Duwamish/Diagonal Sediment Remediation Project
Final 2010 Monitoring Report

Elliott Bay/Duwamish Restoration Program Panel

A P P E N D I C E S

May 2015

Appendix A

2010 QA1 Quality Assurance Review Package

Appendix A1 – Sediment Cap 2010

Appendix A2 – ENR 2010

Appendix A3 – Perimeter Station 2010

Appendix A1 – Sediment Cap 2010

KING COUNTY ENVIRONMENTAL LABORATORY
QUALITY ASSURANCE REVIEW

for

ESTUARINE SEDIMENT ANALYTICAL DATA

DUWAMISH/DIAGONAL SEDIMENT REMEDIATION PROJECT
YEAR SIX, CAP SEDIMENT CHARACTERIZATION
MARCH 2010 SAMPLING EVENT

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INTRODUCTION

This quality assurance (QA) narrative is intended to document the QA review conducted on the chemistry analyses performed for the Duwamish Diagonal Sediment Remediation Project, Year 6 Main Cap Monitoring. The QA narrative is organized into the five sections listed below.

- General Comments
- Sample Collection
- Conventional Analyses
- Metal Chemistry
- Organic Chemistry

An overview of the approach used for the QA review is detailed in the *General Comments* section. Additional information specific to each analysis is included in the appropriate analytical section.

This QA review and narrative (specifically defined as QA1) have been conducted in accordance with guidelines established through the Puget Sound Dredged Disposal Analysis (PSDDA) program, Sediment Management Standards (WAC 173-204-610) and the Sediment Sampling and Analysis Appendix (SAPA), WDOE 2008. Other approaches incorporated in the QA review have been established through collaboration between the King County Environmental Laboratory (KC Laboratory) and the Washington State Department of Ecology (Ecology) Sediment Management Unit.

GENERAL COMMENTS

Scope of Samples Submitted

This QA review is associated with marine sediment samples collected on March 29, 2010 as part of the Duwamish Diagonal Sediment Remediation Project, Year 6, Main Cap Monitoring. The Sampling and Analysis Plan (SAP) in effect for this sampling event is titled: Duwamish/Diagonal Sediment Remediation Dredging and Capping Operations, Sediment Monitoring Sampling and Analysis Plan. March 2010. (KCEL document # 943)

Except where noted in the subcontracting sections of this QA review, all analyses have been conducted by the King County Environmental Laboratory (KCEL). Sediment analytical data are reported with associated data qualifiers and have undergone QA1 review, as summarized in this narrative report.

Completeness

Completeness has been evaluated for this data submission and QA review by considering the following criteria:

- Comparing reported data to the planned project analyses summarized in Table 1.
- Compliance with storage conditions and holding times.
- Frequency of analysis of the complete set of quality control (QC) samples outlined in Table 2.

Subcontracted Analyses

Analyses that have been subcontracted and the issues associated with these subcontracted analyses are noted in this narrative.

Methods

Analytical methods are noted in the applicable analytical sections of this QA review.

Target Lists

The reported target lists have been compared to the target analytes listed in *Table 1 - Marine Sediment Quality Standards Chemical Criteria* and *Table 3 - Puget Sound Marine Sediment Cleanup Screening Levels Chemical Criteria* contained in Chapter 173-204 WAC.

Detection Limits

As part of the QA1 review, the detection limits reported for each parameter have been reviewed against the detection limit requirements defined in the SAP. When sample results have been reported as less than the Method Detection Limit (<MDL) and the associated detection limits are higher than those defined in the SAP, the particular samples and parameters have been identified and the circumstances explained. These summaries are included with each analytical section of this QA review.

The KC Laboratory reports include both the reporting detection limit (RDL) and the method detection limit (MDL) for each sample and parameter, where applicable. The RDL is defined as *the minimum concentration of a chemical constituent that can be reliably quantified while t*he MDL is defined as *the minimum concentration of a chemical constituent that can be detected.* Some subcontracted laboratory data are available with an MDL only, in accordance with the subcontracting laboratory policies. For some methods the detection limits reported may vary from sample to sample depending on the amount of sample analyzed and any additional dilutions required.

Storage Conditions and Holding Times

Storage conditions and holding times have been evaluated using guidelines defined in the 2008 SAPA. Preparation and analysis holding times for each method are summarized in each analytical section.

Method Blanks

Method blank results have been used to evaluate the possible laboratory contamination of samples. Method blank results have been reviewed for the presence of analytes detected at or greater than the MDL. For analytes where the method blank response was at or above the MDL all associated sample results have been qualified with a B flag based on the rules below.

1. Add a "B" flag to all parameters if the associated blank is ≥ the MDL and the sample result is ≥ MDL but ≤ 5 times the blank.
2. Add a "B2" flag to common organic lab contaminants (Acetone, 2-Butanone, Methylene Chloride, Bis (2-ethylhexyl) Phthalate, Butyl Benzyl Phthalate and Di-n-butyl Phthalate) if the method blank is ≥ the MDL and the sample result is > 5 and ≤ 10 times the blank.
3. Add a "B3" flag to all other parameters if the associated blank is ≥ the MDL and the sample result is > 5 and ≤ 10 times the blank.

