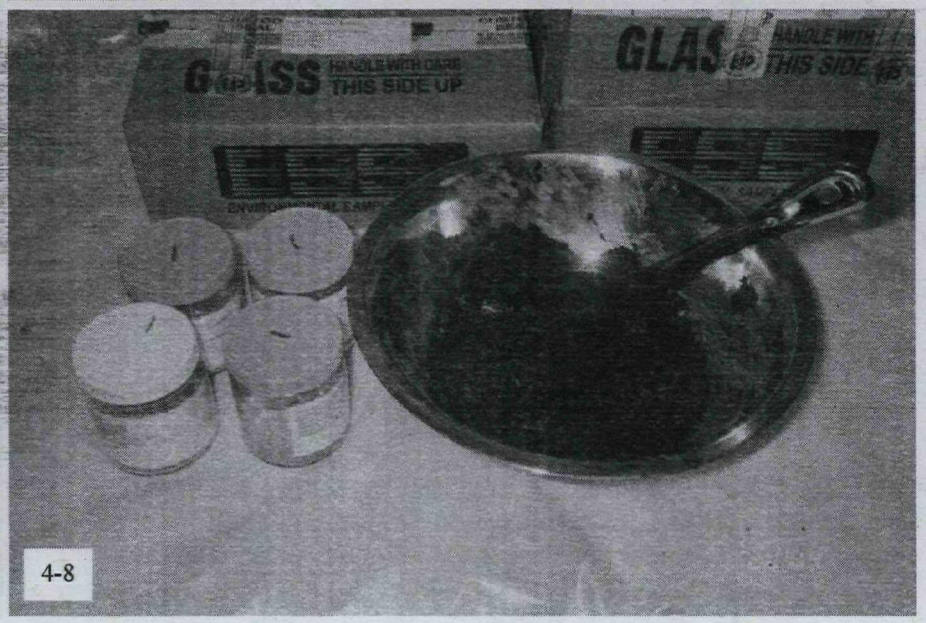
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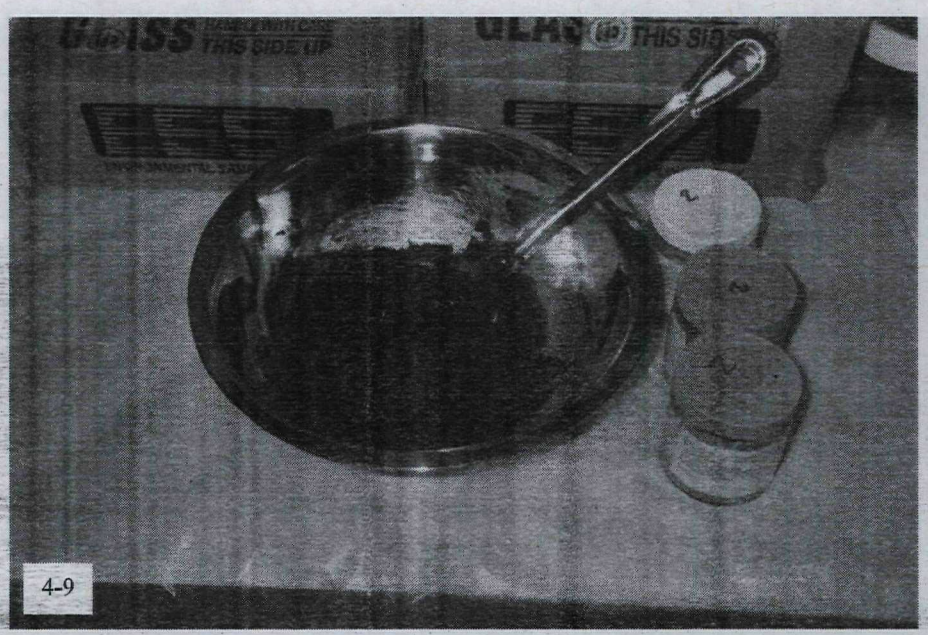

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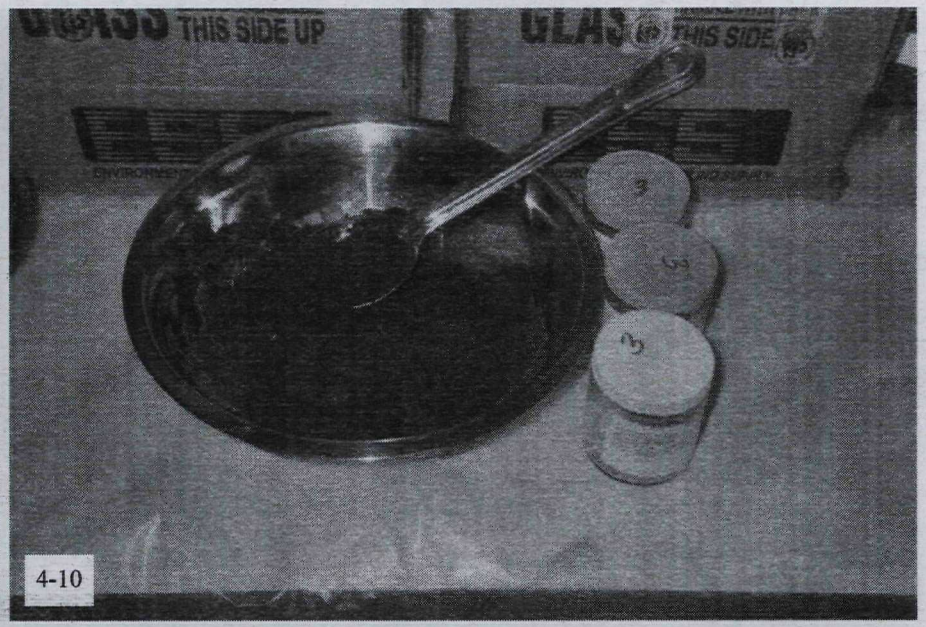

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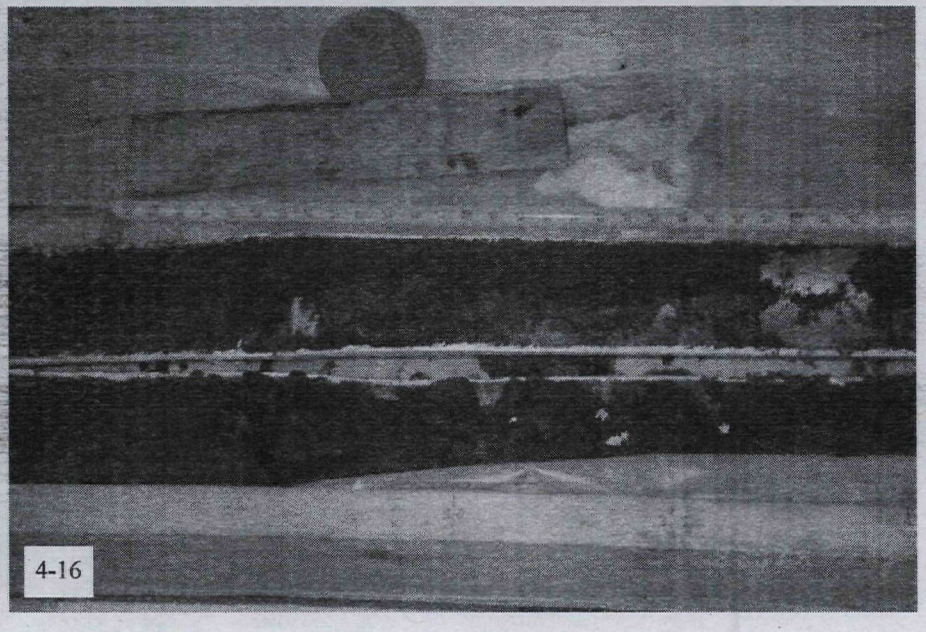

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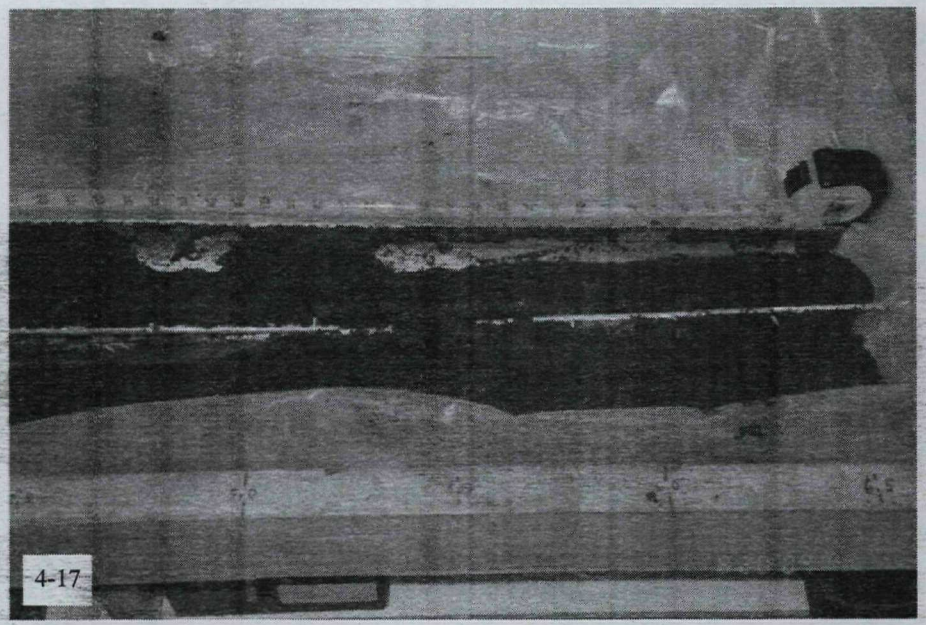

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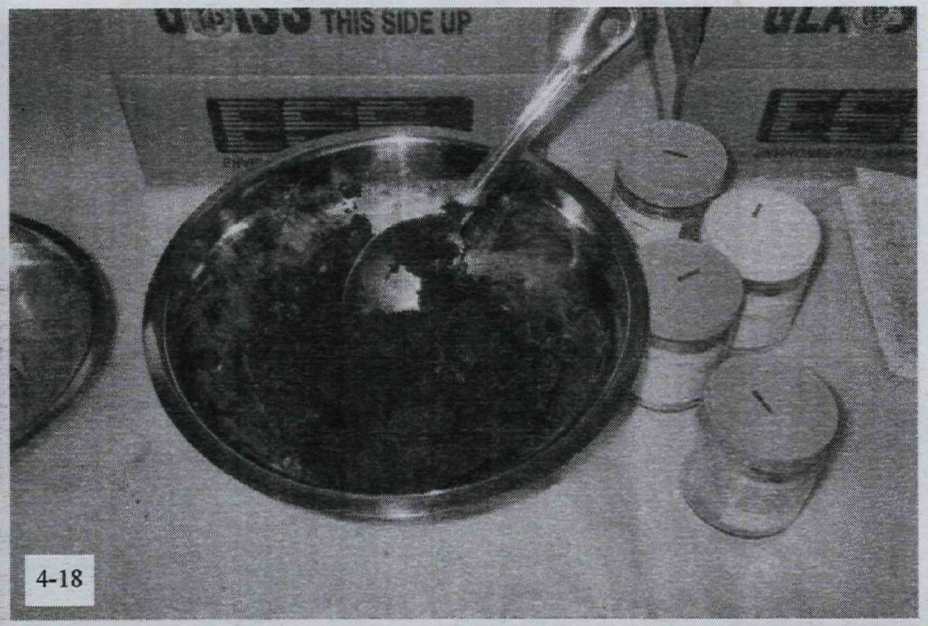

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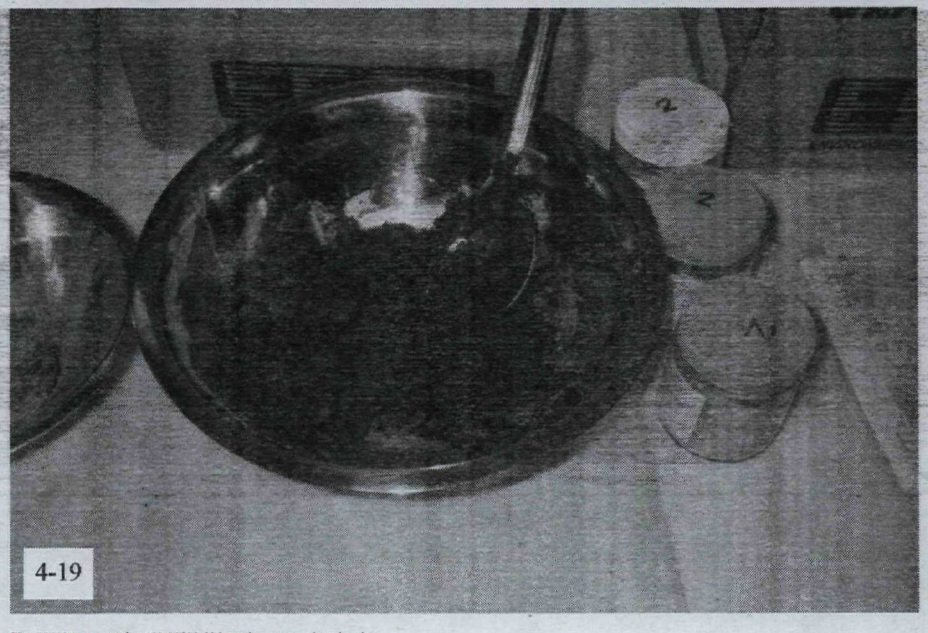

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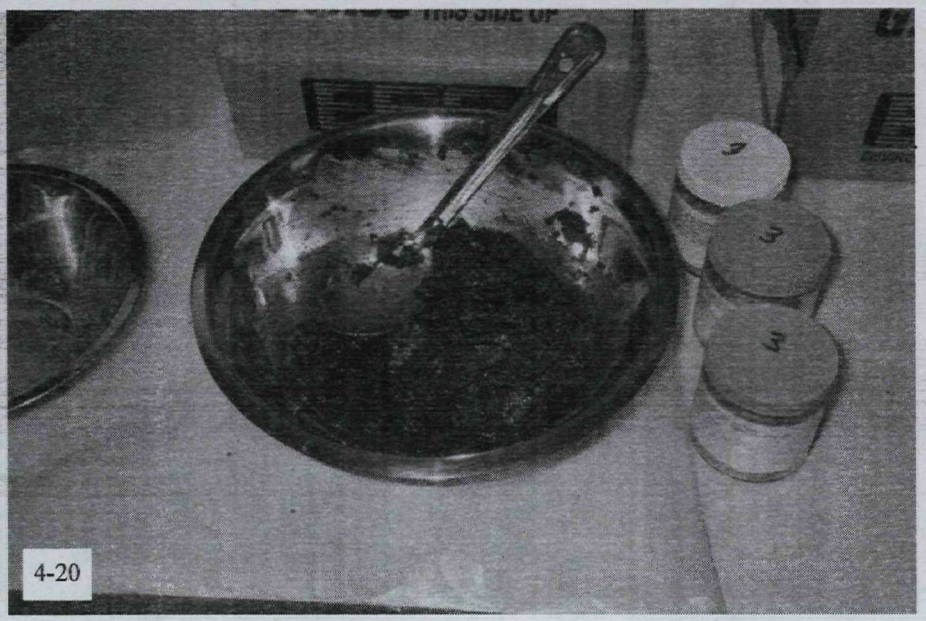

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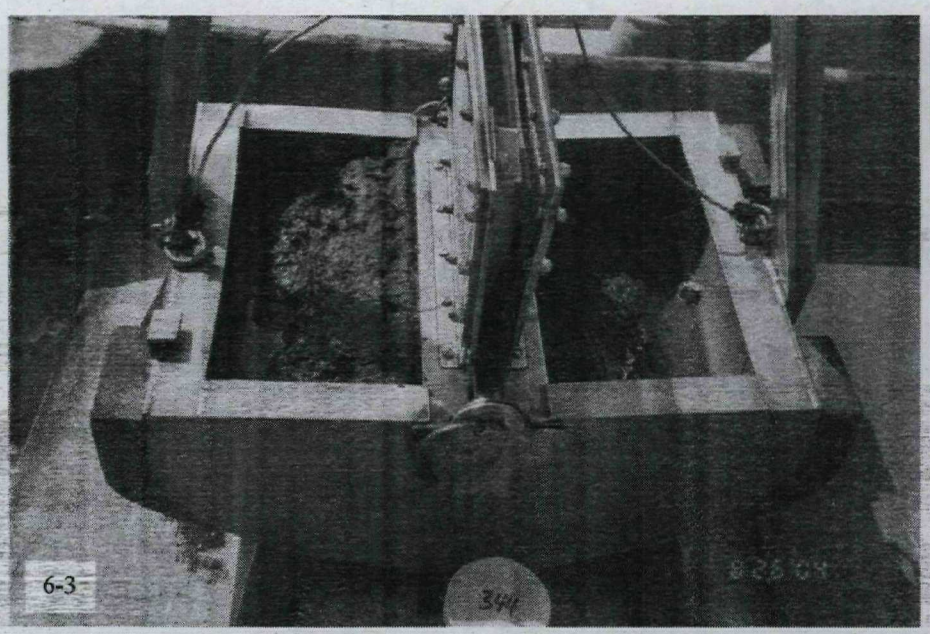
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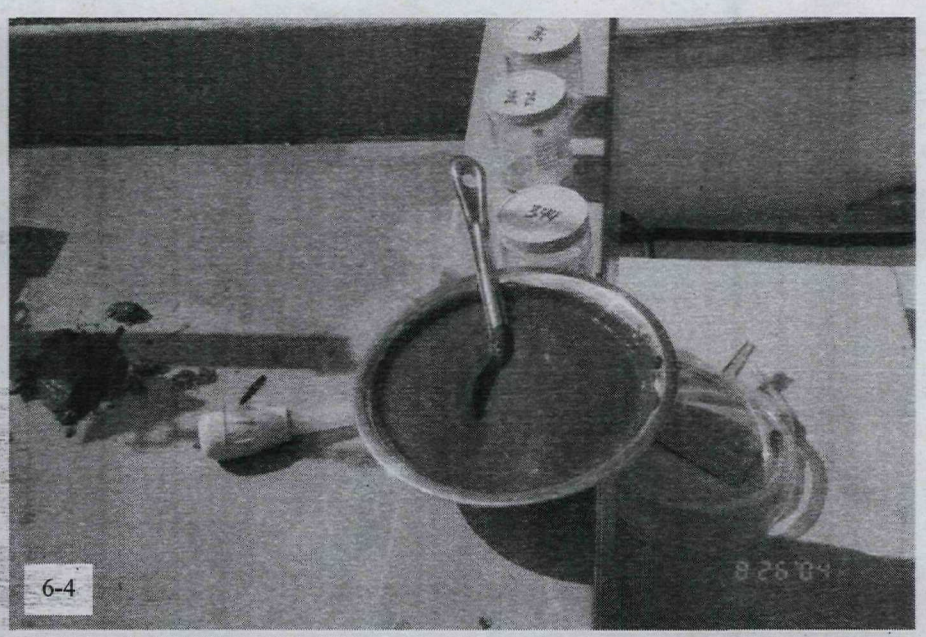
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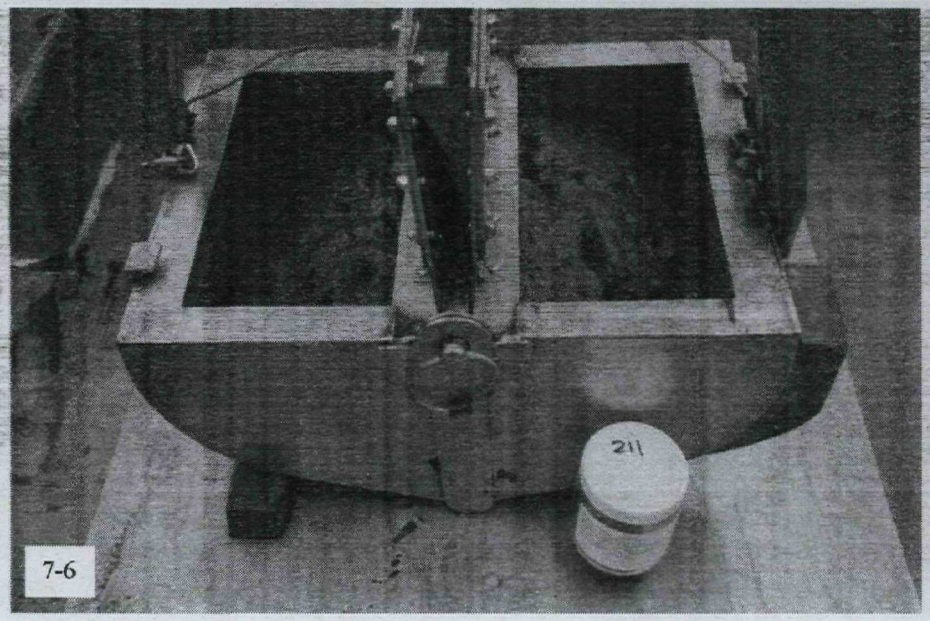
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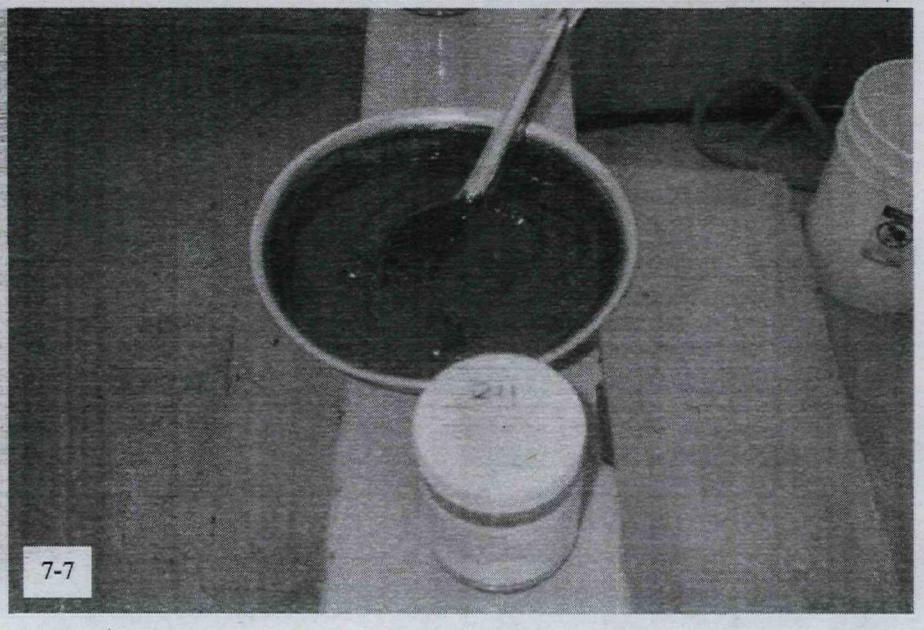
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211

Appendix C: Station Location Coordinates

Table C-1. Planned and final field station location coordinates for the Lower Duwamish Triad sampling event.

Station ID	Station Coordinates [a]					
	Planned Station Location		Final Surface Grab Location		Final Subsurface Core Location	
	Northing	Easting	Northing	Easting	Northing	Easting
SD-DUW-307	195686	1275819	195684	1275819	195673	1275804
SD-DUW-309	195579	1275858	195580	1275858	195576	1275839
SD-DUW-310	195518	1275879	195517	1275880	195514	1275867
SD-DUW-311	195458	1275906	195457	1275909	195460	1275899
SD-DUW-312	195430	1275928	195427	1275912	195427	1275919
SD-DUW-313	195308	1275972	195311	1275946	195309	1275932
SD-DUW-314	195231	1275992	195235	1275968	195237	1275967
SD-DUW-315	195158	1276004	195159	1276003	195159	1275999
SD-DUW-316	195652	1275820	195650	1275820	195647	1275802
SD-DUW-317	195624	1275838	195624	1275837	195632	1275821
SD-DUW-318	195542	1275864	195543	1275863	195550	1275868
SD-DUW-319	195438	1275874	195433	1275871	195435	1275867
SD-DUW-320	195386	1275930	195387	1275927	195382	1275925
SD-DUW-321	195768	1275591	195765	1275593	195768	1275600
SD-DUW-322	195315	1275871	195314	1275870	195311	1275864
SD-DUW-323	195355	1275948	195348	1275946	195347	1275938
SD-DUW-206	195606	1275811	195606	1275814	NA	NA
SD-DUW-207	195555	1275827	195554	1275827	NA	NA
SD-DUW-208	195511	1275851	195512	1275852	NA	NA
SD-DUW-209	195418	1275852	195410	1275860	NA	NA
SD-DUW-210	195366	1275875	195365	1275875	NA	NA
SD-DUW-211	195322	1275905	195319	1275903	NA	NA
SD-DUW-212	195278	1275903	195278	1275905	NA	NA
SD-DUW-213	195577	1275816	195579	1275818	NA	NA
SD-DUW-214	195231	1275902	195230	1275903	NA	NA
SD-DUW-215	195467	1275849	195464	1275851	NA	NA
SD-DUW-216	195184	1275932	195185	1275934	NA	NA
SD-DUW-217	195130	1275950	195131	1275949	NA	NA
SD-DUW-330	195628	1275810	195629	1275811	NA	NA
SD-DUW-331	195610	1275830	195608	1275828	NA	NA
SD-DUW-332	195567	1275853	195566	1275858	NA	NA
SD-DUW-333	195596	1275856	195589	1275849	NA	NA
SD-DUW-334	195473	1275893	195473	1275890	NA	NA
SD-DUW-335	195444	1275852	195446	1275854	NA	NA
SD-DUW-336	194948	1276033	194947	1276034	NA	NA

Table C-1 (continued). Planned and final field station location coordinates for the Lower Duwamish Triad sampling event.

Station ID	Station Coordinates [a]					
	Planned Station Location		Final Surface Grab Location		Final Subsurface Core Location	
	Northing	Easting	Northing	Easting	Northing	Easting
SD-DUW-337	195270	1275948	195270	1275948	NA	NA
SD-DUW-338	195297	1275991	195306	1275944	NA	NA
SD-DUW-339	195210	1276004	195214	1275963	NA	NA
SD-DUW-340	195383	1275907	195381	1275908	NA	NA
SD-DUW-341	195672	1275843	195676	1275827	NA	NA
SD-DUW-342	195406	1275922	195406	1275922	NA	NA
SD-DUW-343	195528	1275875	195527	1275875	NA	NA
SD-DUW-344	195705	1275820	195707	1275799	NA	NA
SD-DUW-345	195135	1275986	195135	1275985	NA	NA

[a] Coordinates are North American Datum (NAD) of 1983 State Plane Washington North.
NA Not applicable.

Appendix D: Samples Submitted for Laboratory Analysis

Table D-1. Phase 2 sediment samples collected and analyzed for the Lower Duwamish Triad sampling event.

Sample ID	Regional Sample ID	SPAWAR	Analytical Resources, Inc					EPA Region 10 Environmental Laboratory			
		PCBs (4020)	TOC	GS	Hg	SVOC	TCLP Pb	PCBs (8082)	Metals	SVOC/PCB [a]	SVOC
SD-307-0000	04344100	X	X	X	O	O			X	X	
SD-307-0001	04344101	X	X					X	X		
SD-307-0002	04344102	X	X					X			
SD-307-0003	04344103	X	X					X			
SD-309-0000	04344104	X	X	X	O	O			X	X	
SD-309-0001	04344105	X	X					X	X		
SD-309-0002	04344106	X	X					X			
SD-309-0003	04344107	X	X					X			
SD-310-0000	04344108	X	X	X	O	O			X	X	
SD-310-0001	04344109	X	X					X	X		
SD-310-0002	04344110	X	X					X			
SD-310-0003	04344111	X	X					X			
SD-311-0000	04344112	X	X	X	O	O			X	X	
SD-311-0001	04344113	X	X					X	X		
SD-311-0002	04344114	X	X					X			
SD-311-0003	04344115	X	X					X			
SD-312-0000	04344116	X	X	X	O	O			X	X	
SD-312-0001	04344117	X	X					X	X		
SD-312-0002	04344118	X	X					X			
SD-312-0003	04344119	X	X					X			
SD-313-0000	04344120	X	X	X	O	O			X	X	
SD-313-0001	04344121	X	X		O	O		X	X		
SD-313A-0001 [b]	04344174										X
SD-313-0002	04344122	X	X					X			
SD-313-0003	04344123	X	X					X			
SD-314-0000	04344124	X	X	X	O	O			X	X	
SD-314-0001	04344125	X	X					X	X		
SD-314-0002	04344126	X	X					X			
SD-314-0003	04344127	X	X					X			
SD-315-0000	04344128	X	X	X	O	O			X	X	
SD-315-0001	04344129	X	X					X	X		
SD-315-0002	04344130	X	X					X			
SD-315-0003	04344131	X	X					X			
SD-316-0000	04344132	X	X	X	O	O			X	X	
SD-316-0001	04344133	X	X					X	X		
SD-316-0002	04344134	X	X					X			
SD-316-0003	04344135	X	X					X			
SD-317-0000	04344136	X	X	X	O	O			X	X	
SD-317-0001	04344137	X	X					X	X		
SD-317-0002	04344138	X	X					X			
SD-317-0003	04344139	X	X					X			
SD-318-0000	04344140	X	X	X	O	O			X	X	
SD-318-0001	04344141	X	X					X	X		
SD-319-0000	04344144	X	X	X	O	O			X	X	
SD-319-0001	04344145	X	X					X	X		
SD-319-0002	04344146	X	X					X			

Table D-1 (continued). Phase 2 sediment samples collected and analyzed for the Lower Duwamish Triad sampling event.

Sample ID	Regional Sample ID	SPAWAR	Analytical Resources, Inc					EPA Region 10 Environmental Laboratory			
		PCBs (4020)	TOC	GS	Hg	SVOC	TCLP Pb	PCBs (8082)	Metals	SVOC/PCB [a]	SVOC
SD-319-0003	04344147	X	X					X			
SD-320-0000	04344148	X	X	X	O	O			X	X	
SD-320-0001	04344149	X	X					X	X		
SD-320-0002	04344150	X	X					X			
SD-320-0003	04344151	X	X					X			
SD-321-0000	04344152	X	X	X	O	O			X	X	
SD-321-0001	04344153	X	X					X	X		
SD-321-0002	04344154	X	X					X			
SD-321-0003	04344155	X	X					X			
SD-322-0000	04344158	X	X	X	O	O			X	X	
SD-322-0001	04344159	X	X					X	X		
SD-322-0002	04344160	X	X					X			
SD-322-0003	04344161	X	X					X			
SD-322-0004	04344162	X	X					X			
SD-322-0005	04344163	X	X					X			
SD-323-0000	04344164	X	X	X	O	O			X	X	
SD-323-0001	04344165	X	X					X	X		
SD-323-0002	04344166	X	X					X			
SD-323-0003	04344167	X	X					X			
SD-324-0000[c]	04344168	X	X	X	O	O			X	X	
SD-325-0000[c]	04344169	X	X		O	O			X	X	
SD-326-0001[c]	04344170	X	X					X			
SD-327-0002[c]	04344171	X						X			
SD-328-0003[c]	04344172	X	X								
SD-434[d]	04344173							X	X		X
WD01[e]	NA						X				

O Sample analysis added after sampling event was complete. Analysis performed using sample jar submitted for TOC.
PCBs (4020) polychlorinated biphenyls (PCBs) by EPA method 4020 (immunoassay).
TOC Total organic carbon by modified EPA method 9060.
GS Grain size by Puget Sound Estuary Program (PSEP) protocols.
Hg Mercury by EPA method 7471A.
PCBs (8082) PCBs by EPA method 8082.
SVOCs Semivolatile organic compounds by EPA method 8260B.
TCLP Pb Lead by the toxicity characteristic leaching procedure (TCLP) (EPA methods 1311 and 6010B).
Metals Metals by EPA method 6010B.

[a] SVOC/PCB = Analyzed for PCBs by EPA method 8082 and then archived (frozen) for SVOC analysis at a later date, if needed.
[b] Sample SD-313A-0001 collected from a rejected core attempt at location SD-321 because a sheen was observed.
[c] Field duplicate of primary sample.
[d] Sample SD-434 is a rinsate sample.
[e] Sample WD01 collected from investigation derived waste (IDW) buckets to determine disposal requirement.

Shaded cells indicate that sample was submitted as a "contingency" sample; sample jars were archived (frozen) upon laboratory receipt (samples may be analyzed at a future date based on project decisions).

NA Not applicable
SPAWAR U.S. Navy Space and Naval Warfare Systems Center laboratory in San Diego, California.

Table D-2. Phase 3 sediment samples collected and analyzed for the Lower Duwamish Triad sampling event.

Sample ID	Regional Sample ID	SPAWAR	Analytical Resources, Inc				EPA Region X Environmental Laboratory	
		PCBs (4020)	TOC	GS	Hg	TCLP Pb	PCBs (8082)	Metals
SD-206-0000	04354000	X	X				X	
SD-207-0000	04354001	X	X				X	
SD-208-0000	04354002	X	X				X	
SD-209-0000	04354003	X	X				X	
SD-210-0000	04354004	X	X				X	
SD-211-0000	04354005	X	X				X	
SD-212-0000	04354006	X	X				X	
SD-213-0000	04354007	X	X				X	
SD-214-0000	04354008	X	X				X	
SD-215-0000	04354009	X	X				X	
SD-216-0000	04354010	X	X				X	
SD-217-0000	04354011	X	X				X	
SD-330-0000	04354012	X	X				X	
SD-331-0000	04354013	X	X				X	
SD-332-0000	04351014	X	X				X	
SD-333-0000	04354015	X	X	X	O		X	X
SD-334-0000	04354016	X	X				X	
SD-335-0000	04354017	X	X				X	
SD-336-0000	04354018	X	X				X	
SD-337-0000	04354019	X	X	X			X	X
SD-338-0000	04354020	X	X				X	
SD-339-0000	04354021	X	X				X	
SD-340-0000	04354022	X	X				X	
SD-341-0000	04354023	X	X		O		X	
SD-342-0000	04354024	X	X	X			X	X
SD-343-0000	04354025	X	X				X	
SD-344-0000	04354026	X	X				X	
SD-345-0000	04354027	X	X				X	
SD-431[a]	04354031	X	X	X			X	X
SD-432[a]	04354032	X	X				X	
SD-433[a]	04354033	X	X				X	
WD02[b]	NA					X		

O Sample analysis added after sampling event was complete. Analysis performed using sample jar submitted for TOC.
PCBs (4020) Polychlorinated biphenyls (PCBs) by immunoassay.
TOC Total organic carbon by EPA method 9060.
GS Grain size by PSEP protocols.
Hg Mercury by EPA method 7471A.
TCLP Pb Lead by the toxicity characteristic leaching procedure (TCLP) (EPA methods 1311 and 6010B).
PCBs (8082) PCBs by EPA method 8082.
[a] Field duplicate of primary sample.
[b] Sample WD02 collected from investigation derived waste (IDW) buckets to determine disposal requirement.
Shaded cells indicate that sample was submitted as a "contingency" sample; sample jars were archived (frozen) upon laboratory receipt (samples may be analyzed at a future date based on project decisions).
NA Not applicable.
SPAWAR U.S. Navy Space and Naval Warfare Systems Center laboratory in San Diego, California.

Appendix E: Analytical Results from ARI

Table E-1. Phase 2 total organic carbon analytical results for the Lower Duwamish Triad sampling event.

Sample ID	TOC (percent)
SD-307-0000	2.20
SD-307-0001	0.800
SD-307-0002	0.226
SD-307-0003	0.317
SD-309-0000	2.21
SD-309-0001	1.77
SD-309-0002	1.32
SD-309-0003	0.941
SD-310-0000	1.98
SD-310-0001	1.54
SD-310-0002	1.50
SD-310-0003	0.986
SD-311-0000	1.84
SD-311-0001	1.06
SD-311-0002	1.45
SD-311-0003	0.725
SD-312-0000	2.58
SD-312-0001	1.09
SD-312-0002	0.134
SD-312-0003	0.130
SD-313-0000	2.22
SD-313-0001	1.81
SD-313-0002	0.947
SD-313-0003	1.18
SD-314-0000	1.66
SD-314-0001	2.44
SD-314-0002	0.237
SD-314-0003	0.428
SD-315-0000	1.57
SD-315-0001	0.218
SD-315-0002	0.305
SD-315-0003	0.183
SD-316-0000	2.25
SD-316-0001	1.66
SD-316-0002	1.87
SD-316-0003	1.53
SD-317-0000	2.58
SD-317-0001	2.00

Table E-1 (continued). Phase 2 total organic carbon analytical results for the Lower Duwamish Triad sampling event.

Sample ID	TOC (percent)
SD-317-0002	2.11
SD-317-0003	0.816
SD-318-0000	2.05
SD-318-0001	0.824
SD-319-0000	1.74
SD-319-0001	1.80
SD-319-0002	2.22
SD-319-0003	1.81
SD-320-0000	1.62
SD-320-0001	2.24
SD-320-0002	2.39
SD-320-0003	1.83
SD-321-0000	2.25
SD-321-0001	1.69
SD-321-0002	1.96
SD-321-0003	1.74
SD-322-0000	2.02
SD-322-0001	1.90
SD-322-0002	2.63
SD-322-0003	2.72
SD-322-0004	1.44
SD-322-0005	0.852
SD-323-0000	2.49
SD-323-0001	1.65
SD-323-0002	2.21
SD-323-0003	1.31
SD-324-0000 [a]	2.23
SD-325-0000 [a]	1.73
SD-326-0001 [a]	1.58
SD-328-0003 [a]	1.72

TOC total organic carbon analyzed by EPA method 9060.
[a] field duplicate samples.

Table E-2. Phase 3 total organic carbon analytical results for the Lower Duwamish Triad sampling event.

Sample ID	TOC (percent)
SD-206-0000	2.34
SD-207-0000	2.11
SD-208-0000	1.46
SD-209-0000	2.71
SD-210-0000	2.65
SD-211-0000	2.16
SD-212-0000	2.33
SD-213-0000	2.17
SD-214-0000	2.78
SD-215-0000	1.64
SD-216-0000	2.02
SD-217-0000	1.84
SD-330-0000	2.15
SD-331-0000	2.43
SD-332-0000	2.24
SD-333-0000	2.50
SD-334-0000	1.55
SD-335-0000	1.98
SD-336-0000	1.55
SD-337-0000	1.92
SD-338-0000	1.81
SD-339-0000	1.7
SD-340-0000	1.61
SD-341-0000	2.68
SD-342-0000	1.45
SD-343-0000	1.96
SD-344-0000	2.58
SD-345-0000	1.24
SD-431[a]	2.24
SD-432[a]	1.92
SD-433[a]	1.56

TOC total organic carbon analyzed by EPA method 9060.
[a] field duplicate samples.

Table E-3. Semivolatile organic compound sediment analytical results for the Lower Duwamish Triad sampling event.

Compound	Sample results (µg/kg)																		
	SD-307-0000	SD-309-0000	SD-310-0000	SD-311-0000	SD-312-0000	SD-313-0000	SD-313-0001	SD-314-0000	SD-315-0000	SD-316-0000	SD-317-0000	SD-318-0000	SD-319-0000	SD-320-0000	SD-321-0000	SD-322-0000	SD-323-0000	SD-324-0000[a]	SD-325-0000[a]
Phenol	**440**	**290**	**270**	**1,200**	**610**	**620**	20 U	**160 J**	**28**	**310**	**1,100**	**800**	**32**	**410**	**130**	**290**	**840**	**140**	**560 J**
Bis-(2-chloroethyl) ether	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
2-Chlorophenol	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
1,3-Dichlorobenzene	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
1,4-Dichlorobenzene	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzyl alcohol	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
1,2-Dichlorobenzene	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
2-Methylphenol	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
2,2'-Oxybis (1-Chloropropane)	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Methylphenol	**52**	**19 J**	20 U	**27**	**22**	**22**	20 U	**21**	20 U	19 U	**34**	**28**	20 U	20 U	20 U	20 U	**83**	20 U	**31**
N-Nitroso-di-N-propylamine	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
Hexachloroethane	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Nitrobenzene	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Isophrone	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
2-Nitrophenol	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
2,4-Dimethylphenol	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzoic acid	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	190 U	200 U	190 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Bis (2-chlorethoxy) methane	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
2,4-Dichlorophenol	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
1,2,4-Trichlorbenzene	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Naphthalene	20 U	**490**	**31**	**62**	**170**	**220**	20 U	**28 J**	20 U	19 U	20 U	**46**	20 U	**24**	20 U	20 U	**22**	20 U	**160 J**
4-Chloroaniline	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
Hexachlorobutadiene	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Chloro-3-methylphenol	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
2-Methylnaphthalene	**27**	**350**	**34**	**60**	**48**	**190**	20 U	**27 J**	20 U	19 U	20 U	**37**	20 U	**24**	20 U	20 U	**22**	20 U	**100 J**
Hexachlorocyclopentadiene	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
2,4,6-Trichlorophenol	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
2,4,5-Trichlorphenol	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
2-Chloronaphthalene	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
2-Nitroaniline	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
Dimethylphthalate	**19 J**	**24**	**29**	**26**	**22**	20 U	20 U	20 U	**35**	**40**	**29**	**23**	20 U	20 U	20 U	20 U	**74**	20 U	20 U
Acenaphthylene	**57**	**98**	**42**	**35**	**98**	20 U	20 U	20 U	**23**	19 U	20 U	**28**	20 U	20 U	20 U	20 U	20 U	20 U	**22**
3-Nitroaniline	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
Acenaphthene	**26**	**220**	**56**	**70**	**250**	**200**	20 U	**42 J**	**44**	19 U	**20**	**52**	20 U	**20**	20 U	20 U	**35**	20 U	**190 J**
2,4-Dinitrophenol	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	190 U	200 U	190 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
4-Nitrophenol	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U

Table E-3 (continued). Semivolatile organic compound sediment analytical results for the Lower Duwamish Triad sampling event.

Compound	Sample results (µg/kg)																		
	SD-307-0000	SD-309-0000	SD-310-0000	SD-311-0000	SD-312-0000	SD-313-0000	SD-313-0001	SD-314-0000	SD-315-0000	SD-316-0000	SD-317-0000	SD-318-0000	SD-319-0000	SD-320-0000	SD-321-0000	SD-322-0000	SD-323-0000	SD-324-0000[a]	SD-325-0000[a]
Dibenzofuran	**180**	**410**	**82**	**100**	**460**	**55**	20 U	**25**	**31**	19 U	**20**	**75**	20 U	**28**	20 U	20 U	**21**	20 U	**54**
2,6-Dinitrotoluene	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
2,4-Dinitrotoluene	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
Diethylphthalate	20 U	20 U	**20**	20 U	**91**	20 U	20 U	**28**	20 U	19 U	**120**	**94**	20 U	**48**	20 U	**150**	20 U	**27**	20 U
4-Chlorophenyl-pheylether	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Fluorene	**1,500**	**810**	**170**	**210**	**940**	**240**	20 U	**51 J**	**51**	**22**	**38**	**150**	20 U	**48**	20 U	20 U	**42**	20 U	**220 J**
4-Nitroaniline	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
4,6-Dinitro-2-methylphenol	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	190 U	200 U	190 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
N-Nitrosodiphenylamine	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Bromophenyl-phenylether	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Hexachlorobenzene	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Pentachlorphenol	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
Phenanthrene	**4,900**	**3,400**	**960**	**1,100**	**3,800**	**1,400**	**39**	**400 J**	**680**	**220**	**280**	**840**	**89**	**250**	**81**	**90**	**420**	**68**	**1,400 J**
Carbazole	**290**	**360**	**110**	**140**	**230**	**75**	20 U	**69**	**150**	**43**	**56**	**100**	20 U	**27**	20 U	**20**	**64**	20 U	**67**
Anthracene	**4,400**	**620**	**220**	**220**	**680**	**360**	20 U	**130 J**	**130**	**45**	**64**	**160**	20 U	**48**	**30**	**28**	**82**	**25**	**330 J**
Di-n-Butylphthalate	**65**	20	**19 J**	20 U	**23**	**34**	20 U	**30**	20 U	**21**	**47**	**21**	**28**	**37**	20 U	20 U	**30**	20 U	**42**
Fluoranthene	**10,000**	**3,300**	**1,500**	**2,000 D**	**3,400**	**1,000**	**77**	**600 J**	**2,300**	**530**	**760**	**1,400**	**150**	**380**	**270**	**300**	**880**	**230**	**1,100 J**
Pyrene	**3,900**	**2,200**	**1,000**	**1,400**	**2,200**	**1,100**	**49**	**570 J**	**1,800**	**450**	**570**	**950**	**190**	**290**	**240**	**180**	**830**	**210**	**1,500 J**
Butylbenzylphthalate	**33**	**34**	**41**	**40**	**36**	**43**	20 U	20 U	**140**	**64**	**100**	**42**	20 U	**38**	**34**	**31**	**100**	**27**	**26**
3,3'-Dichlorobenzidine	98 U	99 U	98 U	98 U	99 U	98 U	99 U	98 U	100 U	97 U	98 U	97 U	99 U	97 U	99 U	100 U	98 U	98 U	98 U
Benzo (a) anthracene	**4,700**	**1,100**	**580**	**700**	**1,100**	**440**	20 U	**220 J**	**660**	**200**	**240**	**490**	**60**	**120**	**98**	**98**	**340**	**81**	**500 J**
Bis (2-ethylhexyl) phthalate	**140**	**220**	**270**	**380**	**220**	**100**	20 U	**150**	**610**	**290**	**360**	**290**	**94**	**110**	**240**	**230**	**410**	**200**	**140**
Chrysene	**6,600**	**1,200**	**730**	**840**	**1,200**	**490**	**22**	**290 J**	**950**	**280**	**420**	**630**	**75**	**160**	**140**	**150**	**450**	**110**	**550 J**
Di-n-Octyl phthalate	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzo (b) fluoranthene	**4,500**	**1,200**	**760**	**1,100**	**1,100**	**370**	20 U	**260**	**1,100**	**340**	**430**	**640**	**83**	**130**	**180**	**160**	**550**	**150**	**430**
Benzo (k) fluoranthene	**2,500**	**830**	**690**	**760**	**840**	**360**	20 U	**210 J**	**950**	**270**	**280**	**440**	**90**	**150**	**140**	**130**	**460**	**130**	**420 J**
Benzo (a) pyrene	**2,000**	**1,000**	**620**	**770**	**970**	**430**	20 U	**230 J**	**780**	**230**	**260**	**510**	**69**	**130**	**110**	**110**	**400**	**97**	**510 J**
Indeno (1,2,3-cd) pyrene	**440**	**410**	**270**	**350**	**330**	**130**	20 U	**110 J**	**390**	**120**	**120**	**270**	**30**	**58**	**52**	**60**	**200**	**46**	**170 J**
Dibenz (a,h) anthracene	**230**	**170**	**110**	**130**	**100**	**63**	20 U	**32**	**150**	**45**	**28**	**100**	20 U	20 U	20 U	**21**	**77**	20 U	**72**
Benzo (g,h,i) perylene	**270**	**280**	**210**	**250**	**250**	**120**	20 U	**88 J**	**300**	**97**	**90**	**190**	**24**	**42**	**44**	**45**	**150**	**39**	**150 J**

µg/kg – microgram per kilogram.
[a] field duplicate sample.
Bold type indicates the sample result is greater than the reporting limit.
Values reported on a dry-weight basis.
U – The material was analyzed for, but was not detected. The associated numerical value is the reporting limit.
J – The associated numerical value is considered an estimated concentration.

Table E-4. Total mercury analytical results for the Lower Duwamish Triad sampling event.

Sample ID	Hg (mg/kg)		Holding time exceedance (days)
SD-307-0000	0.09	J	22
SD-309-0000	0.24	J	22
SD-310-0000	0.14	J	22
SD-311-0000	0.11	J	22
SD-312-0000	0.20	J	22
SD-313-0000	0.39	J	22
SD-313-0001	0.16	J	19
SD-314-0000	0.23	J	21
SD-315-0000	0.09	J	21
SD-316-0000	0.15	J	22
SD-317-0000	0.10	J	22
SD-318-0000	0.10	J	22
SD-319-0000	0.16	J	22
SD-320-0000	0.21	J	22
SD-321-0000	0.18	J	22
SD-322-0000	0.14	J	22
SD-323-0000	0.20	J	21
SD-324-0000[a]	0.20	J	22
SD-325-0000[a]	0.20	J	21
SD-333-0000	0.10	J	12
SD-341-0000	0.09	R	11

Hg total mercury analyzed by EPA method 7471A.
mg/kg milligrams per kilogram.
J The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample.
R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
a field duplicate sample.

Table E-5. Sediment sample grain size distribution summary (percent retained in each grain size fraction) for the Lower Duwamish Triad sampling event.

Sample ID	Gravel	Sand					Silt				Clay		
		Very Coarse	Coarse	Medium	Fine	Very Fine	Coarse	Medium	Fine	Very Fine			
Phi size	>-1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	<10
Sieve Size (microns)	>#10 (2000)	10 to 18 (2000-1000)	18 to 35 (1000-500)	35 to 60 (500-250)	60 to 120 (250-125)	120 to 230 (125-62)	62.5-31.0	31.0-15.6	15.6-7.8	7.8-3.9	3.9-2.0	2.0-1.0	<1.0
SD-322-0002	0.0 J	0.2 J	1.7 J	2.9 J	8.9 J	14.3 J	6.2 J	24.4 J	20.8 J	7.1 J	3.6 J	3.2 J	6.7 J
SD-311-0002	24.6 J	4.2 J	7.0 J	14.5 J	22.6 J	11.7 J	2.2 J	4.1 J	3.9 J	3.1 J	1.1 J	0.4 J	0.6 J
SD-311-0003	5.7 J	3.8 J	9.0 J	21.0 J	29.4 J	16.8 J	6.9 J	3.0 J	2.3 J	1.2 J	0.4 J	0.1 J	0.5 J
SD-317-0002	2.2 J	1.7 J	6.0 J	13.6 J	17.9 J	14.3 J	7.7 J	11.1 J	10.2 J	6.7 J	3.8 J	2.2 J	2.5 J
SD-317-0003	3.4 J	3.6 J	11.6 J	25.9 J	25.6 J	14.0 J	6.1 J	2.9 J	2.5 J	1.6 J	1.0 J	0.7 J	1.0 J
SD-315-0000	1.4	1.7	3.7	17.0	18.4	10.4	10.7	12.8	9.9	5.2	2.5	1.7	4.6
SD-307-0000	0.6	1.4	3.1	21.3	21.3	7.3	10.4	12.1	8.7	5.2	2.9	1.8	4.0
SD-309-0000	3.3	2.3	3.3	5.5	6.7	8.1	11.6	26.1	15.9	5.8	3.6	2.3	5.6
SD-310-0000	0.4	1.0	2.4	4.0	7.5	10.6	17.5	26.7	14.3	5.4	2.9	1.9	5.2
SD-311-0000	2.6	1.6	2.8	5.0	11.3	8.8	14.2	23.2	15.3	5.7	2.9	2.0	4.7
SD-312-0000	1.5	2.2	2.8	4.7	9.3	11.5	12.8	21.2	15.4	6.6	4.0	2.6	5.4
SD-313-0000	13.9	3.1	4.9	7.7	8.8	9.8	8.4	15.2	12.0	6.6	3.1	1.7	4.8
SD-314-0000	10.5	2.0	4.6	11.2	10.9	11.4	14.5	13.4	9.1	4.8	2.3	1.4	3.8
SD-316-0000	2.9	1.6	1.7	4.6	6.6	9.4	18.6	23.0	15.2	6.0	2.7	2.1	5.6
SD-317-0000	0.3	1.9	4.0	6.1	7.6	9.5	19.6	18.5	13.4	6.2	3.4	2.4	7.3
SD-318-0000	0.2	1.5	2.5	3.7	6.7	10.7	19.0	20.0	15.3	7.1	3.6	2.2	7.5
SD-319-0000	0.3	0.8	1.7	3.4	11.4	22.4	15.8	17.9	11.9	4.4	2.5	1.7	5.9
SD-320-0000	3.0	1.8	3.3	6.7	9.4	10.9	13.3	19.2	14.4	7.0	2.8	2.2	6.1
SD-321-0000	0.2	1.0	1.0	1.8	6.5	11.9	13.3	20.8	15.7	8.7	5.2	3.6	10.4
SD-322-0000	0.0	1.9	1.2	1.6	3.8	11.7	15.8	18.9	17.5	8.4	4.8	4.1	10.3
SD-323-0000	6.4	5.7	10.1	14.2	13.7	8.6	10.7	11.9	7.2	3.3	2.0	1.4	4.8
SD-324-0000[a]	0.2	1.0	0.9	1.7	6.1	11.9	14.1	19.1	16.9	8.8	5.2	3.8	10.4
SD-333-0000	1.1	2.4	6.8	10.0	12.2	8.3	16.2	15.7	10.0	5.7	4.0	1.8	5.9
SD-337-0000	2.1	1.8	7.0	13.6	15.4	19.8	11.2	12.3	7.5	3.0	2.0	1.3	3.0
SD-342-0000	4.8	1.0	3.8	9.0	13.5	15.1	13.7	15.6	10.5	5.0	2.6	1.8	3.6
SD-431[a]	3.0	2.5	6.5	10.7	10.4	10.7	18.3	15.0	8.1	5.0	3.1	2.0	4.7

[a] field duplicate sample.

Herrera Environmental Consultants, Inc.

Memorandum

To	John Wakeman, U.S. Army Corps of Engineers, Seattle District
cc	Peter Jowise, Herrera Environmental Consultants
From	Gina Catarra and Rob Zisette, Herrera Environmental Consultants
Date	January 21, 2005
Subject	Grain Size Distribution Data Validation for Lower Duwamish Triad Sampling Event

This memorandum presents a review of grain size distribution data collected from the Lower Duwamish Triad Sampling Event site located in Seattle, Washington. Herrera Environmental Consultants collected 26 sediment samples, including 2 field duplicates between August 16 and 27, 2004. Analytical Resources, Inc. of Tukwila, Washington analyzed the samples for grain size distribution using the PSEP method (PSEP 1996).

The laboratory's performance was reviewed in accordance with quality control (QC) criteria outlined in the *Lower Duwamish Triad Sampling Event Quality Assurance Project Plan (QAPP) (USACE 2004)* and the *Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound (PSEP 1996).*

Quality control data submitted by the laboratory were reviewed; raw laboratory data was provided but was not reviewed. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by a summary of laboratory communications and definitions of data qualifiers.

Data Validation

Custody, Preservation, Holding Times, and Completeness—Acceptable with Qualification

Sample custody was properly maintained from sample collection to receipt at the laboratory. The samples were properly preserved and were received intact at the laboratory. The reported samples were analyzed within the required holding time of 180 days from the date of collection. The laboratory data package is complete and contains test results for all samples listed on the chain of custody forms.

The U.S Army Corps of Engineers selected five additional sediment samples (SD-311-0002, SD-311-0003, SD-317-0002, SD-317-0003, and SD-322-0002) for grain size distribution analysis after the field sampling event was completed. These five samples were frozen prior to analysis

and have been qualified as estimated (flagged J) because freezing may affect the particle size distribution.

Triplicate Analysis—Acceptable

Triplicate analyses were performed at the required frequency. Triplicate results were reported for samples SD-315-0000, SD-333-0000, and a batch sample. The relative standard deviation (RSD) values for each phi size (ranging from 0.10 to 7.39 percent) met the control limits (less than 25 percent) established by the QAPP.

Field Duplicate—Acceptable

Two field duplicate samples were analyzed for grain size distribution by the laboratory. As shown in the following table, the relative percent difference (RPD) values for percent fines (0.8 and 5.4 percent) met the control limits (less than 50 percent) established by the QAPP.

Sample ID	Field Duplicate ID	Sample Result (percent fines[a])	Field Duplicate Result (percent fines[a])	RPD
SD-321-0000	SD-324-0000	77.7	78.3	0.8
SD-333-0000	SD-431	59.3	56.2	5.4

Laboratory Reporting Limits—Acceptable

The laboratory reported grain size distribution as specified in the method (PSEP 1996).

Overall Assessment of Data Quality

The usability of the data is based on the guidance documents listed above. Upon consideration of the information presented here, the data are acceptable as qualified.

Laboratory Communications

The laboratory was not contacted regarding the grain size distribution analyses.

Definition of Data Qualifiers

The following data validation qualifiers were used in the review of this data set. These qualifiers are from the *Lower Duwamish Triad Sampling Event Quality Assurance Project Plan (QAPP)* (USACE 2004).

U The analyte was analyzed for but was not detected above the reporting limit.

J The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample.

UJ The analyte was not detected above the sample reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

References

Puget Sound Estuarine Program (PSEP). 1996. Recommended protocols for measuring selected environmental variables in Puget Sound. U.S. Environmental Protection Agency, Office of Coastal Waters.

USACE. 2004. Lower Duwamish Triad Sampling Event Quality Assurance Project Plan. Prepared for U.S. Environmental Protection Agency, Region 10, by U.S. Army Corps of Engineers, Seattle District.

Herrera Environmental Consultants, Inc.

Memorandum

To	John Wakeman, U.S. Army Corps of Engineers, Seattle District
cc	Peter Jowise, Herrera Environmental Consultants
From	Gina Catarra and Rob Zisette, Herrera Environmental Consultants
Date	June 6, 2008
Subject	Mercury Data Validation for Lower Duwamish Triad Sampling Event

This memorandum presents a review of mercury data collected from the Lower Duwamish Triad Sampling Event site located in Seattle, Washington. Herrera Environmental Consultants collected 21 sediment samples, including 2 field duplicates between August 16 and 27, 2004. Analytical Resources, Inc. of Tukwila, Washington analyzed the samples for mercury using EPA Method 7471A (US EPA 1986).

The laboratory's performance was reviewed in accordance with quality control (QC) criteria outlined in the *Lower Duwamish Triad Sampling Event Quality Assurance Project Plan (QAPP) (USACE 2004)*, the *Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound (PSEP 1996)*, the *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (Functional Guidelines)* (US EPA 2004), and the specified analytical method.

Quality control data submitted by the laboratory were reviewed; raw laboratory data was provided but was not reviewed. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by a summary of laboratory communications and definitions of data qualifiers.

Data Validation

Custody, Preservation, Holding Times, and Completeness—Acceptable with Qualification

Sample custody was properly maintained from sample collection to receipt at the laboratory. The samples were properly preserved and were received intact at the laboratory. As discussed below, all reported samples were not analyzed within the required holding time of 28 days from the date of collection. The laboratory data package is complete and contains test results for all samples listed on the chain of custody forms.

The U.S Army Corps of Engineers selected the 21 sediment samples for mercury analysis after the field sampling event was completed. All samples were analyzed between 11 and 22 days

beyond the recommended holding time of 28 days. All samples that had a detected concentration of mercury above the laboratory reporting limit were qualified as estimated (flagged J) to indicate that sample results may be biased low. Mercury was not detected in sediment sample SD-341-0000 at the laboratory reporting limit and the result was rejected (flagged R), in accordance with Functional Guidelines. Because the reported concentration is expected to be lower than the actual concentration (associated with the extended holding time prior to analysis), the presence or absence of the analyte cannot be verified.

Initial Calibration Verification—Acceptable

An initial calibration verification (ICV) standard was reported with the analytical run. The percent recovery value (108.3 percent) met the control limits (90 to 110 percent) established by the QAPP.

Continuing Calibration Verification—Acceptable

Continuing calibration verification (CCV) standards were analyzed at the required frequency. The percent recovery values (ranging from 100.8 to 107.3 percent) met the control limits (80 to 120 percent) established by the QAPP.

Blank Analysis—Acceptable

Method blanks and instrument blanks were analyzed at the required frequency. Blanks did not contain levels of mercury above the laboratory reporting limit.

Matrix Spike Analysis—Acceptable with Qualification

Matrix spike (MS) analyses were performed at the required frequency. Matrix spike results were reported for samples SD-307-0000 and SD-333-0000. The percent recovery value for sample SD-307-0000 (111 percent) met the control limits (75 to 125 percent) established by the QAPP, but the MS percent recovery for sample SD-333-0000 (131 percent) exceeded the control limits. The only other sample (SD-341-0000) associated with the MS analysis of sample SD-333-0000 was undetected. In accordance with Functional Guidelines sample SD-333-0000 was qualified as estimated (flagged J), as shown in the following table.

Sample ID	Criteria	Qualifier
SD-333-0000	Associated matrix spike recovery > 125 percent and sample reported above detection limit.	J

Duplicate Analysis—Acceptable

Duplicate analyses were performed at the required frequency. Duplicate results were reported for samples SD-307-0000 and SD-333-0000. Both samples had reported values of mercury that were less than five times the reporting limit. In accordance with Functional Guidelines, the difference between the sample and duplicate results must be less than a value equal to the reporting limit. Both duplicate analyses met this criteria and no data were qualified.

Field Duplicate—Acceptable

Two field duplicate samples were analyzed by the laboratory. As shown in the following table, all relative percent difference (RPD) values (10.5 and 14.0 percent) met the control limits (less than 50 percent) established by the QAPP.

Sample ID	Field Duplicate ID	Sample Result (mg/kg)	Field Duplicate Result (mg/kg)	RPD
SD-321-0000	SD-324-0000	0.18 J	0.20 J	10.5
SD-314-0000	SD-325-0000	0.23 J	0.20 J	14.0

Laboratory Control Sample Analysis—Acceptable

Laboratory control samples (LCS) were analyzed with each batch. The percent recovery values (116 and 116 percent) met the control limits (80 to 120 percent) established by the QAPP.

Laboratory Reporting Limits—Acceptable

The laboratory met the detection limit (DL) of 0.1 mg/kg specified in the QAPP.

Overall Assessment of Data Quality

The usability of the data is based on the guidance documents listed above. Upon consideration of the information presented here, the data are acceptable as qualified with the exception of one rejected (flagged R) sample result value for holding time exceedance.