Standard Reference Materials

Standard reference material (SRM) recoveries have been used to evaluate possible low or high analytical bias on a batch-specific basis. SRM analysis is included with metals and selected organic and conventional parameters (see Table 2). SRMs are purchased from outside agencies (NIST or NRCC) and must have a certified analyte value in order for a particular parameter to be evaluated. All associated sample results for the certified analytes are flagged if the SRM recoveries are unacceptable. Associated sample results may be flagged with a JL whenever recoveries are measured above the acceptance limits and may be flagged with a JG when recoveries are measured below the acceptance limits.

Matrix Spikes

Matrix spike recoveries have been used to evaluate possible low or high analytical bias on a matrix and batch-specific basis. Matrix spikes are analyzed with metals, organics and selected conventionals parameters (see Table 2). Associated sample results may be flagged with a JL whenever recoveries are measured above the acceptance limits and may be flagged with a JG when recoveries are measured below the acceptance limits. Flags are applied to specific sample results based on matrix spike recoveries only if the unacceptable recovery is indicative of a consistent bias for all associated samples.

For Metals only, matrix spike recovery results are used to qualify sample data only when the sample levels in the spiked sample are less than 4 times the spiked concentration. High sample levels relative to the spiked concentration can compromise the measurement of accurate spike recoveries.

Laboratory Replicate Samples

Replicate analysis (laboratory duplicates or triplicates) is used as an indicator of method precision and is used to qualify data on an analyte and batch-specific basis. Not all replicate data are used, however, as an indicator for data qualification. Only sets of replicate results which include at least one result greater than the RDL are considered for data qualification. These guidelines have been used to account for the fact that precision obtained near the detection limit is not representative of precision obtained throughout the entire analytical range. The original sample results are flagged with a J or JK whenever the measured precision is unacceptable (greater than the acceptance limit). Associated sample data will also be flagged if the unacceptable precision is expected in samples of the same matrix and composition.

Surrogates

Surrogate recoveries have been used to evaluate possible low or high analytical bias on a sample-specific basis. Surrogates are only analyzed for organic parameters. Individual sample results may be flagged with a JL whenever recoveries are measured above the acceptance limits and may be flagged with a JG when recoveries are measured below the acceptance limits. Flags are applied to reported results based on surrogate recoveries only if the unacceptable recovery is indicative of a bias for the associated parameters.

Data Qualifiers

The data qualification guidelines described above has been summarized in Table 3. This table conforms to the guidelines in the 2008 SAPA and also shows the data qualifiers used for the Washington Dept of Ecology EIM electronic data format.

Units and Significant Figures

Units and the reporting basis vary, depending on the parameter and are explained in the analytical sections below. Data generally have been reported to three significant figures if above the RDL and two significant figures if equal to or below the RDL.

SAMPLE COLLECTION

This section describes sampling activities associated with the collection of nine on-cap saltwater sediment samples on March 29, 2010. These samples were collected for the Duwamish/Diagonal Sediment Remediation Program. All sampling activities were conducted following guidance suggested in the Puget Sound Protocols (PSEP, 1996 and 1998).

Sampling Locations and Station Positioning

Sampling locations (stations) were selected and the prescribed coordinates determined prior to field activities. A minimum of two twin-sampler deployments (i.e., three individual grabs) was required in the SAP to provide a representative sample at each station. Both the prescribed station coordinates and the actual coordinates recorded during sampling activities are presented in the following table (see below). The coordinate system, as shown, is in U.S. State Plane, Washington North 4601, NAD83.

Duwamish/Diagonal Sediment Sampling, On-Cap Stations
Actual and Prescribed Sample Coordinates, March 2010

Lab Number	Locator	Cast	# Grabs	Prescribed Northing	Actual Northing	Prescribed Easting	Actual Easting	Offset > 3 m
L50379-1	DUD_1A	1	1	209089	209094	1267047	1267045	
L50379-1	DUD_1A	2	1	209089	209095	1267047	1267042	
L50379-1	DUD_1A	3	1	209089	209083	1267047	1267043	
L50379-2	DUD_2A	1	2	208902	208901	1267139	1267138	
L50379-2	DUD_2A	2	1	208902	208897	1267139	1267134	
L50379-3	DUD_3A	1	2	208973	208977	1266951	1266952	
L50379-3	DUD_3A	2	1	208973	208983	1266951	1266950	
L50379-4	DUD_4A	1	2	209354	209351	1266888	1266885	
L50379-4	DUD_4A	2	1	209354	209360	1266888	1266894	
L50379-6	DUD_4A, Frep	2	1	209354	209360	1266888	1266894	
L50379-6	DUD_4A, Frep	3	2	209354	209355	1266888	1266891	
L50379-5	DUD_5A	1	2	209410	209410	1266805	1266796	
L50379-5	DUD_5A	2	1	209410	209413	1266805	1266806	
L50379-7	DUD_1B	1	2	208484	208480	1267060	1267060	
L50379-7	DUD_1B	2	1	208484	208486	1267060	1267061	
L50379-8	DUD_2B	1	2	208621	208618	1267079	1267072	
L50379-8	DUD_2B	2	1	208621	208622	1267079	1267083	
L50379-9	DUD_3B	1	1	208716	208722	1267049	1267048	
L50379-9	DUD_3B	2	2	208716	208718	1267049	1267053	