Laboratory Communications

The laboratory was not contacted regarding the mercury analyses.

Definition of Data Qualifiers

The following data validation qualifiers were used in the review of this data set. These qualifiers are from the *Lower Duwamish Triad Sampling Event Quality Assurance Project Plan (QAPP)* (USACE 2004).

U — The analyte was analyzed for but was not detected above the reporting limit.

J — The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample.

UJ — The analyte was not detected above the sample reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

References

Puget Sound Estuarine Program (PSEP). 1996. Recommended protocols for measuring selected environmental variables in Puget Sound. U.S. Environmental Protection Agency, Office of Coastal Waters.

U.S. EPA. 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 Third Edition, Updates I, II, IIA, IIB, and III. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C. December 1986.

U.S. EPA. 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. OSWER 9240.1-45. Office of Superfund Remediation and Technology Innovation (OSRTI), Washington DC. October 2004.

USACE. 2004. Lower Duwamish Triad Sampling Event Quality Assurance Project Plan. Prepared for U.S. Environmental Protection Agency, Region 10, by U.S. Army Corps of Engineers, Seattle District.

Herrera Environmental Consultants, Inc.

Memorandum

To	John Wakeman, U.S. Army Corps of Engineers, Seattle District
cc	Peter Jowise, Herrera Environmental Consultants
From	Gina Catarra and Rob Zisette, Herrera Environmental Consultants
Date	June 6, 2008
Subject	Lead Data Validation for Lower Duwamish Triad Sampling Event

This memorandum presents a review of lead data collected from excess sediment waste buckets for the Lower Duwamish Triad Sampling Event site located in Seattle, Washington. Herrera Environmental Consultants collected 2 sediment samples from sediment waste buckets on September 1, 2004. Analytical Resources, Inc. of Tukwila, Washington analyzed the samples by the toxicity characteristic leaching procedure (TCLP) for lead using EPA Methods 1311 and 6010B (US EPA 1986).

The laboratory's performance was reviewed in accordance with quality control (QC) criteria outlined in the *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (Functional Guidelines)* (US EPA 2004) and the specified analytical method.

Quality control data submitted by the laboratory were reviewed; raw laboratory data was provided but was not reviewed. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by a summary of laboratory communications and definitions of data qualifiers.

Data Validation

Custody, Preservation, Holding Times, and Completeness—Acceptable

Sample custody was properly maintained from sample collection to receipt at the laboratory. The samples were properly preserved and were received intact at the laboratory. All reported samples were analyzed within the required holding time of 180 days from the date of collection. The laboratory data package is complete and contains test results for all samples listed on the chain of custody forms.

Initial Calibration Verification—Acceptable

An initial calibration verification (ICV) standard was reported with the analytical run. The percent recovery value (98.5 percent) met the control limits (90 to 110 percent) established by Functional Guidelines.

Continuing Calibration Verification—Acceptable

Continuing calibration verification (CCV) standards were analyzed at the required frequency. The percent recovery values (ranging from 97.1 to 104.0 percent) met the control limits (80 to 120 percent) established by Functional Guidelines.

ICP Interference Check Sample Analysis—Acceptable

An ICP interference check samples (ICP-ICS) was analyzed with the sample batch. ICP interference check sample criteria (i.e., percent recovery value from 80 to 120 percent) established by Functional Guidelines were met for all compounds.

Blank Analysis—Acceptable

Method blanks and instrument blanks were analyzed at the required frequency. Blanks did not contain levels of lead above the laboratory reporting limit.

Matrix Spike Analysis—Acceptable

Matrix spike (MS) analyses were performed at the required frequency. Matrix spike results were reported for sample WD01. The percent recovery value (99.0 percent) met the control limits (75 to 125 percent) established by Functional Guidelines.

Duplicate Analysis—Acceptable

Duplicate analyses were performed at the required frequency. Duplicate results were reported for sample WD01. The relative percent difference (RPD) value (0 percent) met the control limits (less than 20 percent) established by Functional Guidelines.

No field duplicates were collected.

Laboratory Control Sample Analysis—Not Analyzed

Laboratory control samples (LCS) were not reported with the TCLP lead samples.

Laboratory Reporting Limits—Acceptable

The QAPP did not specify detection limits for the TCLP lead analysis. The detection limits reported by the laboratory (0.1 ug/L) were reasonable for the method.

Overall Assessment of Data Quality

The usability of the data is based on the guidance documents listed above. Upon consideration of the information presented here, the data are acceptable.

Laboratory Communications

The laboratory was not contacted regarding the lead analyses.

Definition of Data Qualifiers

The following data validation qualifiers were used in the review of this data set. These qualifiers are from the *Lower Duwamish Triad Sampling Event Quality Assurance Project Plan (QAPP)* (USACE 2004).

U	The analyte was analyzed for but was not detected above the reporting limit.
J	The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample.
UJ	The analyte was not detected above the sample reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

References

U.S. EPA. 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 Third Edition, Updates I, II, IIA, IIB, and III. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C. December 1986.

U.S. EPA. 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. OSWER 9240.1-45. Office of Superfund Remediation and Technology Innovation (OSRTI), Washington DC. October 2004.

USACE. 2004. Lower Duwamish Triad Sampling Event Quality Assurance Project Plan. Prepared for U.S. Environmental Protection Agency, Region 10, by U.S. Army Corps of Engineers, Seattle District.

Herrera Environmental Consultants, Inc.

Memorandum

To	John Wakeman, U.S. Army Corps of Engineers, Seattle District
cc	Peter Jowise, Herrera Environmental Consultants
From	Gina Catarra and Rob Zisette, Herrera Environmental Consultants
Date	June 6, 2008
Subject	Lead Data Validation for Lower Duwamish Triad Sampling Event

This memorandum presents a review of lead data collected from excess sediment waste buckets for the Lower Duwamish Triad Sampling Event site located in Seattle, Washington. Herrera Environmental Consultants collected 2 sediment samples from sediment waste buckets on September 1, 2004. Analytical Resources, Inc. of Tukwila, Washington analyzed the samples by the toxicity characteristic leaching procedure (TCLP) for lead using EPA Methods 1311 and 6010B (US EPA 1986).

The laboratory's performance was reviewed in accordance with quality control (QC) criteria outlined in the *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (Functional Guidelines)* (US EPA 2004) and the specified analytical method.

Quality control data submitted by the laboratory were reviewed; raw laboratory data was provided but was not reviewed. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by a summary of laboratory communications and definitions of data qualifiers.

Data Validation

Custody, Preservation, Holding Times, and Completeness—Acceptable

Sample custody was properly maintained from sample collection to receipt at the laboratory. The samples were properly preserved and were received intact at the laboratory. All reported samples were analyzed within the required holding time of 180 days from the date of collection. The laboratory data package is complete and contains test results for all samples listed on the chain of custody forms.

Initial Calibration Verification—Acceptable

An initial calibration verification (ICV) standard was reported with the analytical run. The percent recovery value (98.5 percent) met the control limits (90 to 110 percent) established by Functional Guidelines.

Continuing Calibration Verification—Acceptable

Continuing calibration verification (CCV) standards were analyzed at the required frequency. The percent recovery values (ranging from 97.1 to 104.0 percent) met the control limits (80 to 120 percent) established by Functional Guidelines.

ICP Interference Check Sample Analysis—Acceptable

An ICP interference check samples (ICP-ICS) was analyzed with the sample batch. ICP interference check sample criteria (i.e., percent recovery value from 80 to 120 percent) established by Functional Guidelines were met for all compounds.

Blank Analysis—Acceptable

Method blanks and instrument blanks were analyzed at the required frequency. Blanks did not contain levels of lead above the laboratory reporting limit.

Matrix Spike Analysis—Acceptable

Matrix spike (MS) analyses were performed at the required frequency. Matrix spike results were reported for sample WD01. The percent recovery value (99.0 percent) met the control limits (75 to 125 percent) established by Functional Guidelines.

Duplicate Analysis—Acceptable

Duplicate analyses were performed at the required frequency. Duplicate results were reported for sample WD01. The relative percent difference (RPD) value (0 percent) met the control limits (less than 20 percent) established by Functional Guidelines.

No field duplicates were collected.

Laboratory Control Sample Analysis—Not Analyzed

Laboratory control samples (LCS) were not reported with the TCLP lead samples.

Laboratory Reporting Limits—Acceptable

The QAPP did not specify detection limits for the TCLP lead analysis. The detection limits reported by the laboratory (0.1 ug/L) were reasonable for the method.

Overall Assessment of Data Quality

The usability of the data is based on the guidance documents listed above. Upon consideration of the information presented here, the data are acceptable.

Laboratory Communications

The laboratory was not contacted regarding the lead analyses.

Definition of Data Qualifiers

The following data validation qualifiers were used in the review of this data set. These qualifiers are from the *Lower Duwamish Triad Sampling Event Quality Assurance Project Plan (QAPP)* (USACE 2004).

U — The analyte was analyzed for but was not detected above the reporting limit.

J — The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample.

UJ — The analyte was not detected above the sample reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

References

U.S. EPA. 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 Third Edition, Updates I, II, IIA, IIB, and III. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C. December 1986.

U.S. EPA. 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. OSWER 9240.1-45. Office of Superfund Remediation and Technology Innovation (OSRTI), Washington DC. October 2004.

USACE. 2004. Lower Duwamish Triad Sampling Event Quality Assurance Project Plan. Prepared for U.S. Environmental Protection Agency, Region 10, by U.S. Army Corps of Engineers, Seattle District.

Herrera Environmental Consultants, Inc.

Memorandum

To	John Wakeman, U.S. Army Corps of Engineers, Seattle District
cc	Peter Jowise, Herrera Environmental Consultants
From	Gina Catarra and Rob Zisette, Herrera Environmental Consultants
Date	June 6, 2008
Subject	Semivolatile Organic Compound Data Validation for Lower Duwamish Triad Sampling Event

This memorandum presents a review of semivolatile organic compound (SVOC) data collected from the Lower Duwamish Triad Sampling Event site located in Seattle, Washington. Herrera Environmental Consultants collected 19 sediment samples, including 2 field duplicates between August 16 and 27, 2004. Analytical Resources, Inc. of Tukwila, Washington analyzed the samples for SVOCs using EPA Method 8270C (US EPA 1986).

The laboratory's performance was reviewed in accordance with quality control (QC) criteria outlined in the *Contract Laboratory Program National Functional Guidelines for Organic Data Review (Functional Guidelines)* (US EPA 1999), the *Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound (PSEP 1996),* and the specified analytical method.

Quality control data submitted by the laboratory were reviewed; raw laboratory data was provided but was not reviewed. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by a summary of laboratory communications and definitions of data qualifiers.

Data Validation

Custody, Preservation, Holding Times, and Completeness—Acceptable

Sample custody was properly maintained from sample collection to receipt at the laboratory. The samples were properly preserved and were received intact at the laboratory. Samples were archived (frozen) by the laboratory within 14 days from sample collection to extend the acceptable holding time. All reported samples were analyzed within the PSEP recommended holding time for archived samples of one year from collection to extraction and 40 days from extraction to analysis. The laboratory data package is complete and contains test results for all samples listed on the chain of custody form.

Instrument Tuning and Mass Calibration—Acceptable

The tuning compound decafluorotriphenylphosphine was analyzed at the required frequency and all relative abundance values met the criteria established in Functional Guidelines.

Initial Calibration—Acceptable

Initial calibrations were analyzed at the required frequency. Initial calibration criteria (i.e., percent relative standard deviation [RSD] values less than or equal to 30 percent and relative response factors [RRFs] greater than 0.05) established by Functional Guidelines were met for all target compounds.

Continuing Calibration Verification—Acceptable with Discussion

Continuing calibration verification (CCV) standards were analyzed at the required frequency. Continuing calibration criteria (i.e., relative percent difference values less than or equal to 25 percent and RRFs greater than 0.05) established by Functional Guidelines with the exceptions noted below.

The percent difference (%D) values exceeded the 25 percent criterion for benzyl alcohol (37 percent), 2,4-dinitrophenol (29 percent), 4-nitrophenol (32 percent), and 4-nitroaniline (26 percent) in the CCV standard analyzed on 10/11/04, and for benzyl alcohol (29 percent) in the CCV standard analyzed on 10/13/04. No data were qualified because method criteria for an acceptable CCV specifies that up to any four SVOCs may fail to meet %D criteria as long as they have a %D value of less than or equal to 40.0 percent.

Blank Analysis—Acceptable

Method blanks were analyzed at the required frequency. Blanks did not contain levels of SVOCs above the laboratory reporting limit.

Surrogate Analysis—Acceptable with Discussion

Six surrogate compounds were analyzed with each sample and blank in accordance with the requirements in the method. All surrogate recovery values were within the control limits (50 to 130 percent) established by the QAPP with the following exceptions.

As shown in the table below, several samples had a surrogate percent recovery for d4-1,2-dichlorobenzene (ranging from 41.2 to 49.6 percent) that did not meet the control limit (50 to 130 percent) established in the QAPP. However, all surrogate recovery values met both the laboratory control limits and the EPA CLP control limits. No data were qualified because Functional Guidelines allows any one surrogate from each fraction (base/neutral or acid) to exceed percent recovery criteria.

Percent recoveries for surrogates d4-1,2-dichlorobenze (41.2 percent) and d-5-nitrobenzene (48.8 percent) exceeded control limits established by the QAPP for sample SD-313-0001. No data were qualified because the percent recovery failures were marginal and both surrogate recoveries met the laboratory control limits and the EPA CLP control limits.

Sample	Surrogate	Percent Recovery	QAPP Control Limits (%)	Laboratory Control Limits (%)	CLP Control Limits (%)
SD-309-0000	d4-1,2-Dichlrobenzene	48.8	50-130	30-84	20-130
SD-310-0000	d4-1,2-Dichlrobenzene	47.2	50-130	30-84	20-130
SD-311-0000	d4-1,2-Dichlrobenzene	48.8	50-130	30-84	20-130
SD-312-0000	d4-1,2-Dichlrobenzene	46.8	50-130	30-84	20-130
SD-313-0001	d4-1,2-Dichlrobenzene	41.2	50-130	30-84	20-130
SD-313-0001	d-5-Nitrobenzene	48.8	50-130	28-103	23-120
SD-314-0000	d4-1,2-Dichlrobenzene	49.6	50-130	30-84	20-130
SD-316-0000	d4-1,2-Dichlrobenzene	47.6	50-130	30-84	20-130
SD-318-0000	d4-1,2-Dichlrobenzene	44.0	50-130	30-84	20-130
SD-319-0000	d4-1,2-Dichlrobenzene	48.4	50-130	30-84	20-130
SD-324-0000	d4-1,2-Dichlrobenzene	49.6	50-130	30-84	20-130

Internal Standard Evaluation—Acceptable with Discussion

Internal standards were added to all samples, blanks, and QC samples as required. The response and retention time criteria established by Functional Guidelines were met with the exceptions noted below.

Response area for perylene-d12 in the matrix spike (46 percent) and matrix spike duplicate (40 percent) analysis for sample SD-315-0000 exceeded the 50 to 150 percent criteria established by Functional Guidelines. No data were qualified because the response area for perylene-d12 in sample SD-315-0000 (80 percent) met the control limits.

Matrix Spike Analysis—Acceptable with Discussion

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed at the required frequency. MS/MSD results were reported for sample SD-315-0000. The percent recovery values (ranging from 54.7 to 103 percent) met the control limits (40 to 140 percent) established by the QAPP, with the following exceptions.

The percent recovery for pyrene (20.2 percent) in the matrix spike did not meet the control limits established by the QAPP. No data were qualified because the percent recovery for pyrene in the matrix spike duplicate (42.3 percent) met the control limits and all other data met the control limits.

Duplicate Analysis—Acceptable

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed at the required frequency. MS/MSD results were reported for sample SD-315-0000. The relative percent difference (RPD) values (0 to 5.8 percent) met the control limits (less than 50 percent) established by the QAPP.

Field Duplicate Analysis—Acceptable with Qualification

Two field duplicate samples were analyzed for SVOCs. The relative percent difference (RPD) was calculated for each compound where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the field duplicate. A control limit of less than 50 percent RPD was established in the QAPP and a control limit of two times the RL was used to evaluate difference values. As shown in the following table, 15 compounds exceeded the RPD or difference control limits for field duplicate samples SD-314-0000 and SD-325-0000. Because all RPD or difference values met the control limits for sample SD-321-0000 and field duplicate SD-324-0000, only samples SD-314-0000 and SD-325-0000 were qualified as estimated (flagged J) for compounds that exceeded the control limits, as shown in the following table.

Laboratory Control Sample Analysis—Acceptable

Laboratory control samples (LCS) were analyzed at the required frequency. All percent recovery values (ranging from 58.4 to 100 percent) met the control limits (50 to 130 percent) established in the QAPP.

Laboratory Reporting Limits—Acceptable

The QAPP specified reporting limits ranging from 32 to 160 mg/kg for selected compounds. The detection limits reported by the laboratory met the reporting limits specified in the QAPP.

Overall Assessment of Data Quality

The usability of the data is based on the guidance documents listed above. Upon consideration of the information presented here, the data are acceptable as qualified.

Laboratory Communications

The laboratory was not contacted regarding the SVOC analyses.

Compound (results in µg/kg)	RL (µg/kg)	Sample SD-314-0000	Field Duplicate SD-325-0000	RPD / Difference	Sample SD-321-0000	Field Duplicate SD-324-0000	RPD / Difference
Phenol	20	160 J	560 J	**111** / NA	130	140	7 / NA
4-Methylphenol	20	21	31	NA / 10.0	ND	ND	
Naphthalene	20	28 J	160 J	NA / **132**	ND	ND	
2-Methylnaphthalene	20	27 J	100 J	NA / **73**	ND	ND	
Acenaphthylene	20	20 U	22	NA / 2	ND	ND	
Acenaphthene	20	42 J	190 J	NA / **148**	ND	ND	
Dibenzofuran	20	25	54	NA / 29	ND	ND	
Diethylphthalate	20	28	20 U	NA / 8	20 U	27	NA / 7
Fluorene	20	51 J	220 J	NA / **169**	ND	ND	
Phenanthrene	20	400 J	1,400 J	**111** / NA	81	68	NA / 13
Carbazole	20	69	67	NA / 2	ND	ND	
Anthracene	20	130 J	330 J	**87** / NA	30	25	NA / 5
Di-n-Butylphthalate	20	30	42	NA / 12	ND	ND	
Fluoranthene	20	600 J	1,100 J	**59** / NA	270	230	16 / NA
Pyrene	20	570 J	1,500 J	**90** / NA	240	210	13 / NA
Butylbenzylphthalate	20	20 U	26	NA / 6	34	27	NA / 7
Benzo (a) anthracene	20	220 J	500 J	**78** / NA	98	81	NA / 17
Bis (2-ethylhexyl) phthalate	20	150	140	7 / NA	240	200	18 / NA
Chrysene	20	290 J	550 J	**62** / NA	140	110	24 / NA
Benzo (b) fluoranthene	20	260	430	49 / NA	180	150	18 / NA
Benzo (k) fluoranthene	20	210 J	420 J	**67** / NA	140	130	7 / NA
Benzo (a) pyrene	20	230 J	510 J	**76** / NA	110	97	NA / 13
Indeno (1,2,3-cd) pyrene	20	110 J	170 J	**43** / NA	52	46	NA / 6
Dibenz (a,h) anthracene	20	32	72	NA / 40	ND	ND	
Benzo (g,h,i) perylene	20	88 J	150 J	NA / **62**	44	39	NA / 50

µg/kg micrograms per kilogram
RL Laboratory reporting limit
RPD Relative percent difference
Difference Difference between the sample result and field duplicate result
NA Not applicable
ND Not detected above the laboratory reporting limit; the RPD value or difference was not calculated.
[a] The relative percent difference was calculated if both the sample and field duplicate result were greater than five times the laboratory reporting limit (RL). If the sample or the field duplicate result was less than five times the RL, the difference between the two values was calculated. The control limit for RPD is 50 percent; the control limit for difference is two times the RL
U The material was analyzed for, but was not detected. The associated numerical value is the reporting limit.
J The associated numerical value is considered an estimate.
Bold values indicate that the RPD or difference control limit was exceeded.

Herrera Environmental Consultants, Inc.

Memorandum

To	John Wakeman, U.S. Army Corps of Engineers, Seattle District
cc	Peter Jowise, Herrera Environmental Consultants
From	Gina Catarra and Rob Zisette, Herrera Environmental Consultants
Date	June 6, 2008
Subject	Total Organic Carbon Data Validation for Lower Duwamish Triad Sampling Event

This memorandum presents a review of total organic carbon (TOC) data collected from the Lower Duwamish Triad Sampling Event site located in Seattle, Washington. Herrera Environmental Consultants collected 99 sediment samples, including 7 field duplicates between August 16 and 27, 2004. Analytical Resources, Inc. of Tukwila, Washington analyzed the samples for TOC using EPA Method 9060 modified by Puget Sound Estuarine Program (PSEP) for sediments (PSEP 1996).

The laboratory's performance was reviewed in accordance with quality control (QC) criteria outlined in the *Lower Duwamish Triad Sampling Event Quality Assurance Project Plan (QAPP) (USACE 2004)*, the *Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound (PSEP 1996)*, and the specified analytical method.

Quality control data submitted by the laboratory were reviewed; raw laboratory data was provided but was not reviewed. No data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by a summary of laboratory communications and definitions of data qualifiers.

Data Validation

Custody, Preservation, Holding Times, and Completeness—Acceptable

Sample custody was properly maintained from sample collection to receipt at the laboratory. The samples were properly preserved and were received intact at the laboratory. The reported samples were analyzed within the required holding time of 28 days from the date of collection. The laboratory data package is complete and contains test results for all samples listed on the chain of custody forms.

Initial Calibration Verification—Acceptable

Initial calibration verification (ICV) standards were analyzed with each batch. All percent recovery values (ranging from 94.4 to 103 percent) met the control limits (75 to 125 percent) established by the QAPP.

Blank Analysis—Acceptable

Method blanks were analyzed at the required frequency. The method blanks did not contain reportable levels of TOC above the laboratory reporting limit.

Matrix Spike Analysis—Acceptable

Matrix spike (MS) analyses were performed at the required frequency. MS results were reported for samples SD-206-0000, SD-310-0002, SD-315-0000, SD-315-0001, SD-323-0003, and SD-338-0000. The percent recovery values (ranging from 99.5 to 110 percent) met the control limits (75 to 125 percent) established by the QAPP.

Triplicate Analysis—Acceptable

Triplicate analyses were performed at the required frequency. Triplicate results were reported for samples SD-206-0000, SD-310-0002, SD-315-0000, SD-315-0001, SD-323-0003, and SD-338-0000. The relative standard deviation (RSD) values (ranging from 5.4 to 14.5 percent) met the control limits (less than 25 percent) established by the QAPP.

Field Duplicate—Acceptable

Seven field duplicate samples were analyzed by the laboratory. As shown in the following table, all relative percent difference (RPD) values (ranging from 0.9 to 30 percent) met the control limits (less than 50 percent) established by the QAPP.

Sample ID	Field Duplicate ID	Sample Result (percent)	Field Duplicate Result (percent)	RPD
SD-314-0000	SD-325-0000	1.66	1.73	4.1
SD-320-0003	SD-328-0003	1.83	1.72	6.2
SD-321-0000	SD-324-0000	2.25	2.23	0.9
SD-323-0001	SD-326-0001	1.65	1.58	4.3
SD-207-0000	SD-433	2.11	1.56	30.0
SD-333-0000	SD-431	2.50	2.24	11.0
SD-338-0000	SD-432	1.81	1.92	5.9

Laboratory Control Sample Analysis—Acceptable

Standard Reference Material (SRM) analyses were performed with each batch. The SRM (NIST # 8704) percent recovery values (ranging from 79.7 to 102.1 percent) met the control limits (75 to 125 percent) established by the QAPP.

Laboratory Reporting Limits—Acceptable

The laboratory met the detection limit (DL) specified in the QAPP.

Overall Assessment of Data Quality

The usability of the data is based on the guidance documents listed above. Upon consideration of the information presented here, the data are acceptable.

Laboratory Communications

The laboratory was not contacted regarding the TOC analyses.

Definition of Data Qualifiers

The following data validation qualifiers were used in the review of this data set. These qualifiers are from the *Lower Duwamish Triad Sampling Event Quality Assurance Project Plan (QAPP)* (USACE 2004).

U — The analyte was analyzed for but was not detected above the reporting limit.

J — The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample.

UJ — The analyte was not detected above the sample reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

References

Puget Sound Estuarine Program (PSEP). 1996. Recommended protocols for measuring selected environmental variables in Puget Sound. U.S. Environmental Protection Agency, Office of Coastal Waters.

U.S. EPA. 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 Third Edition, Updates I, II, IIA, IIB, and III. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C. December 1986.

U.S. EPA. 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. OSWER 9240.1-45. Office of Superfund Remediation and Technology Innovation (OSRTI), Washington DC. October 2004.

USACE. 2004. Lower Duwamish Triad Sampling Event Quality Assurance Project Plan. Prepared for U.S. Environmental Protection Agency, Region 10, by U.S. Army Corps of Engineers, Seattle District.

Definition of Data Qualifiers

The following data validation qualifiers were used in the review of this data set. These qualifiers are from the *Lower Duwamish Triad Sampling Event Quality Assurance Project Plan (QAPP)* (USACE 2004).

U — The analyte was analyzed for but was not detected above the reporting limit.

J — The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample.

UJ — The analyte was not detected above the sample reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

References

Puget Sound Estuarine Program (PSEP). 1996. Recommended protocols for measuring selected environmental variables in Puget Sound. U.S. Environmental Protection Agency, Office of Coastal Waters.

U.S. EPA. 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 Third Edition, Updates I, II, IIA, IIB, and III. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C. December 1986.

U.S. EPA. 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. U.S. Environmental Protection Agency, Washington, D.C. EPA 540/R-99/008. October 1999.

USACE. 2004. Lower Duwamish Triad Sampling Event Quality Assurance Project Plan. Prepared for U.S. Environmental Protection Agency, Region 10, by U.S. Army Corps of Engineers, Seattle District.

Appendix G: Evaluation of PCB Results from Method 8082 at Three EPA Laboratories

LOWER DUWAMISH TRIAD SAMPLING EVENT

PCB SEDIMENT SAMPLING

QUALITY CONTROL SUMMARY REPORT

Prepared By

SEATTLE DISTRICT CORPS OF ENGEERS
Engineering and Technology Section

In Cooperation With

USEPA REGION X LABORATORY

EPA REGION 10 MANCHESTER ENVIRONMENTAL LABORATORY

Contents:

EPA Region 10 PCB Data Review

EPA Region 8 PCB Data Review

EPA Region 6 PCB Data Review

CHECKLIST FOR SEMIVOLATILE ORGANIC COMPOUNDS IN SEDIMENT

USACE DATA REVIEW– LOWER DUWAMISH TRIAD SAMPLING EVENT (PCB DATA)	
GENERAL INFORMATION	
EPA Region 10 **Manchester Laboratory** 7411 Beach Drive E. Port Orchard, WA 98366 Barry V. Pepich, PhD, Director (360) 871-8701	
Data Report prepared by Cathy Martin (Seattle District USACE Chemist)	**Report Prepared:** 26 September 2008
Date Sampled	16-27 August 2004
Date Received by Lab	Acceptable. However, documentation not available.
Date Analysis Began	Acceptable. However, documentation not available. Analysis was complete by 12 January 2005
Problems Noted (e.g., deviations from prescribed methods, analytical procedures): USACE reviewer was unable to associate all samples with method QC data, based on information available at this time. Region 10 data review was assumed to incorporate the necessary evaluation. It is unknown what impact this has on data usability.	
All required documents submitted? USACE reviewer assumed that all necessary documentation was submitted. Data packages were not available at the time of USACE review.	
Analytical Method	SW-846 8082
COMPLETENESS AND HOLDING CONDITIONS	
Samples Submitted = 51	**Samples Analyzed** = 51
Holding Conditions Acceptable? (One year for frozen sediments)	Acceptable. Documentation of holding conditions was not available in the laboratory narratives. However, samples were frozen and the time from sampling to final documentation of results did not exceed 4.5 months. (Information above provided by John Wakeman.)
If no, identify samples	NA

FORMAT	
Standard Report Sheets	
Concentration in proper units and significant figures?	Yes
Qualifiers defined (e.g., U = undetected)	Yes (see EPA Region 10 QC Review pages 6, 7)
Samples detection limits (DL) provided for each analyte?	No. However, for data qualified as "U" have an implied DL.
QA/QC SAMPLES	
Method Blanks	
Total Number	12
Frequency	Minimum frequency of 1 batch (≤20 samples)
Aroclors detected outside < 20% of any reported value or <RL	None
Certified Reference Materials[a]	
Total #	2
Frequency	2/51 samples
CRM Used	Sequim
Aroclors outside acceptance limit	None
Field Duplicates	
Total #	3
Frequency	5 duplicates/51 samples
Samples/Aroclors with >100% RPD or CV	None
Matrix Spikes	
Total #	4 MS/MSD pairs
Frequency	4/51 samples
Aroclors with <50% Recovery	None
Detection Limits	
Did any DL exceed SLK?	Yes
If yes, detection limits exceeding SL (identify samples)	Most sample detection limits exceed the project-specific reporting limits due to dilution. The dilution was required due to high concentrations of Aroclor-1254.

Surrogate Recovery	
Were surrogates added to all samples?	Yes
Identify samples with DCBP outside 40-140% TCMX outside 50-130%	SD-310-0000 = 353% DCBP SD-311-0000 = 353% DCBP; 263% TCMX SD-322-0000 = 416% DCBP; 297% TCMX SD-324-0000 = 154% DCBP SQ-1 = 141% DCBP OBS4342A1 (blank) = 44% TCMX SD-319-0003 = 33% TCMX SD-216-0000 = 50% DCBP SD-313-0003 = 31% TCMX SD-314-0002 = 49% TCMX SD-315-0002 = 150% DCBP SD-330-0000 = 150% DCBP SD-340-0000 = 161% DCBP SD-336-0000 = 144% DCBP SD-433 = 30%, TCMX OBS4344A1 (blank) = 151%, DCBP SD-315-0002 (MS) = 10% ,TCMX SD-315-0002 (MSD) = 3% TCMX; 42% DCBP OBS4349A1 (blank) = 0%. TCMX SD-315-0003 = 49% TCMX **See Region 10 Data Review (following) for assessment.**
Laboratory Control Samples	
Total #	9
Frequency	9/51 samples
Aroclors with outside 50-130% Recovery	None

[a] According to EPA Region 10, SQ-1 had a spiked value of 170 ug/kg when created, early historical results averaged 120 ug/kg. No control limits have been set in this laboratory.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

January 12, 2005

MEMORANDUM

SUBJECT: Data Review for the PCB Aroclor Analysis of Sediment and Water Samples from the Lower Duwamish Triad Project

Project Code: HWD-188A Account Code: 040510P302D99C

FROM: Gerald Dodo, USEPA

TO: Howard Orlean, USEPA

CC: John Wakeman, Herrera Environmental Consultants
Ravi Sanga, USEPA Allison Hiltner, USEPA Martha Lentz, USEPA Julius Nwosu, USEPA

The data review of the PCB Aroclor analyses of sediment and water samples collected from the above referenced site has been completed. Sediment sample extractions were performed using a modified EPA method 3541. The water samples were extracted using a modified draft EPA method 3511. Extract cleanups were performed using modified EPA methods 3660B, 3620B and 3665A. Analyses of the samples were performed using a modified EPA Method 8082 (PCB Aroclors).

The following samples were reviewed in this report:

04344100	04344104	04344108	04344112	04344116
04344118	04344119	04344120	04344122	04344123
04344124	04344126	04344127	04344128	04344130
04344131	04344132	04344136	04344140	04344141
04344144	04344145	04344147	04344148	04344152
04344158	04344164	04344166	04344167	04344168
04344169	04344173	04354000	04354004	04354005

04354007	04354008	04354009	04354010	04354012
04354015	04354016	04354017	04354018	04354020
04354021	04354022	04354025	04354026	04354032
04354033				

DATA QUALIFICATIONS

The following comments refer to the laboratory performance in meeting the quality control specifications outlined in the analytical methods, the project's quality assurance plan, the Manchester Laboratory Quality Assurance Manual, Standard Operating Procedures, and professional judgement.

The conclusions presented herein are based on the information provided for the review.

Holding Time

The sediment samples were stored frozen upon receipt by the laboratory with a one year holding time criterion applied for extractions. The sediment samples were extracted within four months from time of collection. The water sample, 04344173, was extracted within seven days from time of collection.

Extracts were analyzed within 40 days from preparation except for a diluted re-analysis of sample 04344112 which exceeded this criterion by six days. This re-analysis was performed for acquiring a more accurate measurement of PCB 1254 only. Due to the chemical stability of PCBs, this small exceedance was not judged to be significant therefore no qualifiers were applied based on holding times.

Initial Calibrations (ICAL) -Acceptable

Single or multi-level initial calibrations were performed for the PCB Aroclors. Multi-level initial calibrations were performed for detected PCB Aroclors. The multi-level initial calibrations met the technical acceptance criteria for correlation coefficients (≥ 0.99) and percent difference as compared to the curve (±20%).

A multi-level initial calibration was performed for PCB 1248 but after the sample analyses. The detected PCB 1248 concentrations for the samples could only be estimated due to the presence of PCB 1254. This initial calibration was used as an attempt to get a better estimated value instead of use of single level calibration.

Continuing Calibration Verification (CCV)

The PCB Aroclor CCV checks met the criteria for frequency of analysis and percent difference

from the true value (±15% for target compounds and ±30% for surrogate compounds) except as follows.

The CCV for the diluted extract re-analyses for samples 04344148 and 04344164 resulted with a percent difference of 17% for PCB 1254. These re-analyses were performed for acquiring a more accurate measurement of PCB 1254 only. A calibration standard was analyzed just before this CCV and a CCV was analyzed just after these two sample analyses which resulted with acceptable percent difference values. Therefore, no qualifiers were applied since the first CCV was only slightly out of criterion and these other calibration standard analyses were acceptable.

The CCV for the diluted extract re-analysis for sample 04344112 resulted with a percent difference of >15% for PCB 1254. This re-analysis was performed for acquiring a more accurate measurement of PCB 1254 only. The reported PCB 1254 for this sample was qualified 'J'.

Blanks - Acceptable

Method blanks were prepared with each extraction batch. PCB Aroclors were not detected in the blanks.

Surrogate Spikes

The criteria for surrogate recoveries are 50-130% for tetrachlorometaxylene (TCMX) and 40-140% for decachlorobiphenyl (DCB). Several samples resulted with TCMX recoveries <50% including the matrix spike analyses 04344130S1 and 04344130S2. The spike recoveries for PCB 1016 which is the earliest eluting Aroclor were still acceptable at 79% and 89%. For this reason, qualifiers were not applied toward the PCB Aroclors based on low TCMX recoveries.

Samples 04344112, 04344130, 04344164, 04344168, 04354010, 04354012, 04354018, and 04354022 resulted with DCB recoveries >140%. Detected PCB Aroclor results for these samples were qualified 'J'. Non-detected PCB Aroclor results were not qualified since the high recoveries do not indicate a problem with the reported quantitation limits.

Laboratory Fortified Blanks (LFB) - Acceptable

LFBs were prepared using PCBs1016 and 1260. The recoveries met the criterion of 50-130%.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) - Acceptable

Samples 04344119, 04344130, and 04344168 were used for MS/MSD analyses (S1/S2). PCBs 1016 and 1260 were spiked into the MS/MSD aliquots. The recoveries met the criterion of 40140%.

Laboratory Duplicate

Samples 04344169, 04354015, and 04354025 were analyzed in duplicate. Only PCB 1254 was

detected in these samples. The PCB 1254 relative percent differences (RPD) for samples 04344169, 04354015 and duplicates were <50.

The PCB 1254 RPD for sample 04354025 and duplicate was >50, therefore, the reported results for this Aroclor, sample and duplicate were qualified 'J'. This duplicate analysis was performed by taking aliquots out of separate jars. The duplicate analyses for samples 04344169 and 04354015 were performed by taking aliquots out of the same jar.

Reference Sample -Acceptable

The Sequim I reference sample was analyzed three times with the sediment samples. Only PCB 1254 was detected in this sample with results of 134, 174, and 190 ug/kg. These results were judged acceptable as the expected concentration for this sample is 170 ug/kg with an historical average of 112 ug/kg and a standard deviation of 30 ug/kg.

Compound Quantitation

The initial calibration functions were used for calculations. Reported quantitation limits were based on the initial calibration standards and sample size used for the analysis. Sediment sample results are on a dry weight basis. Detected PCB Aroclors below the quantitation limits were qualified 'J'.

All detected PCB 1248 results were qualified 'J' due to the potential interference from PCB 1254. In addition, the PCB 1260 detected results for sample 04344120, 04344127, and 04344128 were qualified 'J' for the same reason.

Compound Identification

Target compounds were identified based on chromatographic retention times of two dissimilar gas chromatography columns as determined from the initial calibration and peak pattern recognition.

Although detected PCB 1248 results are being reported, when considering the presence of PCB 1254 and weathering effects, it is possible that PCB 1242 may have been present instead.

The GC/ECD chromatograms for samples 04344126, 04344130, 04344131, and 04344133 displayed several early eluting peaks that did not match a PCB Aroclor pattern. Analysis of the extract for sample 04344130 by a GC/AED in a halogen specific mode determined that these compounds were not chlorinated or brominated.

Chemical Abstract Service (CAS) numbers with a "*" indicates that the number was created at the Region 10 Laboratory due to lack of an existing one.

Overall Assessment

All requirements for data qualifiers from the preceding sections were accumulated. Each sample data summary sheet and each compound was checked for positive or negative results. From this overall need for data qualifiers for each analysis was determined. In cases where more than one of the preceding sections required data qualifiers, the most restrictive qualifier has been added to the data.

In general, all unqualified data can be used without restriction. The usefulness of qualified data should be treated according to the severity of the qualifier. Should questions arise regarding the qualification of data and its relation to the usefulness, the reader is encouraged to contact Gerald Dodo at the Region 10 laboratory, phone number (360)871-8728.

LABORATORY QUALIFIER/REMARK CODE DEFINITIONS

Qualifier/ Remark Code	Definition (Codes Assigned to Values)
<	**Microbiology** – Level of target organism present in the sample is less than detection limit. The reported value is the detection limit.
	Flash Point – The expected flash point temperature is less than the reported value.
>	**Microbiology** – Level of target organism exceeds upper limit for acceptable range of countable colonies (MF only) or exceeds MPN indices based on number of positive tubes (MPN only). The reported value is the upper limit.
	Flash Point – If the sample has a flashpoint, it is greater than the reported value.
J	The identification of the analyte is acceptable; the reported value is an estimate.
JK	The identification of the analyte is acceptable; the reported value is an estimate and may be biased high. The actual value is expected to be less than the reported value.
JL	The identification of the analyte is acceptable; the reported value is an estimate and may be biased low. The actual value is expected to be greater than the reported value.
K	The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported value.
L	The identification of the analyte is acceptable; the reported value may be biased low. The actual value is expected to be greater than the reported value.
N	There is presumptive evidence that the analyte is present; the analyte is reported as a tentative identification.
NJ	There is presumptive evidence that the analyte is present; the analyte is reported as a tentative identification. The reported value is an estimate.
U	The analyte was not detected at or above the reported value.
UJ	The analyte was not detected at or above the reported value. The reported value is an estimate.

Qualifier/ Remark Code	Definition (Codes With No Reported Values)
A	Absent – The target parameter was analyzed for but was not present or was undetected. No value is reported with this qualification.
NA	Not Applicable, the parameter was not analyzed for, or there is no analytical result for this parameter. No v alue is reported with this qualification.
P	Present at an undetermined level – The target parameter is present but not quantifiable or no quantifiable result was determined. No value is reported with this qualification.
R	The presence or absence of the analyte can not be determined from the data due to severe quality control problems. The data are rejected and considered unusable. No value is reported with this qualification.

T A trace of the subject parameter was present. For asbestos analysis the subject parameter was identified but at a low level that a quantifiable percentage of content is unreliable. No value is reported with this qualification.

TNTC Too Numerous To Count – Any membrane where the total number of bacterial colonies exceeds 200 per membrane, or if the colonies are not distinct enough for accurate counting (i.e. confluent growth).

F The associated datum was generated using field methods and/or screening methods. The identification of the analyte is acceptable and the reported value has been found to be acceptable for use.

JF The associated datum was generated using field methods and/or screening methods. The identification of the analyte is acceptable and the reported value is an estimate.

JKF The associated datum was generated using field methods and/or screening methods. The identification of the analyte is acceptable; the reported value is an estimate and may be biased high. The actual value is expected to be less than the reported value.

JLF The associated datum was generated using field methods and/or screening methods. The identification of the analyte is acceptable; the reported value is an estimate and may be biased low. The actual value is expected to be greater than the reported value.

UF The associated datum was generated using field methods and/or screening methods. The analyte was not detected at or above the reported value.

UJF The associated datum was generated using field methods and/or screening methods. The analyte was not detected at or above the reported value. The reported value is an estimate.

Qualifier/ Remark Code)	**Cross Reference to Older Codes**
A	UND, ND – Undetected, Not detected
NA	NAR, NAF – No analytical result, Not analyzed for
P	PNQ – Present but not quantified
R	REJ - Rejected
T	TRACE

NOTE: For any qualifier code see the QA memo or case narrative for a more detailed description of its use

USACE DATA REVIEW– LOWER DUWAMISH TRIAD SAMPLING EVENT (PCB DATA)	
GENERAL INFORMATION	
EPA Region 8 Laboratory 16194 W. 45th Drive Golden, Colorado 80403	
Data Report prepared by Cathy Martin (Seattle District USACE Chemist)	**Report Prepared** 26 September 2008
Date Sampled	16-27 August 2004
Date Received by Lab	Acceptable. 12 Dec 2004
Date Analysis Began	Acceptable. However, documentation not available. Results were initially reported on 31 Dec 2004
Problems Noted (e.g., deviations from prescribed methods, analytical procedures): The "Analyst Notes" provided in the narrative by EPA Region 8 incorrectly reports the surrogate recoveries for the samples and does not provide a project-specific assessment. Region 8 applied surrogate acceptance criteria of ±30%. However, the project-specific surrogate recovery limits for DCBP are 40-140%. Therefore, the samples qualified as "J" by Region 8 have been revised to not qualified. It is unknown why the analyte list and surrogates for Region 8 are different from Region 10, nor why method QC was not reported.	
All required documents submitted? Data packages not available for this review.	
Analytical Method: SW-846 8082	
COMPLETENESS AND HOLDING CONDITIONS	
Samples Submitted = 30	**Samples Analyzed** = 29 Sample SD-331-0000 was lost during preparation at the laboratory.
Holding Conditions Acceptable? one year for frozen sediments)	Acceptable - received on 1 Dec 2004 at 2° C
If no, identify samples	NA
FORMAT	
Standard Report Sheets	
Concentration in proper units and significant figures?	Data packages unavailable
Qualifiers defined (e.g., U = undetected)	No - USACE reviewer assumed that CLP National Functional Guidelenes qualifiers were applied.
Samples detection limits (DL) provided for each analyte?	No - USACE reviewer assumed DL only where U qualifier is applied by the laboratory.

QA/QC Samples	
Method Blanks	
Total Number	Data not available
Frequency	
Aroclors detected outside < 20% of any reported value or <RL	
Certified Reference Materials	
Total #	2
Frequency	2/29 samples
CRM Used	Sequim SQ-1
Aroclors outside acceptance limit	All are outside limits. No explanation was provided by EPA Region 8 in the case narrative.
Field Duplicates	
Total #	2 collected but not analyzed in this batch
Frequency	NA
Samples/Aroclors with >100% RPD or CV	NA
Laboratory Control Samples	
Total #	Data not available
Frequency	
Aroclors with outside 50-130% Recovery	
Matrix Spikes	
Total #	Data not available
Frequency	
Aroclors with <50% Recovery	
Detection Limits	
Did any DL exceed SLK?	Data not available
If yes, detection limits exceeding SL (identify samples)	
Surrogate Recovery	
Were surrogates added to all samples?	Yes. However, TCMX was not added as a surrogate.
Identify samples with DCBP outside 40-140% TCMX outside 50-130%	None
Method Blanks (relative blank contamination)	
For target compounds, was blank contamination >5% of a sample concentration?	Data not available.
If yes, identify Aroclor and samples	
Laboratory Control Samples	
Total #	Data not available.
Frequency	
Aroclors with outside 50-130% Recovery	

[a] According to EPA Region 10, SQ-1 had a spiked value of 170 ug/kg when created, early historical results averaged 120 ug/kg. No control limits have been set in this laboratory.

PCBs in Soil
From R10 Lower Duwamish Project

Analyst: Mark A. Murphy

Introduction:

Thirty soil samples from the Lower Duwamish project were submitted to the EPA Region 8 laboratory for PCB analysis on 12/01/2004. The cooler was delivered by FedEx and the samples were received properly preserved and at 2^{O}C. All holding times were met.

Analytical Methods:

EPA method 3545A, "Pressurized Fluid Extraction (PFE)," revision 1, January 1998. This extraction procedure was used for the PCB soil samples.
EPA method 3660B, Sulfur Cleanup," CD-ROM revision 2, 1996.
EPA method 8082, "Polychlorinated Biphenyls (PCBs) By Gas Chromatography," revision 0, December 1996 was used for the PCB analysis.

Analyst Notes:

Surrogate recoveries reported on certificates of analysis are for Aroclor 1260. Aroclor recoveries in six samples were "J" flagged due to surrogate recoveries below the +/-30% acceptance range.

EPA Region 8 sample number	EPA Sample Number	Location number	Surrogate recovery
1.) AF00513	04-35-4001	SD-207-0000	Aroclor 1248 = 52.5% Aroclor 1254 = 47.4% Aroclor 1260 = 62.2
2.) AF00515	04-35-4003	SD-209-0000	Aroclor 1248 = 62.3% Aroclor 1254 = 56.3%
3.) AF00516	04-35-4006	SD-212-0000	Aroclor 1248 = 53.1% Aroclor 1254 = 48.0% Aroclor 1260 = 62.9%
4.) AF00517	04-35-4011	SD-217-0000	Aroclor 1248 = 65.7% Aroclor 1254 = 59.4%
5.) AF00520	04-35-4019	SD-337-0000	Aroclor 1248 = 64.6% Aroclor 1254 = 58.3%
6.) AF00522	04-35-4024	SD-342-0000	Aroclor 1248 = 64.2% Aroclor 1254 = 58.0%

EPA Region 8 sample AF00518, Location number SD-331-0000, EPA Region 10 sample 04-35-4013 was not reported (DNR) because the sample was lost during sample preparation. No further problems were encountered during the analysis.

USACE DATA REVIEW– LOWER DUWAMISH TRIAD SAMPLING EVENT (PCB DATA)	
GENERAL INFORMATION	
EPA Region 6 10625 Fallstone Road, Houston, TX 77099 (281) 983-2100, phone; (281) 983-2248. fax	
Data Report prepared by Cathy Martin (Seattle District USACE Chemist)	**Report Prepared:** 26 September 2008
Date Sampled	16-27 August 2004
Date Received by Lab	Unknown
Date Analysis Began	Unknown;
Problems Noted (e.g., deviations from prescribed methods, analytical procedures): The Region 6 Report Narrative incorrectly Reports that the samples were received past the storage hold time. The sample were stored at 0°C and shipped frozen to Region 6. Therefore, the results should not be qualified doe to hold time exceedances. Region 6 Report Narrative states that B4L0908 BS1 Aroclor recoveries were below advisory limits of 70-130%. However, the project-specific control limits are 50-130 %. Therefore, the associated samples should not be qualified due low bias. The USACE reviewer concurs with the following case narrative that accuracy/bias cannot be assessed for Aroclors not included in the LCS. In addition, USACE concurs that high bias in matrix spike B4L1001-MS1/MSD1 should be qualified due to contributions from Aroclor 1248.	
All required documents submitted? Chain-of-Custody and Sample Receipt Form not included in data package.	
Analytical Method	
COMPLETENESS AND HOLDING CONDITIONS	
Samples Submitted = 21	**Samples Analyzed** = 21
Holding Conditions Acceptable? one year for frozen sediments)	Yes (see "Problems Noted" above)
If no, identify samples	NA
FORMAT	
Standard Report Sheets	
Concentration in proper units and significant figures?	Yes
Qualifiers defined (e.g., U = undetected)	Yes
Samples detection limits (DL) provided for each analyte?	Yes

Method Blanks	
Total Number	2
Frequency	2/21 samples (2 batches)
Aroclors detected above 2x MDL (µg/kg)	None
Certified Reference Materials	
Total #	1
Frequency	1/21 samples
CRM Used	Sequim
Aroclors outside acceptance limit	Aroclor 1254 = 82.3ppb, 48.4% recovery
Field Duplicates	
Total #	Unknown
Frequency	Unknown
Samples/Aroclors with >100% RPD or CV	Unknown
Matrix Spikes	
Total #	2
Frequency	2/21 samples (2 batches)
Aroclors with <50% Recovery	None
Detection Limits	
Did any DL exceed SLK?	No
If yes, detection limits exceeding SL (identify samples)	NA
Surrogate Recovery	
Were surrogates added to all samples?	No
Identify samples with DCBP outside 40-140% TCMX outside 50-130%	NA
Method Blanks (relative blank contamination)	
For target compounds, was blank contamination >5% of a sample concentration?	No
If yes, identify Aroclor and samples	NA
Laboratory Control Samples	
Total #	2
Frequency	2/21 samples (2 batches)
Aroclors with outside 50-130% Recovery	None

[a] According to EPA Region 10, SQ-1 had a spiked value of 170 ug/kg when created, early historical results averaged 120 ug/kg. No control limits have been set in this laboratory.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 6 Laboratory

Environmental Services Branch
10625 Fallstone Road, Houston, TX 77099
Phone: (281)983-2100 Fax: (281)983-2248

Final Analytical Report

Site Name ---------- Lower Duwamish Triad / WA

Sample Collection Date(s)-- 08/16/04 - 08/19/04

Contact ---------- U.S. EPA Region 10 Lab

Report Date ---------- 01/18/05

Project # ---------- 05RCRA028

Work Order(s) ---------- 0411019

Analyses included in this report:

PCB 8082 - R10 Solids, Dry Weight

Report Narrative

Samples were extracted approximately 3 1/2 months after collection. The samples were received in the laboratory approximately 3 months after collection. Concentrations should be considered minimum values.

Aroclor 1254 is qualified as a tentative identification and estimated on sample 0411019-16. This is because some interfering peaks were present that prevented getting a clear pattern match and made some integrations estimated.

Aroclors 1016 and 1260 recovered below advisory limits in the blank spike B4L0908-BS1. This blank spike applies to samples 0411019-01 to 0411019-10. Aroclor 1260 recovered below advisory limits in blank spike B4L1001-BS1. This blank spike applies to samples 0411019-11 to 0411019-21. Of the Aroclors outside limits, only 1260 was reported. This may indicate a low bias for Aroclor 1260 where reported. Because not all of the Aroclors are spiked, it is unknown if the low bias would apply to the other Aroclors reported (Aroclors 1248 and 1254).

Aroclor 1016 is qualified with a high bias on B4L1001-MS1/MSD1 due to contributions from Aroclor 1248.

Standard procedures for quality assurance and quality control were followed in the analysis and reporting of the sample results. The results apply only to the samples tested. This final report should only be reproduced in full.

Reporting limits are adjusted for sample size and matrix interference.

Report Approvals:

Richard McMillin
Region 6 Laboratory Manager

Douglas A. Lipka
Region 6 Laboratory Branch Chief

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 6 Environmental Services Branch Laboratory

10625 Fallstone Road
Houston, Texas 77099

Sample Receipt and Disposal

Data Management Coordinator: Christy Warren

_____ / / _____

Data Management Coordinator Signature Date

Date Transmitted: _____/_____/_____

Please have the U.S. EPA Project Manager/Officer call the Data Management Coordinator at 3-2137 for any comments or questions.

Please sign and date this form below and return it with any comments to:

Christy Warren
Data Management Coordinator
Region 6 Laboratory
6MD-HS

_____/_____/_____

Received by and Date

Comments:

The laboratory routinely disposes of samples 90 days after all analyses have been completed. If you have a need to hold these samples in custody longer than 90 days, please sign below.

_____ _____

Signature Date

Please provide a reason for holding:

Environmental Protection Agency

Region 6 Laboratory

10625 Fallstone Road, Houston, TX 77099
Phone:(281)983-2100 Fax:(281)983-2248

ANALYTICAL REPORT FOR SAMPLES

Station ID	Laboratory ID	Matrix	Date Collected	Date Received
04344106	0411019-01	Solid	8/19/04 11:15	11/23/04 08:50
04344107	0411019-02	Solid	8/19/04 11:15	11/23/04 08:50
04344109	0411019-03	Solid	8/19/04 11:45	11/23/04 08:50
04344110	0411019-04	Solid	8/19/04 11:45	11/23/04 08:50
04344129	0411019-05	Solid	8/19/04 18:52	11/23/04 08:50
04344133	0411019-06	Solid	8/19/04 10:40	11/23/04 08:50
04344135	0411019-07	Solid	8/19/04 10:40	11/23/04 08:50
04344137	0411019-08	Solid	8/19/04 9:55	11/23/04 08:50
04344138	0411019-09	Solid	8/19/04 9:55	11/23/04 08:50
04344139	0411019-10	Solid	8/19/04 9:55	11/23/04 08:50
04344148	0411019-11	Solid	8/16/04 18:47	11/23/04 08:50
04344149	0411019-12	Solid	8/19/04 17:33	11/23/04 08:50
04344150	0411019-13	Solid	8/19/04 17:33	11/23/04 08:50
04344151	0411019-14	Solid	8/19/04 17:33	11/23/04 08:50
04344153	0411019-15	Solid	8/18/04 15:25	11/23/04 08:50
04344154	0411019-16	Solid	8/18/04 15:25	11/23/04 08:50
04344161	0411019-17	Solid	8/18/04 11:20	11/23/04 08:50
04344162	0411019-18	Solid	8/18/04 11:20	11/23/04 08:50
04344165	0411019-19	Solid	8/19/04 18:27	11/23/04 08:50
04344160	0411019-20	Solid	8/18/04 11:20	11/23/04 08:50
SQI	0411019-21	Solid	8/18/04 0:00	11/23/04 08:50

Environmental Protection Agency

Region 6 Laboratory

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-01 **Station ID: 04344106**

Batch: B4L0908
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.456g
%Solids: 62.30

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	280		72.9	42-119	12/09/04	12/15/04
Surr: Decachlorobiphenyl	202		52.6	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		15.4	1	12/09/04	12/15/04
Aroclor-1221	U		30.7	"	"	"
Aroclor-1232	U		15.4	"	"	"
Aroclor-1242	U		15.4	"	"	"
Aroclor-1248	**76.6**		15.4	"	"	01/06/05
Aroclor-1254	**346**		15.4	"	"	12/13/04
Aroclor-1260	**116**		15.4	"	"	12/15/04

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-02 **Station ID: 04344107**

Batch: B4L0908
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.738g
%Solids: 79.09

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	214		72.8	42-119	12/09/04	12/15/04
Surr: Decachlorobiphenyl	217		73.8	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		11.8	1	12/09/04	12/15/04
Aroclor-1221	U		23.5	"	"	"
Aroclor-1232	U		11.8	"	"	"
Aroclor-1242	U		11.8	"	"	"
Aroclor-1248	U		11.8	"	"	01/06/05
Aroclor-1254	**86.7**		11.8	"	"	12/13/04
Aroclor-1260	**40.5**		11.8	"	"	12/15/04

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-03 **Station ID: 04344109**

Batch: B4L0908
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.249g
%Solids: 58.70

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	327		78.6	42-119	12/09/04	12/15/04
Surr: Decachlorobiphenyl	223		53.6	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		16.6	1	12/09/04	12/15/04
Aroclor-1221	U		33.2	"	"	"
Aroclor-1232	U		16.6	"	"	"
Aroclor-1242	U		16.6	"	"	"
Aroclor-1248	U		16.6	"	"	01/06/05
Aroclor-1254	**106**		16.6	"	"	12/13/04
Aroclor-1260	**168**		16.6	"	"	12/15/04

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-04 **Station ID: 04344110**

Batch: B4L0908
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.254g
%Solids: 62.44

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	317		81.3	42-119	12/09/04	12/15/04
Surr: Decachlorobiphenyl	245		62.8	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		15.6	1	12/09/04	12/15/04
Aroclor-1221	U		31.2	"	"	"
Aroclor-1232	U		15.6	"	"	"
Aroclor-1242	U		15.6	"	"	"
Aroclor-1248	U		15.6	"	"	01/06/05
Aroclor-1254	**89.3**		15.6	"	"	12/13/04
Aroclor-1260	**70.4**		15.6	"	"	12/15/04

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-05 **Station ID: 04344129**

Batch: B4L0908
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.244g
%Solids: 86.22

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	203		71.7	42-119	12/09/04	12/15/04
Surr: Decachlorobiphenyl	202		71.4	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		11.3	1	12/09/04	12/15/04
Aroclor-1221	U		22.6	"	"	"
Aroclor-1232	U		11.3	"	"	"
Aroclor-1242	U		11.3	"	"	"
Aroclor-1248	U		11.3	"	"	01/06/05
Aroclor-1254	U		11.3	"	"	12/13/04
Aroclor-1260	U		11.3	"	"	12/15/04

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-06 **Station ID: 04344133**

Batch: B4L0908
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.381g
%Solids: 57.37

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	342		81.4	42-119	12/09/04	12/15/04
Surr: Decachlorobiphenyl	265		63.1	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		16.8	1	12/09/04	12/15/04
Aroclor-1221	U		33.6	"	"	"
Aroclor-1232	U		16.8	"	"	"
Aroclor-1242	U		16.8	"	"	"
Aroclor-1248	**85.0**		16.8	"	"	01/06/05
Aroclor-1254	**501**		16.8	"	"	12/13/04
Aroclor-1260	**149**		16.8	"	"	12/15/04

Environmental Protection Agency

Region 6 Laboratory

10625 Fallstone Road, Houston, TX 77099
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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-07 **Station ID: 04344135**

Batch: B4L0908
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.441g
%Solids: 68.29

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	285		81.2	42-119	12/09/04	12/15/04
Surr: Decachlorobiphenyl	219		62.4	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		14.0	1	12/09/04	12/15/04
Aroclor-1221	U		28.0	"	"	"
Aroclor-1232	U		14.0	"	"	"
Aroclor-1242	U		14.0	"	"	"
Aroclor-1248	**459**		14.0	"	"	01/06/05
Aroclor-1254	**2,170**		70.1	5	"	12/15/04
Aroclor-1260	**436**		14.0	1	"	12/15/04

Environmental Protection Agency

Region 6 Laboratory

10625 Fallstone Road, Houston, TX 77099
Phone:(281)983-2100 Fax:(281)983-2248

Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-08 **Station ID: 04344137**

Batch: B4L0908
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.408g
%Solids: 59.27

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	327		80.7	42-119	12/09/04	12/15/04
Surr: Decachlorobiphenyl	267		65.9	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		16.2	1	12/09/04	12/15/04
Aroclor-1221	U		32.4	"	"	"
Aroclor-1232	U		16.2	"	"	"
Aroclor-1242	U		16.2	"	"	"
Aroclor-1248	**562**		16.2	"	"	01/06/05
Aroclor-1254	**755**		32.4	2	"	12/15/04
Aroclor-1260	**212**		16.2	1	"	12/15/04

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10625 Fallstone Road, Houston, TX 77099
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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-09 **Station ID: 04344138**

Batch: B4L0908
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.168g
%Solids: 69.16

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	283		79.5	42-119	12/09/04	12/15/04
Surr: Decachlorobiphenyl	284		79.8	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		14.2	1	12/09/04	12/15/04
Aroclor-1221	U		28.4	"	"	12/15/04
Aroclor-1232	U		14.2	"	"	"
Aroclor-1242	U		14.2	"	"	"
Aroclor-1248	**6,920**		284	20	"	01/06/05
Aroclor-1254	**2,830**		142	10	"	12/15/04
Aroclor-1260	**688**		28.4	2	"	12/15/04

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-10 **Station ID: 04344139**

Batch: B4L0908
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.113g
%Solids: 80.08

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	222		71.8	42-119	12/09/04	12/15/04
Surr: Decachlorobiphenyl	230		74.4	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		12.3	1	12/09/04	12/15/04
Aroclor-1221	U		24.7	"	"	"
Aroclor-1232	U		12.3	"	"	"
Aroclor-1242	U		12.3	"	"	"
Aroclor-1248	**635**		12.3	"	"	01/06/05
Aroclor-1254	**799**		37.0	3	"	12/15/04
Aroclor-1260	**201**		12.3	1	"	12/15/04

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-11 **Station ID: 04344148**

Batch: B4L1001
Matrix: Solid

Date Collected: 08/16/04
Sample Wet Weight: 10.393g
%Solids: 59.66

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	273		67.7	42-119	12/10/04	12/16/04
Surr: Decachlorobiphenyl	331		82.1	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		16.1	1	12/10/04	12/16/04
Aroclor-1221	U		32.3	"	"	"
Aroclor-1232	U		16.1	"	"	"
Aroclor-1242	U		16.1	"	"	"
Aroclor-1248	**110**		16.1	"	"	01/06/05
Aroclor-1254	**1,980**		161	10	"	12/16/04
Aroclor-1260	**554**		16.1	1	"	"

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Region 6 Laboratory

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-12 **Station ID: 04344149**

Batch: B4L1001
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.374g
%Solids: 56.98

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	355		83.9	42-119	12/10/04	12/16/04
Surr: Decachlorobiphenyl	364		86.1	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		16.9	1	12/10/04	12/16/04
Aroclor-1221	U		33.8	"	"	"
Aroclor-1232	U		16.9	"	"	"
Aroclor-1242	U		16.9	"	"	"
Aroclor-1248	**80.2**		16.9	"	"	01/06/05
Aroclor-1254	**990**		33.8	2	"	12/16/04
Aroclor-1260	**411**		16.9	1	"	"

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-13 **Station ID: 04344150**

Batch: B4L1001
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.292g
%Solids: 57.16

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	347		81.6	42-119	12/10/04	12/16/04
Surr: Decachlorobiphenyl	326		76.7	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		17.0	1	12/10/04	12/16/04
Aroclor-1221	U		34.0	"	"	"
Aroclor-1232	U		17.0	"	"	"
Aroclor-1242	U		17.0	"	"	"
Aroclor-1248	**32.1**		17.0	"	"	01/06/05
Aroclor-1254	**626**		17.0	"	"	12/16/04
Aroclor-1260	**576**		17.0	"	"	"

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-14 **Station ID: 04344151**

Batch: B4L1001
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.069g
%Solids: 63.36

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	331		84.4	42-119	12/10/04	12/16/04
Surr: Decachlorobiphenyl	321		81.9	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		15.7	1	12/10/04	12/16/04
Aroclor-1221	U		31.3	"	"	"
Aroclor-1232	U		15.7	"	"	"
Aroclor-1242	U		15.7	"	"	"
Aroclor-1248	U		15.7	"	"	01/06/05
Aroclor-1254	**68.9**		15.7	"	"	12/16/04
Aroclor-1260	**170**		15.7	"	"	"

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-15 **Station ID: 04344153**

Batch: B4L1001
Matrix: Solid

Date Collected: 08/18/04
Sample Wet Weight: 10.522g
%Solids: 69.00

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	275		79.9	42-119	12/10/04	12/16/04
Surr: Decachlorobiphenyl	312		90.7	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		13.8	1	12/10/04	12/16/04
Aroclor-1221	U		27.5	"	"	"
Aroclor-1232	U		13.8	"	"	"
Aroclor-1242	U		13.8	"	"	"
Aroclor-1248	**54.5**		13.8	"	"	01/06/05
Aroclor-1254	**237**		13.8	"	"	12/16/04
Aroclor-1260	**460**		13.8	"	"	"

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-16 **Station ID: 04344154**

Batch: B4L1001
Matrix: Solid

Date Collected: 08/18/04
Sample Wet Weight: 10.379g
%Solids: 62.53

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	306		79.5	42-119	12/10/04	12/16/04
Surr: Decachlorobiphenyl	319		82.9	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		15.4	1	12/10/04	12/16/04
Aroclor-1221	U		30.8	"	"	"
Aroclor-1232	U		15.4	"	"	"
Aroclor-1242	U		15.4	"	"	"
Aroclor-1248	U		15.4	"	"	01/06/05
Aroclor-1254	**60.4**	**NJ**	15.4	"	"	12/16/04
Aroclor-1260	**298**		15.4	"	"	"

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-17 **Station ID: 04344161**

Batch: B4L1001
Matrix: Solid

Date Collected: 08/18/04
Sample Wet Weight: 10.192g
%Solids: 53.80

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	372		81.6	42-119	12/10/04	12/16/04
Surr: Decachlorobiphenyl	360		78.9	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		18.2	1	12/10/04	12/16/04
Aroclor-1221	U		36.5	"	"	"
Aroclor-1232	U		18.2	"	"	"
Aroclor-1242	U		18.2	"	"	"
Aroclor-1248	**582**		18.2	"	"	01/06/05
Aroclor-1254	**636**		18.2	"	"	12/16/04
Aroclor-1260	**173**		18.2	"	"	"

Environmental Protection Agency
Region 6 Laboratory
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Phone:(281)983-2100 Fax:(281)983-2248

Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-18 **Station ID: 04344162**

Batch: B4L1001
Matrix: Solid

Date Collected: 08/18/04
Sample Wet Weight: 10.159g
%Solids: 67.32

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	269		73.5	42-119	12/10/04	12/16/04
Surr: Decachlorobiphenyl	294		80.3	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		14.6	1	12/10/04	12/16/04
Aroclor-1221	U		29.2	"	"	"
Aroclor-1232	U		14.6	"	"	"
Aroclor-1242	U		14.6	"	"	"
Aroclor-1248	**46.1**		14.6	"	"	01/06/05
Aroclor-1254	**64.0**		14.6	"	"	12/16/04
Aroclor-1260	**16.0**		14.6	"	"	"

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-19 **Station ID: 04344165**

Batch: B4L1001
Matrix: Solid

Date Collected: 08/19/04
Sample Wet Weight: 10.186g
%Solids: 67.12

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	291		79.5	42-119	12/10/04	12/16/04
Surr: Decachlorobiphenyl	271		74.0	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		14.6	1	12/10/04	12/16/04
Aroclor-1221	U		29.3	"	"	"
Aroclor-1232	U		14.6	"	"	"
Aroclor-1242	U		14.6	"	"	"
Aroclor-1248	**21.5**		14.6	"	"	01/06/05
Aroclor-1254	**198**		14.6	"	"	12/16/04
Aroclor-1260	**65.2**		14.6	"	"	"

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-20 **Station ID: 04344160**

Batch: B4L1001
Matrix: Solid

Date Collected: 08/18/04
Sample Wet Weight: 10.348g
%Solids: 55.71

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	349		80.4	42-119	12/10/04	12/16/04
Surr: Decachlorobiphenyl	335		77.2	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		17.3	1	12/10/04	12/16/04
Aroclor-1221	U		34.7	"	"	"
Aroclor-1232	U		17.3	"	"	"
Aroclor-1242	U		17.3	"	"	"
Aroclor-1248	**1,830**		86.7	5	"	01/06/05
Aroclor-1254	**782**		52.0	3	"	12/16/04
Aroclor-1260	**161**		17.3	1	"	"

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Aroclors by EPA Method 8082 - GC/ECD

Lab ID: 0411019-21 **Station ID: SQI**

Batch: B4L1001
Matrix: Solid

Date Collected: 08/18/04
Sample Wet Weight: 10.268g
%Solids: 62.45

Sample Qualifiers: **R6HTS**

Surrogates

Analyte	Result µg/kg dry	Analyte Qualifiers	%Recovery	%Recovery Limits	Prepared	Analyzed
Surr: Tetrachloro-meta-xylene	297		76.2	42-119	12/10/04	12/16/04
Surr: Decachlorobiphenyl	268		68.7	43-118	"	"

Targets

Analyte	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aroclor-1016	U		15.6	1	12/10/04	12/16/04
Aroclor-1221	U		31.2	"	"	"
Aroclor-1232	U		15.6	"	"	"
Aroclor-1242	U		15.6	"	"	"
Aroclor-1248	U		15.6	"	"	01/06/05
Aroclor-1254	**82.3**		15.6	"	"	12/16/04
Aroclor-1260	U		15.6	"	"	"

Environmental Protection Agency
Region 6 Laboratory
10625 Fallstone Road, Houston, TX 77099
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Aroclors by EPA Method 8082 - GC/ECD - Quality Control

Batch: B4L0908 **Matrix: Solid**

Blank (B4L0908-BLK1)
Prepared: 12/09/04 Analyzed: 12/15/2004

Surrogates

ANALYTE	Result µg/kg dry	Analyte Qualifier	Spike Level	%REC	%REC Limits
Surr: Tetrachloro-meta-xylene	201		249	80.7	42-119
Surr: Decachlorobiphenyl	176		249	70.7	43-118

Blank (B4L0908-BLK1)
Prepared: 12/09/04 Analyzed: 12/15/2004

Targets

ANALYTE	Result µg/kg dry	Analyte Qualifiers	Reporting Limit
Aroclor-1016	U		9.9
Aroclor-1221	U		19.9
Aroclor-1232	U		9.9
Aroclor-1242	U		9.9
Aroclor-1248	U		9.9
Aroclor-1254	U		9.9
Aroclor-1260	U		9.9

LCS (B4L0908-BS1)
Prepared: 12/09/04 Analyzed: 12/15/2004

Surrogates

ANALYTE	Result µg/kg dry	Analyte Qualifier	Spike Level	%REC	%REC Limits
Surr: Tetrachloro-meta-xylene	193		246	78.5	42-119
Surr: Decachlorobiphenyl	185		246	75.2	43-118

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Aroclors by EPA Method 8082 - GC/ECD - Quality Control

Batch: B4L0908 **Matrix: Solid**

LCS (B4L0908-BS1)

Prepared: 12/09/04 Analyzed: 12/15/2004

Targets

ANALYTE	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Spike Level	%REC	%REC Limits
Aroclor-1016	610		19.7	986	61.9#	70-130
Aroclor-1260	590		19.7	986	59.8#	70-130

Matrix Spike (B4L0908-MS1)

Source: 0411019-05 Prepared: 12/09/04 Analyzed: 12/15/2004

Surrogates

ANALYTE	Result µg/kg dry	Analyte Qualifier	Spike Level	%REC	%REC Limits
Surr: Tetrachloro-meta-xylene	252		286	88.1	42-119
Surr: Decachlorobiphenyl	227		286	79.4	43-118

Matrix Spike (B4L0908-MS1)

Source: 0411019-05 Prepared: 12/09/04 Analyzed: 12/15/2004

Targets

ANALYTE	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Spike Level	Source Result	%REC	%REC Limits
Aroclor-1016	810		22.9	1,140		71.1	50-150
Aroclor-1260	710		22.9	1,140		62.3	50-150

Matrix Spike Dup (B4L0908-MSD1)

Source: 0411019-05 Prepared: 12/09/04 Analyzed: 12/15/2004

Surrogates

ANALYTE	Result µg/kg dry	Analyte Qualifier	Spike Level	%REC	%REC Limits
Surr: Tetrachloro-meta-xylene	280		286	97.9	42-119
Surr: Decachlorobiphenyl	242		286	84.6	43-118

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Aroclors by EPA Method 8082 - GC/ECD - Quality Control

Batch: B4L0908 **Matrix: Solid**

Matrix Spike Dup (B4L0908-MSD1)

Source: 0411019-05 Prepared: 12/09/04 Analyzed: 12/15/2004

Targets

ANALYTE	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Aroclor-1016	902		22.9	1,140		79.1	50-150	10.7	25
Aroclor-1260	766		22.9	1,140		67.2	50-150	7.59	25

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Aroclors by EPA Method 8082 - GC/ECD - Quality Control

Batch: B4L1001 **Matrix: Solid**

Blank (B4L1001-BLK1)
Prepared: 12/10/04 Analyzed: 12/16/2004

Surrogates

ANALYTE	Result µg/kg dry	Analyte Qualifier	Spike Level	%REC	%REC Limits
Surr: Tetrachloro-meta-xylene	166		246	67.5	42-119
Surr: Decachlorobiphenyl	186		246	75.6	43-118

Blank (B4L1001-BLK1)
Prepared: 12/10/04 Analyzed: 12/16/2004

Targets

ANALYTE	Result µg/kg dry	Analyte Qualifiers	Reporting Limit
Aroclor-1016	U		9.8
Aroclor-1221	U		19.7
Aroclor-1232	U		9.8
Aroclor-1242	U		9.8
Aroclor-1248	U		9.8
Aroclor-1254	U		9.8
Aroclor-1260	U		9.8

LCS (B4L1001-BS1)
Prepared: 12/10/04 Analyzed: 12/16/2004

Surrogates

ANALYTE	Result µg/kg dry	Analyte Qualifier	Spike Level	%REC	%REC Limits
Surr: Tetrachloro-meta-xylene	220		246	89.4	42-119
Surr: Decachlorobiphenyl	199		246	80.9	43-118

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Aroclors by EPA Method 8082 - GC/ECD - Quality Control

Batch: B4L1001 **Matrix: Solid**

LCS (B4L1001-BS1)
Prepared: 12/10/04 Analyzed: 12/16/2004

Targets

ANALYTE	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Spike Level	%REC	%REC Limits
Aroclor-1016	724		19.7	983	73.7	70-130
Aroclor-1260	666		19.7	983	67.8#	70-130

Matrix Spike (B4L1001-MS1)
Source: 0411019-20 Prepared: 12/10/04 Analyzed: 12/16/2004

Surrogates

ANALYTE	Result µg/kg dry	Analyte Qualifier	Spike Level	%REC	%REC Limits
Surr: Tetrachloro-meta-xylene	402		444	90.5	42-119
Surr: Decachlorobiphenyl	371		444	83.6	43-118

Matrix Spike (B4L1001-MS1)
Source: 0411019-20 Prepared: 12/10/04 Analyzed: 12/16/2004

Targets

ANALYTE	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Spike Level	Source Result	%REC	%REC Limits
Aroclor-1016	1,630	K	88.9	1,780		91.6	50-150
Aroclor-1260	1,330		35.5	1,780	161	65.7	50-150

Matrix Spike Dup (B4L1001-MSD1)
Source: 0411019-20 Prepared: 12/10/04 Analyzed: 12/16/2004

Surrogates

ANALYTE	Result µg/kg dry	Analyte Qualifier	Spike Level	%REC	%REC Limits
Surr: Tetrachloro-meta-xylene	418		425	98.4	42-119
Surr: Decachlorobiphenyl	324		425	76.2	43-118

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Aroclors by EPA Method 8082 - GC/ECD - Quality Control

Batch: B4L1001 **Matrix: Solid**

Matrix Spike Dup (B4L1001-MSD1)

Source: 0411019-20 Prepared: 12/10/04 Analyzed: 12/16/2004

Targets

ANALYTE	Result µg/kg dry	Analyte Qualifiers	Reporting Limit	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Aroclor-1016	1,480	K	85.1	1,700		87.1	50-150	9.65	25
Aroclor-1260	1,250		34.0	1,700	161	64.1	50-150	6.20	25

Environmental Protection Agency

Region 6 Laboratory

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Notes and Definitions

NJ	There is presumptive evidence that the analyte is present; the analyte is reported as a tentative identification. The reported value is an estimate.
K	The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported value.
R6A	This sample was extracted at a single acid pH.
R6HTS	Sample was prepared and/or analyzed past recommended holding time. Concentrations should be considered minimum values.
AES	Atomic Emission Spectrometer
CVAA	Cold Vapor Atomic Absorption
ECD	Electron Capture Detector
GC	Gas Chromatograph
GFAA	Graphite Furnace Atomic Absorption
ICP	Inductively Coupled Plasma
MS	Mass Spectrometer
NA	Not Applicable
NPD	Nitrogen Phosphorous Detector
NR	Not Reported
TCLP	Toxicity Characteristic Leaching Procedure
U	Undetected
#	Out of QC limits

Initial pressure in air analyses is the pressure at which the canister was received in psia (pounds *per* square inch absolute pressure).

The pH reported for Volatile liquid samples was tested using a 0-14 pH indicator strip for the purpose of verifying chemical preservation.

APPENDIX H: Field Records

Appendix H: Sediment Sampling Field Notebooks

HERRERA
ENVIRONMENTAL CONSULTANTS
1414 DEXTER AVENUE NORTH
SUITE 200
SEATTLE, WASHINGTON 98109
(206) 281-7604
FAX 281-7651

SEDIMENT SAMPLE RECORD

PROJECT NAME/NUMBER: PLANT2 CO-01802-006 002-001 DATE: 8/18/04

LOCATION: DUWAMISH RIVER CREW: BRUCE CARPENTER JOHN WAKEMAN ROS ZISETTE ALEX SVENDSON GEAR: VIBRATED

OBSERVATIONS:

SAMPLE NUMBER	STA. NO.	REP. NO.	TIME	WATER DEPTH	SEDIMENT DEPTH	CHARACTERISTICS (COLOR,TYPE,DEBRIS,ODOR)
SD-319	319	A	16:10	8.8M	6'9"	

Notes:

HERRERA ENVIRONMENTAL CONSULTANTS
1414 DEXTER AVENUE NORTH
SUITE 200
SEATTLE, WASHINGTON 98109
(206) 281-7604
FAX 281-7651

SEDIMENT SAMPLE RECORD

PROJECT NAME/NUMBER: Boeing Plant 2 00-0180z (Triad) DATE: 8/18/04

LOCATION: Duwamish River CREW: Carpenter, Eisette, Eaton, Putnam GEAR: Vibracorder

Wakeman (recorder)
Filutowski (observer)

OBSERVATIONS:

SAMPLE NUMBER	STA. NO.	REP. NO.	TIME	WATER DEPTH	SEDIMENT DEPTH	CHARACTERISTICS (COLOR,TYPE,DEBRIS,ODOR)
SD-317	317	A	0926	NA	<2 ft	Black mud, sandy gravelly silt
SD-~~321~~322	~~321~~322	A	1012	6.9m	Ø	Nothing to report. (refusal)
SD-~~321~~322	~~321~~322	B	1030	6.8m	3 ft	Black fine mud/silt
SD-~~321~~322	~~321~~322	C	1120	6.5m	6'4"	Black fine mud
SD-321	322	A	1525	7m	~~[illegible]~~	← 4.5' core gn black fine mud
10 → ~~SD-319~~	~~314~~	~~A~~	~~1670~~	~~2.8m~~	~~2'4"~~	~~Samples sent to lab to open~~
SD-314	314	A	1750	4m	<1'	"
SD-314	314	B	1807	4.2m		"
SD-318	315	A	1700	2.8m	2'4"	"
SD-313	313	A	1904	4.2m	~2'	(sheen) "
313A						

Notes:

Jonas Wakeman 8/18/04

HERRERA ENVIRONMENTAL CONSULTANTS
1414 DEXTER AVENUE NORTH
SUITE 200
SEATTLE, WASHINGTON 98109
(206) 281-7604
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SEDIMENT SAMPLE RECORD

PROJECT NAME/NUMBER: Boeing Plant 2 00-01802-006 (Triad) DATE: 8/19/04

LOCATION: Duwamish River CREW: Barker, Enton, Putnam, Carpenter, Wakeman GEAR: vibracorer

OBSERVATIONS:

SAMPLE NUMBER	STA. NO.	REP. NO.	TIME	WATER DEPTH	SEDIMENT DEPTH (recovery)	CHARACTERISTICS (COLOR,TYPE,DEBRIS,ODOR)
SD-307	307	A	0830	3m	2 ft	core likely fell over
		B	0850	2.5m	< 0.5 ft	core fell over
		C	0900	4m	4 ft	core bent but got recovery
SD-317	317	B	0955	11'9"	6'3"	core bent, some recovery
SD-316	316	A	1040	11'3"	7' (full)	core cut to 7' (twice cut) before sampling
SD-309	309	A	1115	10'6"	7' (full)	pre-cut to 7', full
SD-310	310	A	1145	8'2"	5'8"	recovery
SD-311	311	A	1615	7'11"	~~full recovery~~	~~good recovery, very black silt~~ MB 8/19
SD-312	312	A	1735	9.4'		good recovery MB 8/19
SD-311	311	A	1615	7'11"	7'6"	full recovery, very black silt
SD-312	312	A	1700	7.7'	4'8"	*good recovery, very black, fine silt
SD-320	320	A	1733	9.0'	6'3"	good recovery, black fine silt
SD-323	323	A	1877	11.35'	4.5'	good recovery, black fine silt, woody debris
SD-315	315	A	1852	11.33'	5.33'	good recovery, very watery, black fine silt, less fine than
8/19 SD-313	313	B				more sand
SD-313	313	B	1933	13.6'	3'10"	very sandy, sheen, recovery 50%
SD-313	313	C	1958	14.4'	4'2"	better recovery, woody debris

8/19/04

Notes:

*good recovery = 75%

Field Notes

Wednesday August 18, 2004.
00-01802-006 Plant 2
Rob Zisette (RZ), Bruce Carpenter (BC)

0600 Arrived at site and prepared vibrocorer. Needed work on vibracorer switch.

0815 Left Dock to pick up Anna Filutowski and John Wakeman at South Park Marina. We had to fix electric switch for vibrocorer. Dick Sylvester came from Golder office in Redmond to do this.
We set up core processing equipment and table while switch was repaired

0850 Bruce Carpenter gave safety briefing.
0900h - 0915h - Deployed. Due to shallow water, removed weight carriage from vibrocorer

0926h Station 317 begin
A: Did not get good water depth. Generator

8/18/04 19

on/off switch malfunction. Less than 2 ft of recovery. Sample not retained
- 1005 Removed core liner, placed residue in bucket for IDW
1012 → station 322 - new core 322 (A)
Depth 5.9 m (water)
No recovery of sample.
- 1030h 322 (B)
about 6.5 at bottom (sounder)
3 ft of core - 6.5 ft penetration
(10.5 ft - [illegible])
= 3/6.5 recovery
Core not retained (to IDW)
redo.
- 1120h advanced 322 again 322 (C)
6.5 m (approx)
6 ft 4" mud ~~penetration~~ recovery
8 ft 8" penetration
(6'4"/8'8") = % recovery
Iced core horizontal whilst transporting to Harbor Island Marina. (Unable to split core on deck due to electric saw that blows the circuit breaker)
Arrived at Harbor Is. Marina 1125h

processed core starting at 1125h.

Picture 2-18 (misfire) 17 jar
2-18 } SD-322
2-19 } depths as shown
(ore appears winnowed (porous) below 3 ft.)

SD322 - 0010 - black silty clay
0020 - " " " clay with woody debris
0030 - " " sand w/ woody debris
0040 - " " " sand
0050 - " " "

3-3.5 wood predominates; below it is sand.

*Decided to cap cores for transport to lab.
left 1440h to return to site

-1525 SD 321 Depth 6.47m

76" depth of penetration = 6'6"
4'6" recovery

8/18/04

Note to sample-collection
322 was to be a 6' sample, but only 4.5' was recovered. Pls. try to get a PAB sample at least from 4-4.5' if possible. TOC a secondary but preferred.
— John Wakeman

1610h SD-319
Tom says 8.8m to bottom.
(This seems to a deep)
Charlie's bathymetry was 13.5' but this is apparently a slope.
8'9" penetration
6'9" ~~penet recovery~~ recovery

SD 318
1700h - 2.5m depth
Core bent - only 2'4" recovery.

1750h - SD 314
water Depth 4m
penetration 9'?
no recovery (less than 1 foot)

8/18/04

Removed catcher and reinstalled, decanned

Tribal members informed as that 8pm begins gill net fishery. It extends to 8AM on 8/19/04.

1807h SD314 (B)

4.2m to bottom
7.5m to sediment bottom } ~~deck~~ wire measurement

Because core has been used ~~before~~ cannot estimate recovery from mark on barrel. About 8' of mud on barrel. 3.3m = 10'6" so. feet compared to deck measure

Recovery 4'10" but lost a little at bottom on decanting

1904 h SD313

Depth to bottom 4.2m
" to depth of ~~core~~ 7.2m } wire measure

This is an overestimate!

bottom Sheen - Picture 2-20

droplets of sheen 1/2-1"

Abundant wood chips - redish

Hat penetration is poor.

Recovery ~ 2 ft

Took 1-2' sample. Also should revisit this site and try again. If a better 1-2' sample occurs, we can use it

Removed 1950h to dock at Harbor 6

John S Wakeman, US Army
Corps of Engineers

August 19, 2004 00-01802-006 Sunny ±75

0700 Meet @ Marina, Harbor Island
Rebekah Barker - USACE, notes
Bruce Carpenter - HEC, sampler
Charlie Eaton - captain
Tom Putnam - deck hand, winch
0723 Leave slip/marina
after loading ice, equip
Prepare corer (attach head, etc.)
0755 Reach South Park Marina
0807 Pick up John Wakeman - USACE
Health & Safety briefing
0828 Arrive @ station SD-307
0830 zero core
take sample Rep A SD-307
water depth ~ 3 m
~~Rep~~ 8/19 penetration ~ ~~5.5~~ 8/19 10' (full)
recovery ~ 2'
core fell over (too much slack, will lower slower next rep), decon
0850 SD-307 Rep B
water depth = 2.5 m
penetration ~ ~~6 m~~ 3'10"
recovery = <0.5'
corer likely fell over again

[signature] 8/19/04

8/19/04 00-01802-006

SD-307 Rep C, wash tube, zero @ surface
water depth = 4 m
penetration = 6.2 m
recovery = 4'
Rep C → move offshore 15' (5 m)
tough to pull core out, possibly driven in at an angle
corer bent just over 6' up
~~SD-307 Rep D~~ 8/19
~~Arrive~~ 8/19
Prepare corer for next sample
Decon core catcher, attach
0955 Arrive @ station SD-317
0955 zero for Rep B (A on 8/18/04)
water depth = 11'9"
penetration ~ 8'
recovery = 6'3"
Based on conversations with Captain Charlie Eaton team will be moving ~ 5 m offshore for these nearshore samples
1040 Arrive @ station SD-316
zero for Rep A
water depth = 11'3"

[signature] 8/19/04

8/19/04 00-01802-006 sunny ±80°F

penetration = 7'
recovery 316A = 7'
cut tube down to a 7' core
in an attempt to stave off
bending

1115 Arrive @ station SD309
core tube pre-cut to 7'
SD-309A
water depth = 10'6"
penetration = (5.5m max depth)
~~Recovery~~ 8/19 = 7' penetration
recovery = 7' (full)

1145 Arrive @ station SD-310
pre-cut core tube to 7'
zero @ water surface
water depth = 8'2"
penetration = 7"
recovery = 5'8"

1205 Stop @ South Park Marina,
John Waterman disembark

1240 Arrive @ Harbor Island Marina

~~1240 Arrive~~ Stk

1500 Reconvene @ Harbor Island Marina
as tides begin to come back in

[signature] 8/19/04

8/19/04 00-01802-006 sunny ±80°F breezy

Prepare equipment

1517 Leave Marina (Harbor Island)

1555 Arrive @ station 311
- Prior to arrival @ station
while passing South Park Marina
we passed through a diesel
fuel spill extending the entire
length of the Marina and
through the channel
- spray paint on outside of
tube to better note penetration
depth
- had to drill holes for rivets
in tube
- sheen extends south of Marina,
also we are downwind - strong odor

1600 - station 311 is too shallow presently
we will wait 20 minutes
- Δ plans ⇒ since tide is
coming in we'll attempt sanding
now & float off if we ground

1615 SD-311 Rep A
water depth = 7'11"
penetration = 7'6"

[signature] 8/19/04

8/19/04 00-01802-006 sunny ~80°F breezy

recovery = 7' 6" (full)

Note: fuel slick migrating south towards sampling sites with incoming tide

SD-311 Rep A tube bent

1700 Arrive @ station 312

water depth = 7.7'

penetration = 90" = 7'6" (7.5')

recovery = 58" = 4'10" (4.8')

- spray painting outside was not effective because sediment is too soft to scratch the paint

1733 Arrive @ station SD-320

water depth = 9.4' - 0.4 = 9.0'

penetration = 7.5'

recovery = 75" = 6'3" (6.25')

1827 Arrive @ station SD-323

water depth = ~~11'8" (11.73')~~ - 0.4 = 11.35'

penetration = 7.5'

recovery = 4.5' (60%)

1852 Arrive @ station SD-315A

water depth = 11.3' - 0.1 = 10.9'

penetration = 7.5'

recovery = 64" = 5'4" (5.33')

8/19/04

8/19/04 00-01802-006

very watery, some lost through core-catcher, still 5'4" remain

1923 Arrive @ station 313, Rep B

water depth = 13.6' - 0.4 = 13.2'

penetration = 7.5' **

recovery = 46" = 3'10"

Returning to ~~SD-323~~ SD 313 B where sheen but poor recovery yesterday

** Due to presence of small rock & algae lodged at top, we conclude that there was full penetration

- Definite sheen in sediment and strong hydrocarbon smell
- Will move offshore 5m & take SD-313C since recovery was just over 50%

1958 Arrive @ SD-313C

water depth = 14.4'

penetration = 7.5'

recovery = 4'2"

8/19/04

Core Processing Notes

27 FEB 04

08:00 ARRIVED ON-SITE
08:15 BACK HOE OPERATOR BEGAN WORKING IN-RIVER TO REMOVE OUTFALL CAP
08:25 ROCK-UP LAB SAMPLE
08:34 ROCK-DOWN LAB SAMPLE
08:44 TURBIDITY ANALYSIS.
- HACH TURBIDIMETER #1, 4.99 STD = 5.04 NTU
- ROCK UP: 1.01 NTU
- ROCK DOWN 1.25 NTU
08:55 BACK HOE OP. RE-POSITIONED THE BACK HOE, CAUSED A SHORT TERM (~1 MIN) TURBIDITY PLUME - UNABLE TO CATCH THE PLUME DOWNRIVER
09:05 ROCK DOWN: 1.01 NTU
09:07 WHILE ANALYZING ROCK-DOWN SAMPLE, CAP WAS FINALLY REMOVED, BACK HOE WAS IMMEDIATELY WALKED OUT OF RIVER WITH CAP AND ASSOC. CABLES
09:15 IN-RIVER WORK COMPLETED, NO TURBIDITY PLUME VISIBLE. EP SAYS THE POSTCAP WORK WOULD BE DONE IN THE HANSON PONDS

19 AUG 04 -AS-

LOWER DUWAMISH SEDIMENT SAMPLING
- CORES TAKEN YESTERDAY (8/18) IN THE AFTERNOON. CORES STORED OVERNIGHT IN STORAGE ROOM ON ICE, CUSTODY SEALED.

10:44 SD-319
- ONLY ABOUT 1 1/2" HEAD SPACE ON TOP, SMALL AMOUNT OF EXCESS WATER REMOVED
- ~~PHOTOS~~ (21-24), FROM TOP TO BOTTOM
- ~~PHOTO~~ 2-25 1-2FT
1-2 FT: BLACK CLAYEY SILT
- ~~PHOTO~~ 2-26 2-3 FT
2-3 FT: BLACK CLAYEY, SANDY SILT WITH A BLACK SANDY LAYER FROM 2.4 FT TO 2.5 FT
~~PHOTO~~ 2-27 3-4 FT
3-4 FT: FROM 3.0' TO 3.5' BLACK CLAYEY SILT
FROM 3.5 TO 4.0 FT, SILTY SAND (BLACK)
NOTE: CONTINUES BLACK SILTY SAND TO BOTTOM OF CORE (5.8 FT)

13:30 SD-321
- ABOUT 8 1/2" HEAD SPACE ON TOP
- PICTURES (28, 29) OF CORE (TOP TO BOTTOM)

19 AUG 04

- PHOTO 2-30: 1-2 FT
  1.0 FT TO 1.1 FT BLACK CLAYEY SILT
  1.1 FT TO 1.8 FT BLACK SILTY SAND
  1.8 FT TO 2.0 FT BLACK CLAYEY SILT
- PHOTO 2-31 - 2-3 FT
  2.0-3.0 FT: BLACK ~~SILTY~~ SILT W/SOME SAND
- PHOTO 2-32 - 3 - 3.8 FT
  - 3.0-3.8 FT: BLACK SILTY SAND

15:45 SD 314

- CORE PICTURES: PHOTO 2(33, 34) (TOP TO BOTTOM)
- VISIBLE STRATIGRAPHIC SECTIONS

★ NOTE: UNABLE TO ALIGN CORE AND TUBING WITH DEPTH MEASUREMENTS ON SIDEWALL. THUS, 1 FT FOR SD-314 WILL BE 0 FT, WITH AN OFFSET OF 1 FT

- PHOTO 2-35: MIXED 1-2 FT SECTION
  - 1.0 TO 1.1 BROWN SILTY CLAY
  - 1.1 TO 2.0 DARK BROWN SILTY SAND
- PHOTO 2-36 MIXED 2-3 FT. SECTION
  - 2.0 TO 2.1 LIGHT GRAY CLAYEY SILT
  - 2.1 TO 3.0 DK. GRAY/BLACK F-TO M-GRAINED SAND

SD 313 19 AUG 04

PHOTO 2-37: 3.0 FT TO 3.3 FT
3.0 TO 3.3 FT: DARK BROWN SILTY SAND
NOTE: DUE TO SMALL SECTION SAMPLED, VERY LITTLE SEDIMENT LEFT FOR TOC - SGS SAMPLE

PHOTO 3-1 1.0 TO 1.8 FT. SD 313
1.0 to 1.8 FT - Black silty fine- to medium grained sand
John Bakeman - COE PM - due to HC odor & sheen noted in field, he requested SVOCs at this depth.

18:05 SD 318 ~~2~~ GSC 8/19/04
- CORE PHOTO 3-2
- 1.0 - 1.5 very dark gray, fine-grained sand w/ mica. No debris.
photo 3-3 1.0-1.5 mixed in bowl.

19:20 SD-307 Rep C
- core photo 3-4, 3-5, 3-6
1'-2' Very dark gray, fine to med-grained sand. Sample was not in

19 AUG 04

tube solidly → space. Limited sample volume.
SD-307-0001 photo 3-7 mixed up in bowl.
2.0' to 3.0' – VERY DK. GRAY FINE-GRAINED SAND
PHOTO 3-8 – SD-307-0001 @ 2.0 to 3.0' in bowl
3.0 to 3.8' – Very DK. Gray Fine-grained SAND
PHOTO 3-9 – SD307-0001 @ 3.0' to 3.8' in bowl.

20:24 SD-310 – CORES 0'-5'
core photos 3-10, 3-11, 3-12
0-3.3' V. DK GRAY/BLACK alternate layers of fine-grained sand / organic silt / clayey silt.
3.3 to 4.5 V. DK. Gray fine-grained sand with some medium-grained sand, mica flakes.
4.5 to 5.0 Fine-grained sand matrix w/ wood chips fragments.
PHOTO 3-13 Sample 1.0 to 2.0' SD-310 (clayey silt)

19 AUG 04

PHOTO 3-14 Sample 2.0 to 3.0' SD-310 SILT & Fine-grained SAND
PHOTO 3-15 Sample 3.0' to 4.0' SD310 fine-grained sand.
Clean up lab / decon bowls & spoons for tomorrow's sample processing
10:25 Done

Diane M. Phelan
19-AUG-04

08/20/04, FRIDAY LOWER DUWAMISH SEDIMENT SAMPLING - SAMPLE PROCESSING CORES COLLECTED YESTERDAY 8/19/04 - DP, AS, GC, BC, PJ

07:15 DP SETS UP SAMPLING AREA; GC SETS UP TO PROCESS SAMPLES FOR SHIPPING; AS/BC/PJ SETS UP CORES COLLECTED YESTERDAY

0855 SD 311 - START CUTTING CORE

PHOTO 3-16 - AS cutting SD 311 core

CORE PHOTOS 3-17, 3-18, 3-19, 3-20, & 3-21

Black clayey silt w/ tr. gravel 0-44"

Black silty SAND 44" to 88"

0-1 Black clay silt tr. gravel

1-3'2" Black clayey silt gravel 3" ϕ

PHOTO 3-22 Sample 1.0 to 2.0 SD 311 in bowl.

3'2" to 88" Black silty SAND

36" brick fragment

photo 3-23 2-3' SD-311 in bowl

photo 3-24 3' to 4' SD-311 in bowl

10:10 Boeing consultants stop by to watch sample processing

10:21 SD 313 Rep. Core

Diana M. Phula

313C top is a brick fragment

0'-0.5' clayey silt Black

0.5-1.0 Black silty SAND

1-2.3 Black clayey silt

2.3-4 Black silty SAND

photo 4-1 Core photo of 313C after samples collected

photo 4-2 fine-grained sandy silt

*SD 313C 1.0' to 2.0' Sample in bowl.

photo 4-3 SD 313C 2.0' to 3.0' in bowl wet fine to med-grained SAND w/ some gravel

photo 4-4 SD 313C 3.0' to 4.0' sample in bowl - V. DEGANT FINE TO MED. SAND

11:10 SD 309A core

core photos 4-5, 4-6, & 4-7

* rehomogenize 1.0'-2.0" sample 313C to fill a fourth jar for grainsize

photo 4-8 1.0' to 2.0' 309A sample in bowl.

SD-309A 0-0.5' Black silty SAND, 0.5-2.75 Black clayey silt, tr. gravel 2.75 woody debris, black silty SAND (2.75-7.0)

Diana M. Phula

20 AUG 04 Plant 2

photo 4-9 2.0' to 3.0' SD 309A
Sample in bowl. clayey silt w/ some sand
Collected field duplicate SB 327
2.0' to 3.0' sample from 309A
core
photo 4-10 3.0' to 4.0' SD 309A
Sample in bowl DK GRAY F-M SAND
12:15 SD-~~312~~ 320 DMP core cap mislabeled in field
core photos 4-11, 4-12, & 4-13
photo 4-14 Sample 1.0' to 2.0' SD ~~312~~ 320 DMP
in bowl (clayey sandy silt)
SD ~~312~~ DMP 320
0'-14" Black clayey SILT w/
debris, brick, slag, plastic wire
Coating 14" same as above w/ some
Sand, 3.3' some clay 3.3' to 6.3'
Black silty Clay.
~~photo 4-15~~ not collected Sample 2 - 2.0' to 3.0' SD ~~312~~ 320 DMP
in bowl. (clayey silt)
~~photo 4-16~~ not collected DMP Sample 3 - 3.0' to 4.0' SD ~~312~~ 320 DMP
in bowl (clayey silt)
Collected field duplicate SD 328-3
3.0' to 4.0' sample of SD ~~312~~ DMP 320
13:00 - 14:00 break

Diana M. Phelan

20 AUG 04 Plant 2

14:20 SD 317B core
Core photos 4-15, 4-16, & 4-17
photo 4-18 - Sample 1 - 1.0' to 2.0'
of SD 317B in Bowl.
photo 4-19 - Sample 2 - 2.0' to 3.0'
of SD 317B in bowl
0-1.4' Black silty clay
1.4' - 3.0' Black sandy silt w/
trace clay
3.0' - 4.0' Black sandy silt w/
gravel
4.0' - 6.6' Black silty sand
photo 4-20 Sample 3 - 3.0' to 4.0'
of SD 317B in bowl.
1605 SD 323 core being cut
Core photos 4-21, 4-22, & 4-23
photo 5-1 Sample 1 - 1.0' to 2.0' of
core SD 323 in bowl
Collected field duplicate SD 326-0001
from 1.0' to 2.0' sample of SD 323
photos 5-2 Sample 2 2.0' to 3.0'
of SD 323
not collected ~~photo 5-3~~ DMP Sample 3 3.0' to 4.0' of
SD 323

Diana M. Phelan

20 AUG. 04 Plant 2

SD 323
0.0-0.7' Black clayey silt w/ pieces of slag
0.7'-2.1' Black sandy silt w/ gravel
2.1'-2.5' Black silty clay, trace amounts of organic material
2.5'-3.1' Black silty clay w/ large pieces of wood debris
3.1' to 4.5' Black silty sand
1650 SD 316A Core
core photos 5-3, 5-4, & 5-5
photo 5-6 Sample 1 1.0' to 2.0' of SD 316A in bowl
photo 5-7 Sample 2 2.0' to 3.0' of SD 316A in bowl
photo 5-8 Sample 3 3.0' to 4.0' of SD 316A in bowl
0-0.3' Black silty sand
0.3'-3.2' Black silty clay
3.2'-4.2' Black silty sand trace clay 2" piece of asphalt-like material
4.2'-6.2' Dark grayish brown silty sand.
17:58 SD 315 Core
core photos 5-9, 5-10, & 5-11
photo 5-12 Sample 1 1.0' to 2.0' of SD 315 in bowl

Diana M. Phelan

20 AUG. 04 Plant 2

photo 5-13 Sample 2 2.0' to 3.0' of SD 315 core in bowl.
Photo 5-14 Sample 3 3.0' to 4.0' of SD 315 core in bowl.
0-1.2' Dk. brownish gray sandy silt, trace wood debris
1.2'-4.8' Black silty sand
0-0.5' Core - no sediment
19:50 SD 312 Core
core photos 5-15, 5-16, & 5-17
photo 5-18 SAMPLE 1 1.0' to 2.0' of SD 312 core in bowl.
photo 5-19 Sample 2 2.0' to 3.0' of SD 312 core in bowl (taken after sample collected).
photo 5-20 Sample 3 3.0' to 4.0' of SD 312 core in bowl.
0-1.8' Black sandy silt w/ large 4" wood piece (black) and smaller-sized wood pieces.
1.8' to 4.8' Black silty sand
1" dark black stain @ 2.7' of layer
Cleaned up, repack remaining cores
22:25 Done

Diana M. Phelan

Supplement to Appendix G
Tables Showing Data Quality Review
PCB Analyses by Method 8082

TABLE G-1 - LOWER DUWAMISH TRIAD SAMPLING EVENT
PCB DATA REVIEW
EPA REGION 10

Field Sample ID	Lab Sample ID	Sample Description	Analyte	Result*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK	LSC % Rec.		MS % Rec.	MS CLs Met?	MSD % Rec.	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CL OK?	Dup RPD	Preservation Met?**	Container OK?	Sample Date		Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample CL Met?***	% Completeness OK?****
							(221 = 40 ppb Others = 20 ppb			DCBP = 40-140 TCMX = 30-150	~ 70% of any reported value or >RL		50-150%		40-140%		40-140%		<50%	<50%	≤0°C**	8 oz WMG			365 days (extraction)		6 months (sediment)	Spike = 170 ppb Average = 120 Acceptance = 40-140%	≥3%
Acceptance = 40-140%																													
SD-311-0000	4344112	Reg sample	Aroclor-1016	900	U	900	No														Yes	Yes	08/16/04	11/18/04	Yes	01/03/05	Yes		Yes
			Aroclor-1221	900	U	900	No																						
			Aroclor-1232	1800	U	1800	No																						
			Aroclor-1242	900	U	900	No																						
			Aroclor-1248	900	U	900	No																						
			Aroclor-1254	3300	J		Yes																						
			Aroclor-1260	900	U	900	No																						
			Decachlorobiphenyl						353	No																			
			Tetrachlorometaxylene						263	No																			
SD-314-0000	4344124	Reg sample	Aroclor-1016	95	U		No														Yes	Yes	08/17/04	11/18/04	Yes	12/07/04	Yes		Yes
			Aroclor-1221	95	U		No																						
			Aroclor-1232	190	U		No																						
			Aroclor-1242	95	U		No																						
			Aroclor-1248	95	U		No																						
			Aroclor-1254	870			Yes																						
			Aroclor-1260	95	U		No																						
			Decachlorobiphenyl						112	Yes																			
			Tetrachlorometaxylene						70	Yes																			
SD-315-0000	4344128	Reg sample	Aroclor-1016	66	U		No														Yes	Yes	08/17/04	11/18/04	Yes	12/05/04	Yes		Yes
			Aroclor-1221	66	U		No																						
			Aroclor-1232	130	U		No																						
			Aroclor-1242	66	U		No																						
			Aroclor-1248	66	U		No																						
			Aroclor-1254	150			Yes																						
			Aroclor-1260	110	J		Yes																						
			Decachlorobiphenyl						123	Yes																			
			Tetrachlorometaxylene						104	Yes																			
SD-317-0000	4344136	Reg sample	Aroclor-1016	100	U		No														Yes	Yes	08/16/04	11/18/04	Yes	12/06/04	Yes		Yes
			Aroclor-1221	100	U		No																						
			Aroclor-1232	210	U		No																						
			Aroclor-1242	100	U		No																						
			Aroclor-1248	100	U		Yes																						
			Aroclor-1254	800			Yes																						
			Aroclor-1260	100	U		No																						
			Decachlorobiphenyl						109	Yes																			
			Tetrachlorometaxylene						79	Yes																			
SD-319-0000	4344144	Reg sample	Aroclor-1016	160	U		No														Yes	Yes	08/15/04	11/18/04	Yes	12/08/04	Yes		Yes
			Aroclor-1221	160	U		No																						
			Aroclor-1232	330	U		No																						
			Aroclor-1242	160	U		No																						
			Aroclor-1248	160	U		No																						
			Aroclor-1254	3100			Yes																						
			Aroclor-1260	160	U		No																						
			Decachlorobiphenyl						119	Yes																			
			Tetrachlorometaxylene						85	Yes																			
SD-320-0000	4344148	Reg sample	Aroclor-1016	780	U		No														Yes	Yes	08/16/04	11/18/04	Yes	12/15/04	Yes		Yes
			Aroclor-1221	780	U		No																						
			Aroclor-1232	1600	U		No																						
			Aroclor-1242	780	U		No																						
			Aroclor-1248	780	U		No																						
			Aroclor-1254	8200			Yes																						
			Aroclor-1260	780	U		No																						
			Decachlorobiphenyl						140	Yes																			
			Tetrachlorometaxylene						108	Yes																			
SD-321-0000	4344152	Reg sample	Aroclor-1016	91	U		No														Yes	Yes	08/16/04	11/18/04	Yes	12/06/04	Yes		Yes
			Aroclor-1221	91	U		No																						
			Aroclor-1232	180	U		No																						
			Aroclor-1242	91	U		No																						
			Aroclor-1248	230	J		No																						
			Aroclor-1254	260			Yes																						
			Aroclor-1260	91	U		No																						
			Decachlorobiphenyl						113	Yes																			
			Tetrachlorometaxylene						85	Yes																			

TABLE G-1 - LOWER DUWAMISH TRIAD SAMPLING EVENT
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Field Sample ID	Lab Sample ID	Sample Description	Analyte	Result*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK	LSC % Rec.		MS % Rec.	MS CLs Met?	MSD % Rec.	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CL OK?	Dup RPD	Preservation Met?**	Container OK?	Sample Date		Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample CL Met?***	% Completeness OK?****
							1221 = 40 ppb Others = 20 - ppb			DCBP = 40-140 TCMX = 50-120	< 20% of any reported value or <RL		30-130%		40-140%		40-140%		<50%	<50%	30°C**	8 oz VOAG			365 days (extraction)		6 months (analysis)	Spike = 170 ppb Average = 120 Acceptance = 40-140%	95%
SD-322-0000	4344184	Reg sample	Aroclor-1016	980	U		No														Yes	Yes	08/17/04	11/18/04	Yes	12/07/04	Yes		Yes
			Aroclor-1221	980	U		No																						
			Aroclor-1232	2000	U		No																						
			Aroclor-1242	980	U		No																						
			Aroclor-1248	980	U		No																						
			Aroclor-1254	8400	J		Yes																						
			Aroclor-1260	980	U		No																						
			Decachlorobiphenyl						416	No																			
			Tetrachlorometaxylene						297	No																			
SD-324-0000	4344188	Reg sample	Aroclor-1016	94	U		No														Yes	Yes	08/18/04	11/18/04	Yes	12/06/04	Yes		Yes
			Aroclor-1221	94	U		No																						
			Aroclor-1232	180	U		No																						
			Aroclor-1242	94	U		No																						
			Aroclor-1248	290	J		No																						
			Aroclor-1254	340	J		Yes																						
			Aroclor-1260	84	U		No																						
			Decachlorobiphenyl						154	No																			
			Tetrachlorometaxylene						124	Yes																			
Reference Material																													
SQ-1	A	Sediment Reference (spiked at 170 ppb)	Aroclor-1254	190																								Yes (11.7%)	
			Decachlorobiphenyl						141	No														11/18/2004		12/6/2004	Yes		Yes
			Tetrachlorometaxylene						71	Yes																			
Method QC																													
Method Blank																													
	OBS4373A1	Blank	Aroclor-1016	-	A																			11/18/2004		12/7/2004	Yes		
			Aroclor-1221	-	A																								
			Aroclor-1232	-	A																								
			Aroclor-1242	-	A																								
			Aroclor-1248	-	A																								
			Aroclor-1254	-	A																								
			Aroclor-1260	-	A																								
			Decachlorobiphenyl						120	Yes																			
			Tetrachlorometaxylene						93	Yes																			
Laboratory Control Sample																													
		LCS	Aroclor-1016																										
			Aroclor-1260																										
			Decachlorobiphenyl																										
			Tetrachlorometaxylene																										
Matrix Spike																													
	4344188	Matrix Spike	Aroclor-1016				Yes							98	Yes									11/18/2004		12/6/2004	Yes		
			Aroclor-1260				Yes							88	Yes														
			Decachlorobiphenyl						115	Yes																			
			Tetrachlorometaxylene						99	Yes																			
Matrix Spike Duplicate																													
	4344188	Matrix Spike Dupl	Aroclor-1016				Yes									106	Yes	7.8	Yes					11/18/2004		12/6/2004	Yes		
			Aroclor-1260				Yes									110	Yes	10.5	Yes										
			Decachlorobiphenyl						117	Yes																			
			Tetrachlorometaxylene						95	Yes																			
Primary Samples																													
SD-309-0000	4344104	Reg sample	Aroclor-1016	85	U	85	No														Yes	Yes	08/16/04	11/30/04	Yes	12/07/04	Yes		Yes
			Aroclor-1221	85	U	85	No																						
			Aroclor-1232	170	U	170	No																						
			Aroclor-1242	85	U	85	No																						
			Aroclor-1248	85	U	85	No																						
			Aroclor-1254	570			Yes																						
			Aroclor-1260	85	U	85	No																						
			Decachlorobiphenyl						130	Yes																			
			Tetrachlorometaxylene						89	Yes																			
SD-316-0000	4344132	Reg sample	Aroclor-1016	98	U		No														Yes	Yes	08/16/04	11/30/04	Yes	12/07/04	Yes		Yes
			Aroclor-1221	98	U		No																						
			Aroclor-1232	190	U		No																						
			Aroclor-1242	98	U		No																						
			Aroclor-1248	98	U		No																						
			Aroclor-1254	840			Yes																						
			Aroclor-1260	98	U		No																						
			Decachlorobiphenyl						121	Yes																			
			Tetrachlorometaxylene						89	Yes																			

TABLE G-1 - LOWER DUWAMISH TRIAD SAMPLING EVENT
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Field Sample ID	Lab Sample ID	Sample Description	Analyte	Result*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK	LSC % Rec.		MS % Rec.	MS CLs Met?	MSD % Rec.	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CL OK?	Dup RPD	Preservation Met?**	Container OK?	Sample Date		Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample CL Met?***	% Completeness OK?****
							1221 = 40 ppb Others = 20 ppb			DCBP = 40-140 TCMX = 30-130	< 20% of any reported value or <RL		30-130%		40-140%		40-140%		<50%	<50%	#0°C**	8 oz WMG			365 days (extraction)		6 months (analysis)	Spike = 1/2 ppb Average = 120 Acceptance = 40-140%	95%
SD-316-0000	4344140	Reg sample	Aroclor-1016	94	U		No														Yes	Yes	08/18/04	11/30/04	Yes	12/08/04	Yes		Yes
			Aroclor-1221	94	U		No																						
			Aroclor-1232	150	U		No																						
			Aroclor-1242	94	U		No																						
			Aroclor-1248	290	J		No																						
			Aroclor-1254	640			Yes																						
			Aroclor-1260	94	U		No																						
			Decachlorobiphenyl						127	Yes																			
			Tetrachlorometaxylene						89	Yes																			
SD-325-0000	4344189	Reg sample	Aroclor-1016	80	U		No														Yes	Yes	08/17/04	11/30/04	Yes	12/07/04	Yes		Yes
			Aroclor-1221	80	U		No																						
			Aroclor-1232	160	U		No																						
			Aroclor-1242	80	U		No																						
			Aroclor-1248	80	U		No																						
			Aroclor-1254	850			Yes																						
			Aroclor-1260	80	U		No																						
			Decachlorobiphenyl						130	Yes																			
			Tetrachlorometaxylene						97	Yes																			
Duplicate																													
SD-325-0000	4344189	Duplicate	Aroclor-1016	66	U		No													NC	Yes	Yes	08/17/04	11/30/04	Yes	12/07/04	Yes		Yes
			Aroclor-1221	66	U		No													NC									
			Aroclor-1232	170	U		No													NC									
			Aroclor-1242	66	U		No													NC									
			Aroclor-1248	66	U		No													NC									
			Aroclor-1254	790			Yes													19.4									
			Aroclor-1260	66	U		No													NC									
			Decachlorobiphenyl						127	Yes										NC									
			Tetrachlorometaxylene						89	Yes										NC									
Method QC																													
Blank																													
	OBS4335A2	Blank	Aroclor-1016	-	A																			11/30/2004		12/7/2004	Yes		
			Aroclor-1221	-	A																								
			Aroclor-1232	-	A																								
			Aroclor-1242	-	A																								
			Aroclor-1248	-	A																								
			Aroclor-1254	-	A																								
			Aroclor-1260	-	A																								
			Decachlorobiphenyl						127	Yes																			
			Tetrachlorometaxylene						86	Yes																			
Blank																													
	OBS4335A1	Blank	Aroclor-1016	-	A																			11/30/2004		12/6/2004	Yes		
			Aroclor-1221	-	A																								
			Aroclor-1232	-	A																								
			Aroclor-1242	-	A																								
			Aroclor-1248	-	A																								
			Aroclor-1254	-	A																								
			Aroclor-1260	-	A																								
			Decachlorobiphenyl						122	Yes																			
			Tetrachlorometaxylene						87	Yes																			
Laboratory Control Sample																													
	OBF4335A1	LCS	Aroclor-1016				Yes					68	Yes											11/30/2004		12/9/2004	Yes		
			Aroclor-1260				Yes					107	Yes																
			Decachlorobiphenyl						111	Yes																			
			Tetrachlorometaxylene						84	Yes																			
Laboratory Control Sample																													
	OBF4335A2	LCS	Aroclor-1016				Yes					95	Yes											11/30/2004		12/9/2004	Yes		
			Aroclor-1260				Yes					118	Yes																
			Decachlorobiphenyl						111	Yes																			
			Tetrachlorometaxylene						90	Yes																			
Matrix Spike																													
		MS	Aroclor-1016																										
			Aroclor-1260																										
			Decachlorobiphenyl																										
			Tetrachlorometaxylene																										
Matrix Spike Duplicate																													
		MSD	Aroclor-1016																										
			Aroclor-1260																										
			Decachlorobiphenyl																										
			Tetrachlorometaxylene																										
Primary Samples																													
SD-211-0000	4354005	Reg sample	Aroclor-1016	73	U		No														Yes	Yes	08/27/04	12/01/04	Yes	12/07/04	Yes		Yes
			Aroclor-1221	73	U		No																						
			Aroclor-1232	150	U		No																						
			Aroclor-1242	73	U		No																						
			Aroclor-1248	73	U		No																						

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Field Sample ID	Lab Sample ID	Sample Description	Analyte	Result*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK	LSC % Rec.		MS % Rec.	MS CLs Met?	MSD % Rec.	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CL OK?	Dup RPD	Preservation Met?**	Container OK?	Sample Date		Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample CL Met?***	% Completeness OK?****
							1221 = 49 ppb Others = 30 ppb			DCBP = 40-140 TCMX = 30-130	< 20% of any reported value or <5%		30-130%		40-140%		40-140%		<50%	<50%	30°C**	8 oz WWG			263 days (extraction)		6 months (analysis)	Spike = 170 ppb Average = 129 Acceptance = 40-140%	93%
			Aroclor-1254	610			Yes																						
			Aroclor-1260	73	U		No																						
			Decachlorobiphenyl						129	Yes																			
			Tetrachlorometaxylene						90	Yes																			
SD-307-0000	4344100	Reg sample	Aroclor-1016	190	U	190	No														Yes	Yes	08/16/04	12/01/04	Yes	12/07/04	Yes		Yes
			Aroclor-1221	190	U	190	No																						
			Aroclor-1232	380	U	380	No																						
			Aroclor-1242	190	U	190	No																						
			Aroclor-1248	190	U	190	No																						
			Aroclor-1254	2800		2800	Yes																						
			Aroclor-1260	190	U	190	No																						
			Decachlorobiphenyl						99	Yes																			
			Tetrachlorometaxylene						74	Yes																			
SD-310-0000	4344108	Reg sample	Aroclor-1016	100	U	100	No														Yes	Yes	08/18/04	12/01/04	Yes	12/07/04	Yes		Yes
			Aroclor-1221	100	U	100	No																						
			Aroclor-1232	200	U	200	No																						
			Aroclor-1242	100	U	100	No																						
			Aroclor-1248	100	U	100	No																						
			Aroclor-1254	580			Yes																						
			Aroclor-1260	100	U	100	No																						
			Decachlorobiphenyl						353	No																			
			Tetrachlorometaxylene						97	Yes																			
SD-322-0000	4344158	Reg sample	Aroclor-1016	98	U		No														Yes	Yes	08/18/04	12/01/04	Yes	12/07/04	Yes		Yes
			Aroclor-1221	96	U		No																						
			Aroclor-1232	190	U		No																						
			Aroclor-1242	96	U		No																						
			Aroclor-1248	96	U		No																						
			Aroclor-1254	110			Yes																						
			Aroclor-1260	96	U		No																						
			Decachlorobiphenyl						127	Yes																			
			Tetrachlorometaxylene						102	Yes																			
SD-323-0002	4344166	Reg sample	Aroclor-1016	9.8	U		Yes														Yes	Yes	08/19/04	12/01/04	Yes	12/15/04	Yes		Yes
			Aroclor-1221	9.8	U		Yes																						
			Aroclor-1232	19	U		Yes																						
			Aroclor-1242	9.8	U		Yes																						
			Aroclor-1248	9.8	U		Yes																						
			Aroclor-1254	4	J		Yes																						
			Aroclor-1260	9.8	U		Yes																						
			Decachlorobiphenyl						127	Yes																			
			Tetrachlorometaxylene						53	Yes																			
SD-323-0003	4344167	Reg sample	Aroclor-1016	5	U		Yes														Yes	Yes	08/19/04	12/01/04	Yes	12/16/04	Yes		Yes
			Aroclor-1221	5	U		Yes																						
			Aroclor-1232	10	U		Yes																						
			Aroclor-1242	5	U		Yes																						
			Aroclor-1248	5	U		Yes																						
			Aroclor-1254	1.2	J		Yes																						
			Aroclor-1260	5	U		Yes																						
			Decachlorobiphenyl						173	Yes																			
			Tetrachlorometaxylene						75	Yes																			
SD-339-0000	4354021	Reg sample	Aroclor-1016	87	U		No														Yes	Yes	08/26/04	12/01/04	Yes	12/07/04	Yes		Yes
			Aroclor-1221	87	U		No																						
			Aroclor-1232	170	U		No																						
			Aroclor-1242	87	U		No																						
			Aroclor-1248	87	U		No																						
			Aroclor-1254	480			Yes																						
			Aroclor-1260	87	U		No																						
			Decachlorobiphenyl						130	Yes																			
			Tetrachlorometaxylene						90	Yes																			
SD-343-0000	4354025	Reg sample	Aroclor-1016	78	U		No														Yes	Yes	08/27/04	12/01/04	Yes	12/07/04	Yes		Yes
			Aroclor-1221	78	U		No																						
			Aroclor-1232	160	U		No																						
			Aroclor-1242	78	U		No																						
			Aroclor-1248	78	U		No																						
			Aroclor-1254	260	J		Yes																						
			Aroclor-1260	78	U		No																						
			Decachlorobiphenyl						119	Yes																			
			Tetrachlorometaxylene						73	Yes																			
Reference Sample																													
			Aroclor-1254	174																								Yes (102.4%)	
	B	Sequim Reference	Decachlorobiphenyl						128	Yes														12/12/04		12/7/2004	Yes		Yes

TABLE G-1 - LOWER DUWAMISH TRIAD SAMPLING EVENT
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Field Sample ID	Lab Sample ID	Sample Description	Analyte	Result*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK	LSC % Rec.		MS % Rec.	MS CLs Met?	MSD % Rec.	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CL OK?	Dup RPD	Preservation Met?**	Container OK?	Sample Date		Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample CL Met?***	% Completeness OK?****
							(22) = 49 ppb Others = 20 ppb			DCBP = 40-140 TCMX = 30-150	* 20% of any reported value or <RL		50-132%		40-140%		40-140%		<50%	<50%	10° C**	8 or WNG			365 days (extracted)		6 months (analyzed)	Sites = 170 ppb Average = 120 Acceptance = 40-140%	85%
			Tetrachlorometaxylene						99	Yes																			
Method QC																													
Blank																													
	OBS4338A1	Blank	Aroclor-1016	-	A																			12/1/2004		12/7/2004	Yes		
			Aroclor-1221	-	A																								
			Aroclor-1232	-	A																								
			Aroclor-1242	-	A																								
			Aroclor-1248	-	A																								
			Aroclor-1254	-	A																								
			Aroclor-1260	-	A																								
			Decachlorobiphenyl						118	Yes																			
			Tetrachlorometaxylene						52	Yes																			
Laboratory Control Sample																													
		LCS	Aroclor-1016																										
			Aroclor-1260																										
			Decachlorobiphenyl																										
			Tetrachlorometaxylene																										
Matrix Spike																													
		MS	Aroclor-1016																										
			Aroclor-1260																										
			Decachlorobiphenyl																										
			Tetrachlorometaxylene																										
Matrix Spike Duplicate																													
		MSD	Aroclor-1016																										
			Aroclor-1260																										
			Decachlorobiphenyl																										
			Tetrachlorometaxylene																										
Primary Samples																													
																					Duplicate								
	4354025	Duplicate	Aroclor-1016	86	U		No														Yes	Yes		12/07/04	No	12/07/04	Yes		Yes
			Aroclor-1221	86	U		No																						
			Aroclor-1232	170	U		No																						
			Aroclor-1242	86	U		No																						
			Aroclor-1248	86	U		No																						
			Aroclor-1254	1000	J		Yes																						
			Aroclor-1260	86	U		No																						
			Decachlorobiphenyl						112	Yes																			
			Tetrachlorometaxylene						72	Yes																			
SD-206-0000	4354000	Reg sample	Aroclor-1016	82	U		Yes														Yes	Yes	08/26/04	12/07/04	Yes	12/09/04	Yes		Yes
			Aroclor-1221	82	U		Yes																						
			Aroclor-1232	160	U		Yes																						
			Aroclor-1242	82	U		Yes																						
			Aroclor-1248	82	U		Yes																						
			Aroclor-1254	280			Yes																						
			Aroclor-1260	82	U		Yes																						
			Decachlorobiphenyl						114	Yes																			
			Tetrachlorometaxylene						63	Yes																			
SD-210-0000	4354004	Reg sample	Aroclor-1016	68	U		No														Yes	Yes	08/27/04	12/07/04	Yes	12/09/04	Yes		Yes
			Aroclor-1221	68	U		No																						
			Aroclor-1232	140	U		No																						
			Aroclor-1242	68	U		No																						
			Aroclor-1248	68	U		No																						
			Aroclor-1254	130			Yes																						
			Aroclor-1260	68	U		No																						
			Decachlorobiphenyl						103	Yes																			
			Tetrachlorometaxylene						71	Yes																			

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Field Sample ID	Lab Sample ID	Sample Description	Analyte	Result*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK	LSC % Rec.		MS % Rec.	MS CLs Met?	MSD % Rec.	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CL OK?	Dup RPD	Preservation Met?**	Container OK?	Sample Date		Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample CL Met?***	% Completeness OK?****
							1221 = 49 ppb Others = 70 ppb			DCBP = 40-140 TCMX = 30-130	< 20% of any reported value or RL		50-130%		40-140%		40-140%		<50%	<50%	90°C**	8 oz WWG			365 days (unfrozen)		8 months (frozen)	Spike = 170 ppb Average = 120 Acceptance = 40-140%	95%
SD-312-0003	4344119	Reg sample	Aroclor-1016	5.8	U		Yes														Yes	Yes	08/19/04	12/07/04	Yes	12/09/04	Yes		Yes
			Aroclor-1221	5.8	U		Yes																						
			Aroclor-1232	12	U		Yes																						
			Aroclor-1242	5.8	U		Yes																						
			Aroclor-1248	5.8	U		Yes																						
			Aroclor-1254	0.52	J		Yes																						
			Aroclor-1260	5.8	U		Yes																						
			Decachlorobiphenyl						123	Yes																			
			Tetrachlorometaxylene						84	Yes																			
SD-213-0000	4354007	Reg sample	Aroclor-1016	110	U		No														Yes	Yes	08/27/04	12/07/04	Yes	12/09/04	Yes		Yes
			Aroclor-1221	110	U		No																						
			Aroclor-1232	230	U		No																						
			Aroclor-1242	110	U		No																						
			Aroclor-1248	190	J		Yes																						
			Aroclor-1254	420			Yes																						
			Aroclor-1260	110	U		Yes																						
			Decachlorobiphenyl						116	Yes																			
			Tetrachlorometaxylene						81	Yes																			
SD-214-0000	4354008	Reg sample	Aroclor-1016	19	U		Yes														Yes	Yes	08/27/04	12/07/04	Yes	12/15/04	Yes		Yes
			Aroclor-1221	19	U		Yes																						
			Aroclor-1232	38	U		Yes																						
			Aroclor-1242	19	U		Yes																						
			Aroclor-1248	19	U		Yes																						
			Aroclor-1254	6.7	J		Yes																						
			Aroclor-1260	19	U		Yes																						
			Decachlorobiphenyl						83	Yes																			
			Tetrachlorometaxylene						67	Yes																			
SD-215-0000	4354009	Reg sample	Aroclor-1016	69	U		No														Yes	Yes	05/27/04	12/07/04	Yes	12/09/04	Yes		Yes
			Aroclor-1221	69	U		No																						
			Aroclor-1232	140	U		No																						
			Aroclor-1242	69	U		No																						
			Aroclor-1248	69	U		No																						
			Aroclor-1254	420			Yes																						
			Aroclor-1260	460			Yes																						
			Decachlorobiphenyl						107	Yes																			
			Tetrachlorometaxylene						75	Yes																			
SD-432	4354032	Reg sample	Aroclor-1016	80	U		No														Yes	Yes	08/26/04	12/07/04	Yes	12/09/04	Yes		Yes
			Aroclor-1221	80	U		No																						
			Aroclor-1232	160	U		No																						
			Aroclor-1242	80	U		No																						
			Aroclor-1248	80	U		No																						
			Aroclor-1254	800			Yes																						
			Aroclor-1260	88	U		No																						
			Decachlorobiphenyl						121	Yes																			
			Tetrachlorometaxylene						82	Yes																			
Method QC																													
Blank																													
	OBS4342A1	Blank	Aroclor-1016	-	A																			12/7/2004		12/7/2004	Yes		Yes
			Aroclor-1221	-	A																								
			Aroclor-1232	-	A																								
			Aroclor-1242	-	A																								
			Aroclor-1248	-	A																								
			Aroclor-1254	-	A																								
			Aroclor-1260	-	A																								
			Decachlorobiphenyl						119	Yes																			
			Tetrachlorometaxylene						44	No																			
Laboratory Control Sample																													
		LCS	Aroclor-1016																										Yes
			Aroclor-1260																										
			Decachlorobiphenyl																										
			Tetrachlorometaxylene																										
Matrix Spike																													
	4344119	Matrix Spike	Aroclor-1016				Yes							68	Yes									12/7/2004		12/8/2004	Yes		Yes
			Aroclor-1260				Yes							103	Yes														
			Decachlorobiphenyl						118	Yes																			
			Tetrachlorometaxylene						82	Yes																			
Matrix Spike Duplicate																													
	4344119	Matrix Spike Dupl	Aroclor-1016				Yes									88	Yes	2.3	Yes					12/7/2004		12/8/2004	Yes		Yes
			Aroclor-1260				Yes									103	Yes	NC	Yes										
			Decachlorobiphenyl						119	Yes																			
			Tetrachlorometaxylene						59	Yes																			
Primary Samples																													

TABLE G-1 - LOWER DUWAMISH TRIAD SAMPLING EVENT
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Field Sample ID	Lab Sample ID	Sample Description	Analyte	Result*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK	LSC % Rec.		MS % Rec.	MS CLs Met?	MSD % Rec.	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CL OK?	Dup RPD	Preservation Met?**	Container OK?	Sample Date		Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample CL Met?***	% Completeness OK?****
							1221 = 40 ppb Others = 20 ppb			DCBP = 40-140 TCMX = 50-130	< 20% of any reported value or <RL		35-130%		40-140%		40-140%		<50%	<50%	37°C**	3 oz WMG			365 days (extracted)		6 months (analysis)	Spike = 1/0 ppb Average = 120 Acceptance = 40-140%	81%
SD-313-0002	4344122	Reg sample	Aroclor-1016	5.9	U		Yes														Yes	Yes	08/18/04	12/08/04	Yes	12/15/04	Yes		Yes
			Aroclor-1221	5.9	U		Yes																						
			Aroclor-1232	12	U		Yes																						
			Aroclor-1242	5.9	U		Yes																						
			Aroclor-1248	5.9	U		Yes																						
			Aroclor-1254	5.9	U		Yes																						
			Aroclor-1260	5.9	U		Yes																						
			Decachlorobiphenyl						133	Yes																			
			Tetrachlorometaxylene						76	Yes																			
SD-316-0001	4344141	Reg sample	Aroclor-1016	6.6	U		Yes														Yes	Yes	08/18/04	12/08/04	Yes	12/15/04	Yes		Yes
			Aroclor-1221	6.6	U		Yes																						
			Aroclor-1232	13	U		Yes																						
			Aroclor-1242	6.6	U		Yes																						
			Aroclor-1248	6.6	U		Yes																						
			Aroclor-1254	6.6	U		Yes																						
			Aroclor-1260	6.6	U		Yes																						
			Decachlorobiphenyl						134	Yes																			
			Tetrachlorometaxylene						72	Yes																			
SD-314-0003	4344127	Reg sample	Aroclor-1016	61	U		No														Yes	Yes	08/18/04	12/08/04	Yes	12/09/04	Yes		Yes
			Aroclor-1221	61	U		No																						
			Aroclor-1232	120	U		No																						
			Aroclor-1242	61	U		No																						
			Aroclor-1248	61	U		No																						
			Aroclor-1254	130			Yes																						
			Aroclor-1260	94	J		Yes																						
			Decachlorobiphenyl						103	Yes																			
			Tetrachlorometaxylene						63	Yes																			
SD-319-0001	4344145	Reg sample	Aroclor-1016	82	U		No														Yes	Yes	08/18/04	12/08/04	Yes	12/09/04	Yes		Yes
			Aroclor-1221	82	U		No																						
			Aroclor-1232	160	U		No																						
			Aroclor-1242	82	U		No																						
			Aroclor-1248	82	U		No																						
			Aroclor-1254	120			Yes																						
			Aroclor-1260	82	U		No																						
			Decachlorobiphenyl						119	Yes																			
			Tetrachlorometaxylene						76	Yes																			
SD-319-0003	4344147	Reg sample	Aroclor-1016	6.3	U		Yes														Yes	Yes	08/18/04	12/08/04	Yes	12/09/04	Yes		Yes
			Aroclor-1221	6.3	U		Yes																						
			Aroclor-1232	13	U		Yes																						
			Aroclor-1242	6.3	U		Yes																						
			Aroclor-1248	6.3	U		Yes																						
			Aroclor-1254	6.3	U		Yes																						
			Aroclor-1260	6.3	U		Yes																						
			Decachlorobiphenyl						131	Yes																			
			Tetrachlorometaxylene						33	No																			
SD-344-0000	4354026	Reg sample	Aroclor-1016	720	U		No														Yes	Yes	08/26/04	12/08/04	Yes	12/13/04	Yes		Yes
			Aroclor-1221	720	U		No																						
			Aroclor-1232	1400	U		No																						
			Aroclor-1242	720	U		No																						
			Aroclor-1248	720	U		No																						
			Aroclor-1254	11000			Yes																						
			Aroclor-1260	720	U		No																						
			Decachlorobiphenyl						114	Yes																			
			Tetrachlorometaxylene						77	Yes																			
SD-335-0000	4354017	Reg sample	Aroclor-1016	93	U		No														Yes	Yes	08/27/04	12/08/04	Yes	12/09/04	Yes		Yes
			Aroclor-1221	93	U		No																						
			Aroclor-1232	190	U		No																						
			Aroclor-1242	93	U		No																						
			Aroclor-1248	93	U		No																						
			Aroclor-1254	93	U		Yes																						
			Aroclor-1260	400			Yes																						
			Decachlorobiphenyl						116	Yes																			

TABLE G-1 - LOWER DUWAMISH TRIAD SAMPLING EVENT
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Field Sample ID	Lab Sample ID	Sample Description	Analyte	Result*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK	LSC % Rec.		MS % Rec.	MS CLs Met?	MSD % Rec.	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CL OK?	Dup RPD	Preservation Met?***	Container OK?	Sample Date		Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample CL Met?****	% Completeness OK?*****
							1221 = 40 ppb Others = 20 ppb			DCBP = 40-140 TCMX = 30-150	< 20% of any reported value or <RL		30-130%		40-140%		40-140%		<50%	<50%	30°C**	3 or WHG			365 days (extracts)		6 months (analysis)	Spike = 170 ppb Average = 120 Acceptance = 40-140%	33%
			Tetrachlorometaxylene						62	Yes																			
Method QC																													
Blank																													
	OBS4343A1	Blank	Aroclor-1016	-	A																			12/8/2004		12/7/2004	Yes		Yes
			Aroclor-1221	-	A																								
			Aroclor-1232	-	A																								
			Aroclor-1242	-	A																								
			Aroclor-1248	-	A																								
			Aroclor-1254	-	A																								
			Aroclor-1260	-	A																								
			Decachlorobiphenyl						127	Yes																			
			Tetrachlorometaxylene						78	Yes																			
Blank																													
	OBS4343A2	Blank	Aroclor-1016	-	A																			12/8/2004		12/7/2004	Yes		Yes
			Aroclor-1221	-	A																								
			Aroclor-1232	-	A																								
			Aroclor-1242	-	A																								
			Aroclor-1248	-	A																								
			Aroclor-1254	-	A																								
			Aroclor-1260	-	A																								
			Decachlorobiphenyl						109	Yes																			
			Tetrachlorometaxylene						67	Yes																			
Laboratory Control Sample																													
	OBF4343A1	LCS	Aroclor-1016				Yes					87	Yes											12/8/2004		12/15/2004	Yes		Yes
			Aroclor-1260				Yes					106	Yes																
			Decachlorobiphenyl						129	Yes																			
			Tetrachlorometaxylene						76	Yes																			
Laboratory Control Sample																													
	OBF4343A2	LCS	Aroclor-1016				Yes					94	Yes											-12/8/2004		12/15/2004	Yes		Yes
			Aroclor-1260				Yes					110	Yes																
			Decachlorobiphenyl						126	Yes																			
			Tetrachlorometaxylene						75	Yes																			
Matrix Spike																													
	4344119	Matrix Spike	Aroclor-1016																										Yes
			Aroclor-1260																										
			Decachlorobiphenyl																										
			Tetrachlorometaxylene																										
Matrix Spike Duplicate																													
	4344119	Matrix Spike Dupl	Aroclor-1016																										Yes
			Aroclor-1260																										
			Decachlorobiphenyl																										
			Tetrachlorometaxylene																										
Primary Samples																													
SD-218-0000	4354019	Reg sample	Aroclor-1016	93	U		No														Yes	Yes	08/28/04	12/09/04	Yes	12/15/04	Yes		Yes
			Aroclor-1221	93	U		No																						
			Aroclor-1232	190	U		No																						
			Aroclor-1242	93	U		No																						
			Aroclor-1248	120	J		Yes																						
			Aroclor-1254	240	J		Yes																						
			Aroclor-1260	93	U		No																						
			Decachlorobiphenyl						150	No																			
			Tetrachlorometaxylene						100	Yes																			
SD-313-0003	4344123	Reg sample	Aroclor-1016	60	U		No														Yes	Yes	08/18/04	12/09/04	Yes	12/13/04	Yes		Yes
			Aroclor-1221	60	U		No																						
			Aroclor-1232	120	U		No																						
			Aroclor-1242	60	U		No																						
			Aroclor-1248	60	U		No																						
			Aroclor-1254	60	U		No																						
			Aroclor-1260	60	U		No																						
			Decachlorobiphenyl						134	Yes																			
			Tetrachlorometaxylene						31	No																			

TABLE G-1 - LOWER DUWAMISH TRIAD SAMPLING EVENT
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Field Sample ID	Lab Sample ID	Sample Description	Analyte	Result*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK	LSC % Rec.		MS % Rec.	MS CLs Met?	MSD % Rec.	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CL OK?	Dup RPD	Preservation Met?**	Container OK?	Sample Date		Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample CL Met?***	% Completeness OK?****
							1221 = 48 ppb Others = 20 ppb			DCBP = 40-140 TCMX = 50-130	< 20% of any reported value or <RL		50-130%		40-140%		40-140%		<50%	<50%	50°C**	8 oz WMG			365 days (estimated)		4 months (analysed)	Spike = 170 ppb Average = 120 Acceptance = 40-140%	85%
SD-314-0002	4344176	Reg sample	Aroclor-1016	580	U		No														Yes	Yes	08/18/04	12/09/04	Yes	12/13/04	Yes		Yes
			Aroclor-1221	580	U		No																						
			Aroclor-1232	120	U		No																						
			Aroclor-1242	58	U		No																						
			Aroclor-1248	58	U		No																						
			Aroclor-1254	58	U		No																						
			Aroclor-1260	58	U		No																						
			Decachlorobiphenyl						135	Yes																			
			Tetrachlorometaxylene						49	No																			
SD-315-0002	4344130	Reg sample	Aroclor-1016	46	U		No														Yes	Yes	08/19/04	12/09/04	Yes	12/13/04	Yes		Yes
			Aroclor-1221	46	U		No																						
			Aroclor-1232	91	U		No																						
			Aroclor-1242	46	U		No																						
			Aroclor-1248	46	U		No																						
			Aroclor-1254	4.6	U		Yes																						
			Aroclor-1260	4.6	U		Yes																						
			Decachlorobiphenyl						150	No																			
			Tetrachlorometaxylene						59	Yes																			
SD-330-0000	4354012	Reg sample	Aroclor-1016	94	U		No														Yes	Yes	08/27/04	12/09/04	Yes	12/15/04	Yes		Yes
			Aroclor-1221	94	U		No																						
			Aroclor-1232	190	U		No																						
			Aroclor-1242	94	U		No																						
			Aroclor-1248	94	U		No																						
			Aroclor-1254	680	J		Yes																						
			Aroclor-1260	94	U		No																						
			Decachlorobiphenyl						150	No																			
			Tetrachlorometaxylene						106	Yes																			
SD-336-0000	4354018	Reg sample	Aroclor-1016	71	U		No														Yes	Yes	08/27/04	12/09/04	Yes	12/15/04	Yes		Yes
			Aroclor-1221	71	U		No																						
			Aroclor-1232	140	U		No																						
			Aroclor-1242	71	U		No																						
			Aroclor-1248	71	U		No																						
			Aroclor-1254	180	J		Yes																						
			Aroclor-1260	71	J		Yes																						
			Decachlorobiphenyl						144	No																			
			Tetrachlorometaxylene						93	Yes																			
SD-340-0000	4354022	Reg sample	Aroclor-1016	76	U		No														Yes	Yes	08/26/04	12/09/04	Yes	12/15/04	Yes		Yes
			Aroclor-1221	76	U		No																						
			Aroclor-1232	150	U		No																						
			Aroclor-1242	76	U		No																						
			Aroclor-1248	76	U		No																						
			Aroclor-1254	230	J		Yes																						
			Aroclor-1260	76	U		No																						
			Decachlorobiphenyl						181	No																			
			Tetrachlorometaxylene						101	Yes																			
SD-433	4354033	Reg sample	Aroclor-1016	97	U		No														Yes	Yes	08/26/04	12/09/04	Yes	12/15/04	Yes		Yes
			Aroclor-1221	97	U		No																						
			Aroclor-1232	19	U		Yes																						
			Aroclor-1242	9.7	U		Yes																						
			Aroclor-1248	9.7	U		Yes																						
			Aroclor-1254	9.7	U		Yes																						
			Aroclor-1260	9.7	U		Yes																						
			Decachlorobiphenyl						133	Yes																			
			Tetrachlorometaxylene						30	No																			
Method QC																													
Method Blank																													
	OBS4344A1	Blank	Aroclor-1016	-	A																			12/9/2004		12/15/2004	Yes		Yes
			Aroclor-1221	-	A																								
			Aroclor-1232	-	A																								
			Aroclor-1242	-	A																								
			Aroclor-1248	-	A																								
			Aroclor-1254	-	A																								
			Aroclor-1260	-	A																								
			Decachlorobiphenyl						151	No																			
			Tetrachlorometaxylene						93	Yes																			

TABLE G-1 - LOWER DUWAMISH TRIAD SAMPLING EVENT
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Field Sample ID	Lab Sample ID	Sample Description	Analyte	Result*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK	LSC % Rec.		MS % Rec.	MS CLs Met?	MSD % Rec.	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CL OK?	Dup RPD	Preservation Met?**	Container OK?	Sample Date		Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample CL Met?***	% Completeness OK?****
							1221 = 49 ppb 1232=20 ppb			DCBP = 40-140 TCMX = 30-150	< 2% of any reported value or <RL		50-150%		40-140%		40-140%		<50%	<50%	≥0°C**	8 oz WMG			365 days (extended)		6 months (extended)	Spike = 120 ppb Average = 120 Acceptance = 40-140%	95%
Method Blank																													
	OBS4344A2	Blank	Aroclor-1016	-	A																			12/9/2004		12/15/2004	Yes		Yes
			Aroclor-1221	-	A																								
			Aroclor-1232	-	A																								
			Aroclor-1242	-	A																								
			Aroclor-1248	-	A																								
			Aroclor-1254	-	A																								
			Aroclor-1260	-	A																								
			Decachlorobiphenyl						137	Yes																			
			Tetrachlorometaxylene						65	Yes																			
Laboratory Control Sample																													
		LCS	Aroclor-1016																										Yes
			Aroclor-1260																										
			Decachlorobiphenyl																										
			Tetrachlorometaxylene																										
Matrix Spike																													
SD-315-0002	4344130	Matrix Spike	Aroclor-1016											89	Yes									12/9/2004		12/13/2004	Yes		Yes
			Aroclor-1260											112	Yes														
			Decachlorobiphenyl						135	Yes																			
			Tetrachlorometaxylene						10	No																			
Matrix Spike Duplicate																													
SD-315-0002	4344130	Matrix Spike Dupl	Aroclor-1016													79	Yes	11.9	Yes					12/9/2004		12/13/2004	Yes		Yes
			Aroclor-1260													115	Yes	2.6	Yes										
			Decachlorobiphenyl						142	No																			
			Tetrachlorometaxylene						3	No																			
Primary Samples																													
SD-333-0000	4354015	Reg sample	Aroclor-1016	94	U		No														Yes	Yes	08/27/04	12/14/04	Yes	12/15/04	Yes		Yes
			Aroclor-1221	94	U		No																						
			Aroclor-1232	190	U		No																						
			Aroclor-1242	94	U		No																						
			Aroclor-1248	94	U		No																						
			Aroclor-1254	1000			Yes																						
			Aroclor-1260	94	U		No																						
			Decachlorobiphenyl						133	Yes																			
			Tetrachlorometaxylene						68	Yes																			
SD-333-0000	4354015	Duplicate	Aroclor-1016	110	U		No													NC	Yes	Yes		12/14/04	No	12/15/04	Yes		Yes
			Aroclor-1221	110	U		No													NC									
			Aroclor-1232	230	U		No													NC									
			Aroclor-1242	110	U		No													NC									
			Aroclor-1248	110	U		No													NC									
			Aroclor-1254	840			Yes													17.4									
			Aroclor-1260	110	U		No													NC									
			Decachlorobiphenyl						126	Yes										NC									
			Tetrachlorometaxylene						75	Yes										NC									
SD-334-0000	4354016	Reg sample	Aroclor-1016	86	U		No														Yes	Yes	08/26/04	12/14/04	Yes	12/15/04	Yes		Yes
			Aroclor-1221	86	U		No																						
			Aroclor-1232	130	U		No																						
			Aroclor-1242	86	U		No																						
			Aroclor-1248	86	U		No																						
			Aroclor-1254	290			Yes																						
			Aroclor-1260	86	U		No																						
			Decachlorobiphenyl						126	Yes																			
			Tetrachlorometaxylene						79	Yes																			
SD-338-0000	4354020	Reg sample	Aroclor-1016	86	U		No														Yes	Yes	08/26/04	12/14/04	Yes	12/15/04	Yes		Yes
			Aroclor-1221	86	U		No																						
			Aroclor-1232	170	U		No																						
			Aroclor-1242	86	U		No																						
			Aroclor-1248	86	U		No																						
			Aroclor-1254	270			Yes																						
			Aroclor-1260	100			Yes																						
			Decachlorobiphenyl						121	Yes																			
			Tetrachlorometaxylene						80	Yes																			

TABLE G-1 - LOWER DUWAMISH TRIAD SAMPLING EVENT
PCB DATA REVIEW
EPA REGION 10

Field Sample ID	Lab Sample ID	Sample Description	Analyte	Result*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK	LCS % Rec.		MS % Rec.	MS CLs Met?	MSD % Rec.	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CL OK?	Dup RPD	Preservation Met?**	Container OK?	Sample Date		Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample CL Met?***	% Completeness OK?****
							1221 = 40 ppb Others = 20 ppb			DCBP = 45-149 TCMX = 50-133	< 25% or any reported value or <RL		35-130%		40-140%		40-140%		<50%	<50%	48°C**	8 oz VOAs			28-3 days extraction		8 months (analysis)	Sediment = 170 ppb Average = 120 Acceptance = 40-140%	65%
Reference Sample																													
SQ-1	C	Sequim Reference (spiked at 170 ppb)	Aroclor-1254	134																				12/14/2004		?	Yes	Yes (78.8%)	Yes
			Decachlorobiphenyl						131	Yes																			
			Tetrachlorometaxylene						76	Yes																			
Method QC																													
Blank																													
	OBS4348A1	Blank	Aroclor-1016	-	A																			12/14/2004		12/15/2004	Yes		Yes
			Aroclor-1221	-	A																								
			Aroclor-1232	-	A																								
			Aroclor-1242	-	A																								
			Aroclor-1248	-	A																								
			Aroclor-1254	-	A																								
			Aroclor-1260	-	A																								
			Decachlorobiphenyl						139	Yes																			
			Tetrachlorometaxylene						0	No																			
Orphaned Result																													
	OBW4239A1	Blank	Aroclor-1016	0.4	U	0.4	Yes																	8/26/2004		8/27/2004	Yes		Yes
			Aroclor-1221	0.4	U	0.4	Yes																						
			Aroclor-1232	0.8	U	0.8	Yes																						
			Aroclor-1242	0.4	U	0.4	Yes																						
			Aroclor-1248	0.4	U	0.4	Yes																						
			Aroclor-1254	0.4	U	0.4	Yes																						
			Aroclor-1260	0.4	U	0.4	Yes																						
			Decachlorobiphenyl						82	Yes																			
			Tetrachlorometaxylene						87	Yes																			
Orphaned Result																													
	OBF4239A1	LCS	Aroclor-1016									115	Yes											8/26/2004		8/27/2004	Yes		Yes
			Aroclor-1260									116	Yes																
			Decachlorobiphenyl						48	Yes																			
			Tetrachlorometaxylene						92	Yes																			
Orphaned Result																													
SD-315-0003	4344131	Reg sample	Aroclor-1016	67	U		No														Yes	Yes	08/18/04	11/08/04	Yes	12/09/04	Yes		Yes
			Aroclor-1221	67	U		No																						
			Aroclor-1232	13	U		Yes																						
			Aroclor-1242	6.7	U		Yes																						
			Aroclor-1248	6.7	U		Yes																						
			Aroclor-1254	6.7	U		Yes																						
			Aroclor-1260	6.7	U		Yes																						
			Decachlorobiphenyl						133	Yes																			
			Tetrachlorometaxylene						49	No																			
Orphaned Result																													
SD-434	4344173	Rinsate	Aroclor-1016	0.4	U		Yes														Yes	Yes	08/21/04	rinse	Yes	08/27/04	Yes		Yes
			Aroclor-1221	0.4	U		Yes																						
			Aroclor-1232	0.8	U		Yes																						
			Aroclor-1242	0.4	U		Yes																						
			Aroclor-1248	0.4	U		Yes																						
			Aroclor-1254	0.4	U		Yes																						
			Aroclor-1260	0.4	U		Yes																						
			Decachlorobiphenyl						75	Yes																			
			Tetrachlorometaxylene						87	Yes																			

Blank cells - data is not available

*Surrogates, LCS's and MS/MSD's are only reported in % recovery in the Region 10 LIMS.

**Preservation based on PSEP requirements for organic parameters (hold time is 1 year when frozen)

***Sequim sediment reference limits derived from information received from EPA Region 10 (Steve Reimer - "SQ-1 had a spiked value of 170 ug/kg when created, early historical results averaged 120 ug/kg. No control limits have been set in this laboratory.")

****Assume 100% per John Wakeman

NC = value not calculated

Table G-2 - Lower Duwamish Triad Sampling Event
PCB Data Review
EPA Region 6

Field Sample ID	Sample Name	Lab Sample ID	Sample Description	Batch	Analyte	Results*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK?	LCS % Rec	LCS CLs Met?	MS % Rec	MS CLs Met?	MSD % Rec	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CLs Met?	Field Dup RPD Met?	Preservation Met?**	Container OK?	Sample Date	Prep Date	Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample***	% Completeness Increment OK?****
									Aroclor 1221 = 40 ppb Other			DCBP 40-140 TCMX 50-130	< 20% of any reported value or		50-130%		40-140%		40-140%	<50	<50%	<50%	<0°C				365 days (extraction)		40 days (analysis)	Spike = 170 ppb Average = 120	95%
SD-309-0001	04344106	0411019-01	Primary	B4L0908	Aroclor-1016	15.4	U	15.4	Yes	1													Yes	Yes	8/19/2004	12/9/2004	Yes	12/15/2004	Yes		Yes
					Aroclor-1221	30.7	U	30.7	Yes	1																		12/15/2004			
					Aroclor-1232	15.4	U	15.4	Yes	1																		12/15/2004			
					Aroclor-1242	15.4	U	15.4	Yes	1																		12/15/2004			
					Aroclor-1248	76.6		15.4	Yes	1																		1/6/2005			
					Aroclor-1254	340		15.4	Yes	1																		12/13/2004			
					Aroclor-1260	118		15.4	Yes	1																		12/15/2004			
					Decachlorobiphenyl	202				1	52.6	Yes																12/15/2004			
					Tetrachloro-meta-xylene	280				1	72.9	Yes																12/15/2004			
SD-309-0002	04344107	0411019-02	Primary	B4L0908	Aroclor-1016	11.8	U	11.8	Yes	1													Yes	Yes	8/19/2004	12/9/2004	Yes	12/15/2004	Yes		Yes
					Aroclor-1221	23.5	U	23.5	Yes	1																		12/15/2004			
					Aroclor-1232	11.8	U	11.8	Yes	1																		12/15/2004			
					Aroclor-1242	11.8	U	11.8	Yes	1																		12/15/2004			
					Aroclor-1248	11.8	U	11.8	Yes	1																		1/6/2005			
					Aroclor-1254	86.7		11.8	Yes	1																		12/13/2004			
					Aroclor-1260	40.5		11.8	Yes	1																		12/15/2004			
					Decachlorobiphenyl	217				1	71.8	Yes																12/15/2004			
					Tetrachloro-meta-xylene	214				1	72.5	Yes																12/15/2004			
SD-310-0001	04344109	0411019-03	Primary	B4L0908	Aroclor-1016	16.6	U	16.6	Yes	1													Yes	Yes	8/19/2004	12/9/2004	Yes	12/15/2004	Yes		Yes
					Aroclor-1221	33.2	U	33.2	Yes	1																		12/15/2004			
					Aroclor-1232	16.6	U	16.6	Yes	1																		12/15/2004			
					Aroclor-1242	16.6	U	16.6	Yes	1																		12/15/2004			
					Aroclor-1248	16.6	U	16.6	Yes	1																		1/6/2005			
					Aroclor-1254	106		16.6	Yes	1																		12/13/2004			
					Aroclor-1260	168		16.6	Yes	1																		12/15/2004			
					Decachlorobiphenyl	223				1	53.6	Yes																12/15/2004			
					Tetrachloro-meta-xylene	327				1	78.6	Yes																12/15/2004			
SD-310-0002	04344110	0411019-04	Primary	B4L0908	Aroclor-1016	15.6	U	15.6	Yes	1													Yes	Yes	8/19/2004	12/9/2004	Yes	12/15/2004	Yes		Yes
					Aroclor-1221	31.2	U	31.2	Yes	1																		12/15/2004			
					Aroclor-1232	15.6	U	15.6	Yes	1																		12/15/2004			
					Aroclor-1242	15.6	U	15.6	Yes	1																		12/15/2004			
					Aroclor-1248	15.6	U	15.6	Yes	1																		1/6/2005			
					Aroclor-1254	89.3		15.6	Yes	1																		12/13/2004			
					Aroclor-1260	70.4		15.6	Yes	1																		12/15/2004			
					Decachlorobiphenyl	245				1	62.8	Yes																12/15/2004			
					Tetrachloro-meta-xylene	317				1	81.3	Yes																12/15/2004			
SD-316-0001	04344133	0411019-06	Primary	B4L0908	Aroclor-1016	16.8	U	16.8	Yes	1													Yes	Yes	8/19/2004	12/9/2004	Yes	12/15/2004	Yes		Yes
					Aroclor-1221	33.6	U	33.6	Yes	1																		12/15/2004			
					Aroclor-1232	16.8	U	16.8	Yes	1																		12/15/2004			
					Aroclor-1242	16.8	U	16.8	Yes	1																		12/15/2004			
					Aroclor-1248	85		16.8	Yes	1																		1/6/2005			
					Aroclor-1254	501		16.8	Yes	1																		12/15/2004			
					Aroclor-1260	149		16.8	Yes	1																		12/15/2004			
					Decachlorobiphenyl	265				1	63.1	Yes																12/15/2004			
					Tetrachloro-meta-xylene	342				1	81.4	Yes																12/15/2004			
SD-316-0002	04344135	0411019-07	Primary	B4L0908	Aroclor-1016	14	U	14	Yes	1													Yes	Yes	8/19/2004	12/9/2004	Yes	12/15/2004	Yes		Yes
					Aroclor-1221	28	U	28	Yes	1																		12/15/2004			
					Aroclor-1232	14	U	14	Yes	1																		12/15/2004			
					Aroclor-1242	14	U	14	Yes	1																		12/15/2004			
					Aroclor-1248	458		14	Yes	1																		1/6/2005			
					Aroclor-1254	2170		70.1	Yes	5																		12/15/2004			
					Aroclor-1260	438		14	Yes	1																		12/15/2004			
					Decachlorobiphenyl	219				1	62.4	Yes																12/15/2004			
					Tetrachloro-meta-xylene	285				1	81.2	Yes																12/15/2004			
SD-317-0001	04344137	0411019-08	Primary	B4L0908	Aroclor-1016	16.2	U	16.2	Yes	1													Yes	Yes	8/19/2004	12/9/2004	Yes	12/15/2004	Yes		Yes
					Aroclor-1221	32.4	U	32.4	Yes	1																		12/15/2004			
					Aroclor-1232	16.2	U	16.2	Yes	1																		12/15/2004			
					Aroclor-1242	16.2	U	16.2	Yes	1																		12/15/2004			
					Aroclor-1248	562		16.2	Yes	1																		1/6/2005			
					Aroclor-1254	755		32.4	Yes	2																		12/15/2004			
					Aroclor-1260	212		16.2	Yes	1																		12/15/2004			
					Decachlorobiphenyl	207				1	65.9	Yes																12/15/2004			

Table G-2 - Lower Duwamish Triad Sampling Event
PCB Data Review
EPA Region 6

Field Sample ID	Sample Name	Lab Sample ID	Sample Description	Batch	Analyte	Results*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK?	LCS % Rec	LCS CLs Met?	MS % Rec	MS CLs Met?	MSD % Rec	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CLs Met?	Field Dup RPD Met?	Preservation Met?**	Container OK?	Sample Date	Prep Date	Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample***	% Completeness Increment OK?****
									Aroclor 1221 = 40 ppb Other			DCBP 40-140 TCMX 50-120	< 20% of any reported value or		50-130%		40-140%		40-140%	<50	<50%	<50%	<0°C				365 days (extraction)		40 days (analysis)	Spike = 170 ppb Average = 120	95%
					Tetrachloro-meta-xylene	327				1	80.7	Yes																			
SD-315-0001	04344129	0411019-05	Primary	B4L0908	Aroclor-1016	11.3	U	11.3	Yes	1												Yes	Yes	8/19/2004	12/9/2004	Yes	12/15/2004	Yes		Yes
					Aroclor-1221	22.6	U	22.6	Yes	1																	12/15/2004				
					Aroclor-1232	11.3	U	11.3	Yes	1																	12/15/2004				
					Aroclor-1242	11.3	U	11.3	Yes	1																	12/15/2004				
					Aroclor-1248	11.3	U	11.3	Yes	1																	1/6/2005				
					Aroclor-1254	11.3	U	11.3	Yes	1																	12/13/2004				
					Aroclor-1260	11.3	U	11.3	Yes	1																	12/15/2004				
					Decachlorobiphenyl	207				1	71.4	Yes															12/15/2004				
					Tetrachloro-meta-xylene	203				1	71.7	Yes															12/15/2004				
SD-317-0002	04344138	0411019-09	Primary	B4L0908	Aroclor-1016	14.2	U	14.2	Yes	1												Yes	Yes	8/19/2004	12/9/2004	Yes	12/15/2004	Yes		Yes
					Aroclor-1221	28.4	U	28.4	Yes	1																	12/15/2004				
					Aroclor-1232	14.2	U	14.2	Yes	1																	12/15/2004				
					Aroclor-1242	14.2	U	14.2	Yes	1																	12/15/2004				
					Aroclor-1248	6920		284	Yes	20																	1/6/2005				
					Aroclor-1254	2830		142	Yes	10																	12/15/2004				
					Aroclor-1260	688		28.4	Yes	2																	12/15/2004				
					Decachlorobiphenyl	254				2	79.8	Yes															12/15/2004				
					Tetrachloro-meta-xylene	283				2	79.5	Yes															12/15/2004				
SD-317-0003	04344139	0411019-10	Primary	B4L0908	Aroclor-1016	12.3	U	12.3	Yes	1												Yes	Yes	8/19/2004	12/9/2004	Yes	12/15/2004	Yes		Yes
					Aroclor-1221	24.7	U	24.7	Yes	1																	12/15/2004				
					Aroclor-1232	12.3	U	12.3	Yes	1																	12/15/2004				
					Aroclor-1242	12.3	U	12.3	Yes	1																	12/15/2004				
					Aroclor-1248	635		12.3	Yes	1																	1/6/2005				
					Aroclor-1254	799		37	Yes	3																	12/15/2004				
					Aroclor-1260	201		12.3	Yes	1																	12/15/2004				
					Decachlorobiphenyl	230				1	74.4	Yes															12/15/2004				
					Tetrachloro-meta-xylene	222				1	71.8	Yes															12/15/2004				
Method QC																															
Method Blank																															
			Blank	B4L0908-BLK1	Aroclor-1016	9.9	U		Yes																12/9/2004		12/15/2004	Yes		Yes
					Aroclor-1221	19.9	U	19.9	Yes																						
					Aroclor-1232	9.9	U	9.9	Yes																						
					Aroclor-1242	9.9	U	9.9	Yes																						
					Aroclor-1248	9.9	U	9.9	Yes																						
					Aroclor-1254	9.9	U	9.9	Yes																						
					Aroclor-1260	9.9	U	9.9	Yes																						
					Decachlorobiphenyl	176					70.7	Yes																			
					Tetrachloro-meta-xylene	291					80.7	Yes																			
Laboratory Control Sample																															
			LCS	B4L0908-BS1	Aroclor-1016	610		19.7	Yes					61.9	Yes										12/9/2004		12/15/2004	Yes		Yes
					Aroclor-1260	590		19.7	Yes					59.8	Yes																
					Decachlorobiphenyl	165					75.2	Yes																			
					Tetrachloro-meta-xylene	193					78.5	Yes																			
Matrix Spike																															
			MS	B4L0908-MS1	Aroclor-1016	810		22.9	Yes							71.1	Yes								12/9/2004		12/15/2004	Yes		Yes
					Aroclor-1260	710		22.9	Yes							62.3	Yes														
					Decachlorobiphenyl	227					79.4	Yes																			
					Tetrachloro-meta-xylene	252					88.1	Yes																			
Matrix Spike Duplicate																															
			MSD	B4L0908-MSD1	Aroclor-1016	902		22.9	Yes									79.1	Yes	10.7	Yes				12/9/2004		12/15/2004	Yes		Yes
					Aroclor-1260	766		22.9	Yes									67.2	Yes	7.0	Yes										
					Decachlorobiphenyl	242					84.6	Yes																			
					Tetrachloro-meta-xylene	280					87.9	Yes																			
Primary Samples																															
SD-320-0001	04344149	0411019-12	Primary	B4L1001	Aroclor-1016	16.9	U	16.9	Yes	1												Yes	Yes	8/19/2004	12/10/2004	Yes	12/16/2004	Yes		Yes
					Aroclor-1221	33.8	U	33.8	Yes	1																	12/16/2004				
					Aroclor-1232	16.9	U	16.9	Yes	1																	12/16/2004				
					Aroclor-1242	16.9	U	16.9	Yes	1																	12/16/2004				
					Aroclor-1248	80.2		16.9	Yes	1																	1/6/2005				
					Aroclor-1254	990		33.8	Yes	2																	12/16/2004				
					Aroclor-1260	411		16.9	Yes	1																	12/16/2004				
					Decachlorobiphenyl	364				1	86.1	Yes															12/16/2004				
					Tetrachloro-meta-xylene	355				1	83.9	Yes															12/16/2004				

Table G-2 - Lower Duwamish Triad Sampling Event
PCB Data Review
EPA Region 6

Field Sample ID	Sample Name	Lab Sample ID	Sample Description	Batch	Analyte	Results*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK?	LCS % Rec	LCS CLs Met?	MS % Rec	MS CLs Met?	MSD % Rec	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CLs Met?	Field Dup RPD Met?	Preservation Met?**	Container OK?	Sample Date	Prep Date	Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample***	% Completeness Increment OK?***
									Aroclor 1221 = 40 ppb Other			DCBP 40-140 TCMX 50-130	< 20% of any reported value or		50-130%		40-140%		40-140%	<50	<50%	<50%	<0°C				365 days (extraction)		40 days (analysis)	Spike = 170 ppb Average = 120	≥5%
SD-320-0002	04344150	0411019-13	Primary	B4L1001	Aroclor-1016	17	U	17	Yes	1													Yes	Yes	8/19/2004	12/10/2004	Yes	12/16/2004	Yes		Yes
					Aroclor-1221	34	U	34	Yes	1																		12/16/2004			
					Aroclor-1232	17	U	17	Yes	1																		12/16/2004			
					Aroclor-1242	17	U	17	Yes	1																		12/16/2004			
					Aroclor-1248	32.1		17	Yes	1																		1/6/2005			
					Aroclor-1254	626		17	Yes	1																		12/16/2004			
					Aroclor-1260	576		17	Yes	1																		12/16/2004			
					Decachlorobiphenyl	326				1	78.7	Yes																12/16/2004			
					Tetrachloro-meta-xylene	347				1	81.6	Yes																12/16/2004			
SD-320-0002	04344151	0411019-14	Primary	B4L1001	Aroclor-1016	15.7	U	15.7	Yes	1													Yes	Yes	8/19/2004	12/10/2004	Yes	12/16/2004	Yes		Yes
					Aroclor-1221	31.3	U	31.3	Yes	1																		12/16/2004			
					Aroclor-1232	15.7	U	15.7	Yes	1																		12/16/2004			
					Aroclor-1242	15.7	U	15.7	Yes	1																		12/16/2004			
					Aroclor-1248	15.7	U	15.7	Yes	1																		1/6/2005			
					Aroclor-1254	88.9		15.7	Yes	1																		12/16/2004			
					Aroclor-1260	170		15.7	Yes	1																		12/16/2004			
					Decachlorobiphenyl	321				1	81.9	Yes																12/16/2004			
					Tetrachloro-meta-xylene	331				1	84.4	Yes																12/16/2004			
SD-321-0001	04344153	0411019-15	Primary	B4L1001	Aroclor-1016	18.9	U	18.9	Yes	1													Yes	Yes	8/19/2004	12/10/2004	Yes	12/16/2004	Yes		Yes
					Aroclor-1221	27.5	U	27.5	Yes	1																		12/16/2004			
					Aroclor-1232	13.8	U	13.8	Yes	1																		12/16/2004			
					Aroclor-1242	13.8	U	13.8	Yes	1																		12/16/2004			
					Aroclor-1248	54.5		13.8	Yes	1																		1/6/2005			
					Aroclor-1254	237		13.8	Yes	1																		12/16/2004			
					Aroclor-1260	460		13.8	Yes	1																		12/16/2004			
					Decachlorobiphenyl	312				1	90.7	Yes																12/16/2004			
					Tetrachloro-meta-xylene	275				1	79.9	Yes																12/16/2004			
SD-321-0002	04344154	0411019-16	Primary	B4L1001	Aroclor-1016	15.4	U	15.4	Yes	1													Yes	Yes	8/18/2004	12/10/2004	Yes	12/16/2004	Yes		Yes
					Aroclor-1221	30.8	U	30.8	Yes	1																		12/16/2004			
					Aroclor-1232	15.4	U	15.4	Yes	1																		12/16/2004			
					Aroclor-1242	15.4	U	15.4	Yes	1																		12/16/2004			
					Aroclor-1248	15.4		15.4	Yes	1																		1/6/2005			
					Aroclor-1254	80.4	TIC	15.4	Yes	1																		12/16/2004			
					Aroclor-1260	298	J	15.4	Yes	1																		12/16/2004			
					Decachlorobiphenyl	319				1	82.9	Yes																12/16/2004			
					Tetrachloro-meta-xylene	308				1	79.5	Yes																12/16/2004			
SD-322-0002	04344160	0411019-20	Primary	B4L1001	Aroclor-1016	17.3	U	17.3	Yes	1													Yes	Yes	8/18/2004	12/10/2004	Yes	12/16/2004	Yes		Yes
					Aroclor-1221	34.7	U	34.7	Yes	1																		12/16/2004			
					Aroclor-1232	17.3	U	17.3	Yes	1																		12/16/2004			
					Aroclor-1242	17.3	U	17.3	Yes	1																		12/16/2004			
					Aroclor-1248	1630		86.7	No	5																		1/6/2005			
					Aroclor-1254	782		52	Yes	3																		12/16/2004			
					Aroclor-1260	161		17.3	Yes	1																		12/16/2004			
					Decachlorobiphenyl	335				1	77.2	Yes																12/16/2004			
					Tetrachloro-meta-xylene	349				1	80.4	Yes																12/16/2004			

Table G-2 - Lower Duwamish Triad Sampling Event
PCB Data Review
EPA Region 6

Field Sample ID	Sample Name	Lab Sample ID	Sample Description	Batch	Analyte	Results*	Qualifier	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Surrogate CLs OK?	Method Blank CLs OK?	LCS % Rec	LCS CLs Met?	MS % Rec	MS CLs Met?	MSD % Rec	MSD CLs Met?	MS/MSD RPD	MS/MSD RPD CLs Met?	Field Dup RPD Met?	Preservation Met?**	Container OK?	Sample Date	Prep Date	Prep Hold Time Met?	Analysis Date	Analysis Hold Time Met?	Reference Sample***	% Completeness Increment OK?****
									Aroclor 1221 = 40 ppb Other			DCBP 40-149 TCMX 30-139	< 20% of any reported value or		50-130%		40-140%		40-140%	<50	<50%	<50%	<0°C				365 days (extraction)		40 days (analysis)	Spike = 170 ppb Average = 120	95%
SD-322-0001	04344161	0411019-17	Primary	B4L1001	Aroclor-1016	18.2	U	18.2	Yes	1													Yes	Yes	8/18/2004	12/10/2004	Yes	12/16/2004	Yes		Yes
					Aroclor-1221	36.5	U	36.5	Yes	1																		12/16/2004			
					Aroclor-1232	18.2	U	18.2	Yes	1																		12/16/2004			
					Aroclor-1242	18.2	U	18.2	Yes	1																		12/16/2004			
					Aroclor-1248	582		18.2	Yes	1																		1/6/2005			
					Aroclor-1254	638		18.2	Yes	1																		12/16/2004			
					Aroclor-1260	173		18.2	Yes	1																		12/16/2004			
					Decachlorobiphenyl	360				1	78.9	Yes																12/16/2004			
					Tetrachloro-meta-xylene	372				1	81.6	Yes																12/16/2004			
SD-322-0002	04344162	0411019-16	Primary	B4L1001	Aroclor-1016	14.6	U	14.6	Yes	1													Yes	Yes	8/18/2004	12/10/2004	Yes	12/16/2004	Yes		Yes
					Aroclor-1221	29.2	U	29.2	Yes	1																		12/16/2004			
					Aroclor-1232	14.6	U	14.6	Yes	1																		12/16/2004			
					Aroclor-1242	14.6	U	14.6	Yes	1																		12/16/2004			
					Aroclor-1248	46.1		14.6	Yes	1																		1/6/2005			
					Aroclor-1254	64		14.6	Yes	1																		12/16/2004			
					Aroclor-1260	16		14.6	Yes	1																		12/16/2004			
					Decachlorobiphenyl	294				1	80.3	Yes																12/16/2004			
					Tetrachloro-meta-xylene	269				1	73.5	Yes																12/16/2004			
SD-323-001	04344165	0411019-19	Primary	B4L1001	Aroclor-1016	14.6	U	14.6	Yes	1													Yes	Yes	8/19/2004	12/10/2004	Yes	12/16/2004	Yes		Yes
					Aroclor-1221	29.3	U	29.3	Yes	1																		12/16/2004			
					Aroclor-1232	14.6	U	14.6	Yes	1																		12/16/2004			
					Aroclor-1242	14.6	U	14.6	Yes	1																		12/16/2004			
					Aroclor-1248	21.5		14.6	Yes	1																		1/6/2005			
					Aroclor-1254	198		14.6	Yes	1																		12/16/2004			
					Aroclor-1260	65.2		14.6	Yes	1																		12/16/2004			
					Decachlorobiphenyl	271				1	74	Yes																12/16/2004			
					Tetrachloro-meta-xylene	291				1	79.5	Yes																12/16/2004			
Sequim Reference Sample																															
	SQI	0411019-21	Sequim Reference (spiked at 170 ppb	B4L1001	Aroclor-1016	15.6	U	15.6	Yes	1													Yes	Yes	8/18/2004	12/10/2004	Yes	12/16/2004	Yes	No	Yes
					Aroclor-1221	31.2	U	31.2	Yes	1																		12/16/2004			
					Aroclor-1232	15.6	U	15.6	Yes	1																		12/16/2004			
					Aroclor-1242	15.6	U	15.6	Yes	1																		12/16/2004			
					Aroclor-1248	15.6	U	15.6	Yes	1																		1/6/2005			
					Aroclor-1254	82.3		15.6	Yes	1																		12/16/2004			
					Aroclor-1260	15.6	U	15.6	Yes	1																		12/16/2004			
					Decachlorobiphenyl	268				1	68.7	Yes																12/16/2004			
					Tetrachloro-meta-xylene	297				1	76.2	Yes																12/16/2004			
Method QC																															
Method Blank																															
			Blank	B4L1001-BLK1	Aroclor-1016	9.8	U	9.9	Yes																	12/10/2004		12/16/2004	Yes		Yes
					Aroclor-1221	19.7	U	19.9	Yes																						
					Aroclor-1232	9.8	U	9.9	Yes																						
					Aroclor-1242	9.8	U	9.9	Yes																						
					Aroclor-1248	9.8	U	9.9	Yes																						
					Aroclor-1254	9.8	U	9.9	Yes																						
					Aroclor-1260	9.8	U	9.9	Yes																						
					Decachlorobiphenyl	186					75.6	Yes																			
					Tetrachloro-meta-xylene	166					67.5	Yes																			
Laboratory Control Sample																															
			LCS	B4L1001-BS1	Aroclor-1016	724		19.7	Yes					73.7												12/10/2004		12/16/2004	Yes		Yes
					Aroclor-1260	656		19.7	Yes					67.6																	
					Decachlorobiphenyl	199					80.9	Yes																			
					Tetrachloro-meta-xylene	220					89.4	Yes																			
Matrix Spike																															
			MS	B4L1001-MS1	Aroclor-1016	1630	J+	88.9	Yes							91.6	Yes									12/10/2004		12/16/2004	Yes		Yes
					Aroclor-1260	1330		33.5	Yes							65.7	Yes														
					Decachlorobiphenyl	371					83.6	Yes																			
					Tetrachloro-meta-xylene	402					90.5	Yes																			
Matrix Spike Duplicate																															
			MSD	B4L1001-MSD1	Aroclor-1016	1480	J+	22.9	Yes									87.1	Yes	9.6	Yes					12/10/2004		12/16/2004	Yes		Yes
					Aroclor-1260	1250		22.9	Yes									84.1	Yes	6.2	Yes										
					Decachlorobiphenyl	324					98.4	Yes																			
					Tetrachloro-meta-xylene	416					75.2	Yes																			

Blank cells - data not available
*Surrogates, LCS's and MS/MSD's are only reported in % recovery in the Region 10 LIMS.
**Preservation based on PSEP requirements for organic parameters (hold time is 1 year when frozen)
***Sequim sediment reference limits derived from information received from EPA Region 10 (Steve Reimer of EPA stated, "SQ-1 had a spiked value of 170 ug/kg when created, early historical results averaged 120 ug/kg. No control limits have been set in this laboratory.")
****Not stated in laboratory narratives. The time from sampling to final deliverables was 3.5-4 months.
NC = value not calculated

TABLE G-3 - LOWER DUWAMISH TRIAD SAMPLING EVENT
PCB DATA REVIEW
EPA REGION 8

Field Sample ID	Lab Sample ID	Sample Description	Analyte	Results*	Qualifier (Lab Qualifier)	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Preservation Met?**	Container OK?	Analysis Date	Analysis Hold Time Met?	Reference Sample***	% Completeness OK?****
							20 ppb						6 months (analysis)	Spike = 170 ppb Average = 120 Acceptance = 40-140%	95%
Primary Samples															
SD-307-0001	4344101	Reg Sample	Aroclor-1248	20	U	20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	20.2			Yes								
			Aroclor-1260	61.6			Yes								
			Decachlorobiphenyl						114						
SD-307-0002	4344102	Reg Sample	Aroclor-1248	20	U	20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	30.1			Yes								
			Aroclor-1260	132			Yes								
			Decachlorobiphenyl						107						
SD-307-003	4344103	Reg Sample	Aroclor-1248	20	U	20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	27.2			Yes								
			Aroclor-1260	43.2			Yes								
			Decachlorobiphenyl						125						
SD-309-0001	4344105	Reg Sample	Aroclor-1248	20	U	20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	184			Yes								
			Aroclor-1260	69.1			Yes								
			Decachlorobiphenyl						118						
SD-310-0003	4344111	Reg Sample	Aroclor-1248	20	U	20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	29.8			Yes								
			Aroclor-1260	35.4			Yes								
			Decachlorobiphenyl						101						
SD-311-0001	4344113	Reg Sample	Aroclor-1248	259			Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	1110			Yes								
			Aroclor-1260	217			Yes								
			Decachlorobiphenyl						94						
SD-311-0002	4344114	Reg Sample	Aroclor-1248	1280			Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	4090			Yes								
			Aroclor-1260	419			Yes								
			Decachlorobiphenyl						113						
SD-311-0003	4344115	Reg Sample	Aroclor-1248	703		20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	3370			Yes								
			Aroclor-1260	373			Yes								
			Decachlorobiphenyl						120						
SD-312-0001	4344117	Reg Sample	Aroclor-1248	20	U	20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	1460			Yes								
			Aroclor-1260	409			Yes								
			Decachlorobiphenyl						103						
SD-313-0001	4344121	Reg Sample	Aroclor-1248	20	U	20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	84.2			Yes								
			Aroclor-1260	20	U	20	Yes								
			Decachlorobiphenyl						117						

TABLE G-3 - LOWER DUWAMISH TRIAD SAMPLING EVENT
PCB DATA REVIEW
EPA REGION 8

Field Sample ID	Lab Sample ID	Sample Description	Analyte	Results*	Qualifier (Lab Qualifier)	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Preservation Met?**	Container OK?	Analysis Date	Analysis Hold Time Met?	Reference Sample***	% Completeness OK?****
							20 ppb						6 months (analysis)	Spike = 170 ppb Average = 120 Acceptance = 40-140%	95%
SD-314-0001	4344125	Reg Sample	Aroclor-1248	20	U	20	Yes			Yes	Yes				Yes
			Aroclor-1254	20	U	20	Yes								
			Aroclor-1260	20	U	20	Yes								
			Decachlorobiphenyl						119						
SD-316-0002	4344134	Reg Sample	Aroclor-1248	146			Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	513			Yes								
			Aroclor-1260	120			Yes								
			Decachlorobiphenyl						104						
SD-319-0002	4344146	Reg Sample	Aroclor-1248	20		20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	36.2			Yes								
			Aroclor-1260	96.7			Yes								
			Decachlorobiphenyl						127						
SD-321-0003	4344155	Reg Sample	Aroclor-1248	20	U	20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	109			Yes								
			Aroclor-1260	183			Yes								
			Decachlorobiphenyl						124						
SD-322-0001	4344159	Reg Sample	Aroclor-1248	420			Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	482			Yes								
			Aroclor-1260	61.2			Yes								
			Decachlorobiphenyl						128						
SD-322-0005	4344163	Reg Sample	Aroclor-1248	63.2			Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	147			Yes								
			Aroclor-1260	21.6			Yes								
			Decachlorobiphenyl						114						
SD-326-0001	4344170	Reg Sample	Aroclor-1248	179			Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	693			Yes								
			Aroclor-1260	99.3			Yes								
			Decachlorobiphenyl						105						
SD-327-0002	4344171	Reg Sample	Aroclor-1248	111			Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	349			Yes								
			Aroclor-1260	90.8			Yes								
			Decachlorobiphenyl						91						
Primary Samples															
SD-207-0000 (dup SD-433-0000, not analyzed)	4354001	Reg Sample	Aroclor-1248	20	U	20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	104			Yes								
			Aroclor-1260	41.6			Yes								
			Decachlorobiphenyl						62						
SD-208-0000	4354002	Reg Sample	Aroclor-1248	34.7			Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	190			Yes								
			Aroclor-1260	116			Yes								
			Decachlorobiphenyl						90						

TABLE G-3 - LOWER DUWAMISH TRIAD SAMPLING EVENT
PCB DATA REVIEW
EPA REGION 8

Field Sample ID	Lab Sample ID	Sample Description	Analyte	Results*	Qualifier (Lab Qualifier)	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Preservation Met?**	Container OK?	Analysis Date	Analysis Hold Time Met?	Reference Sample***	% Completeness OK?****
							20 ppb						*6 months (analysis)*	*Spike = 170 ppb Average = 120 Acceptance = 40-140%*	*95%*
SD-209-0000	4354003	Reg Sample	Aroclor-1248	20	U	20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	57.5			Yes								
			Aroclor-1260	20.2			Yes								
			Decachlorobiphenyl						74						
SD-212-0000	4354006	Reg Sample	Aroclor-1248	20	U	20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	48.9			Yes								
			Aroclor-1260	20	U	20	Yes								
			Decachlorobiphenyl						63						
SD-217-0000	4354011	Reg Sample	Aroclor-1248	48.3			Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	201			Yes								
			Aroclor-1260	43.4			Yes								
			Decachlorobiphenyl						78						
SD-331-0000	4354013	Reg Sample	Aroclor-1248	DNR						Yes	Yes				Yes
			Aroclor-1254	DNR											
			Aroclor-1260	DNR											
			Decachlorobiphenyl						dnr						
SD-332-0000	4354014	Reg Sample	Aroclor-1248	75.9			Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	227			Yes								
			Aroclor-1260	58.3			Yes								
			Decachlorobiphenyl						102						
SD-337-0000	4354019	Reg Sample	Aroclor-1248	215			Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	719			Yes								
			Aroclor-1260	304			Yes								
			Decachlorobiphenyl						77						
SD-341-0000	4354023	Duplicate of SD-333-0000	Aroclor-1248	20	U	20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	1170			Yes								
			Aroclor-1260	228			Yes								
			Decachlorobiphenyl						113						
SD-342-0000	4354024	Duplicate of SD-338-0000	Aroclor-1248	113			Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	3290			Yes								
			Aroclor-1260	236			Yes								
			Decachlorobiphenyl						76						
SD-345-000	4354027	Reg Sample	Aroclor-1248	20		20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	124			Yes								
			Aroclor-1260	58.1			Yes								
			Decachlorobiphenyl						120						
SD-431 (dup SD-333-0000, not analyzed)	4354031	Reg Sample	Aroclor-1248	20	U	20	Yes			Yes	Yes	12/30/2004			Yes
			Aroclor-1254	238			Yes								
			Aroclor-1260	65.4			Yes								
			Decachlorobiphenyl						106						

TABLE G-3 - LOWER DUWAMISH TRIAD SAMPLING EVENT
PCB DATA REVIEW
EPA REGION 8

Field Sample ID	Lab Sample ID	Sample Description	Analyte	Results*	Qualifier (Lab Qualifier)	Sample RL	Project RL Met?	Dilution	Surrogate % Recovery	Preservation Met?**	Container OK?	Analysis Date	Analysis Hold Time Met?	Reference Sample***	% Completeness OK?****
							20 ppb						*6 months (analysis)*	*Spike = 170 ppb Average = 120 Acceptance = 40-140%*	*95%*
Reference Samples															
SQI		Sequim Reference (spiked at ? ppb)	Aroclor-1248	20	U	20	Yes			Yes	Yes			No	Yes
			Aroclor-1254	46.9			Yes								
			Aroclor-1260	20	U	20	Yes								
			Decachlorobiphenyl												
SQI		Sequim Reference (spiked at ? ppb)	Aroclor-1248	20	U	20	Yes			Yes	Yes			No	Yes
			Aroclor-1254	57.6			Yes								
			Aroclor-1260	20	U	20	Yes								
			Decachlorobiphenyl												
Method QC															
Matrix Spike															
		MS	Aroclor-1254												
			Aroclor-1260												
			Decachlorobiphenyl												
Matrix Spike Duplicate															
		MSD	Aroclor-1254												
			Aroclor-1260												
			Decachlorobiphenyl												
Matrix Spike															
		MS	Aroclor-1254												
			Aroclor-1260												
			Decachlorobiphenyl												
Matrix Spike Duplicate															
		MSD	Aroclor-1254												
			Aroclor-1260												
			Decachlorobiphenyl												
Laboratory Control Sample															
		LCS	Aroclor-1254												
			Aroclor-1260												
			Decachlorobiphenyl												
		LCS	Aroclor-1254												
			Aroclor-1260												
			Decachlorobiphenyl												
Method Blanks															
		Blank	Aroclor-1248												
			Aroclor-1254												
			Aroclor-1260												
			Decachlorobiphenyl												
		Blank	Aroclor-1248												
			Aroclor-1254												
			Aroclor-1260												
			Decachlorobiphenyl												

Blank cells - data is not available

*Surrogates, LCS's and MS/MSD's are only reported in % recovery in the Region 8 LIMS.

**Preservation based on PSEP requirements for organic parameters (hold time is 1 year when frozen)

***Sequim sediment reference limits derived from information received from EPA Region 10 (Steve Reimer - "SQ-1 had a spiked value of 170 ug/kg when created, early historical results averaged 120 ug/kg. No control limits have been set in this laboratory.")

****Assume 100% per John Wakeman

NC = value not calculated

DNR - did not report; sample lost during preparation at the laboratory