Sediment grab samples were collected from the King County research vessel *Liberty*, which is equipped with a differential global positioning system (DGPS). Using DGPS, field coordinates were recorded for each cast of the two grab samplers, deployed in tandem, as they contacted the sediment. All field coordinates for each cast listed in the above table are within the +/- 3 meter accuracy limits, as defined in the SAP.

Sample Description Table

Lab Sample #	Station	Sample Collection	Average Sediment Depth (cm)	Sample Usage
L50379-1	DUD_1A	Surface Grabs	11	Chemistry
L50379-2	DUD_2A	Surface Grabs	15	Chemistry
L50379-3	DUD_3A	Surface Grabs	14	Chemistry
L50379-4	DUD_4A	Surface Grabs	12	Chemistry
L50379-5	DUD_5A	Surface Grabs	10	Chemistry

L50379-6	DUD_4A	Surface Grabs (field replicate)	11	Chemistry
L50379-7	DUD_1B	Surface Grabs	15	Chemistry
L50379-8	DUD_2B	Surface Grabs	15	Chemistry
L50379-9	DUD_3B	Surface Grabs	15	Chemistry

Sample Collection

Sediment was collected at each station using two stainless steel, modified, 0.1 m^2 Van Veen grab samplers deployed in tandem via hydrowire. For each acceptable deployment, average depths ranging between 10 - 15 cm of sediment were collected within each grab, allowing for sub-sampling within the upper 9 - 10 cm of material. A minimum of two twin-sampler deployments (i.e., three individual grabs) was required in the SAP to provide a representative sample at each station.

Water depth at the eight subtidal cap sediment stations ranged between 3.5 - 9 meters (not corrected for tide).

Sample Handling

Close to equal amounts of sediment were sub-sampled from the three or more separate grabs used for chemistry analysis. For chemistry testing, 9 to 10 cm deep aliquots, as measured from the sediment surface, were collected using a stainless steel spoon. Sediment that had touched the sides or bottom of the grab sampler was excluded. Less than the top 10 cm of sediment was sub-sampled in those instances where it was not possible to collect material down to the minimum sediment penetration depth. All aliquots were placed in a covered stainless-steel compositing bowl, specific for that station. After collecting all aliquots from three or more grabs, the sediment was thoroughly homogenized, then split out into pre-labeled containers. All sample containers were supplied by the King County Environmental Laboratory, first having been pre-cleaned according to analytical specifications.

Decontamination

Individual sets of the sub-sampling and mixing equipment were dedicated to each station, precluding the need for decontamination of said equipment. The Van Veen grab samplers were decontaminated between stations by scrubbing with a brush using ambient water and Detergent 8, followed by a thorough *in situ* rinsing.

Sample Storage and Preservation

Samples were stored in ice-filled coolers from the time of collection until delivery to the King County Environmental Laboratory. They were delivered under chain-of-custody and were maintained as such throughout the analytical process. Samples were stored frozen (-18°C) by the laboratory until analysis with the exception of samples for particle size distribution (PSD) analysis. PSD samples were stored refrigerated at approximately 4°C. A more complete description of sample handling and storage can be found in each analytical chemistry section of this narrative.

Copies of chain-of-custody forms and field notes are included as an appendix to this QA review narrative. The collect time is defined as that time that sampling commences at each station.

CONVENTIONAL ANALYSES

Completeness
Conventional data are reported for all samples and parameters summarized in Table 1. These samples were analyzed in association with the complete set of QC samples outlined in Table 2.

Subcontracted Analyses
All analyses were conducted at the King County Env Lab.

Methods
PSD analysis was performed in accordance with ASTM D422 and Puget Sound Protocols methodologies (*Recommended Protocols for Measuring Conventional Sediment Variables in Puget Sound* - page 9 - PSEP, 1986). TOC analysis was performed in accordance with EPA 9060 and PSEP 1996. Total solids analyses were performed in accordance with SM2540-G.

Detection Limits
The detection limits (MDLs) reported for Conventionals parameters are all within the requirements defined in the SAP (after appropriate dry weight adjustment), except for the following:

Parameter	Sample ID#	SAP MDL	Reported MDL	Reason for higher MDL Value
Total Organic Carbon	L50379-1, 4, 6, 7	1000	1900-2100	Reduced sample size analyzed due to High Organic Background
Total Organic Carbon	L50379-2, 3, 8, 9	1000	2000-3900	Reduced sample size analyzed due to High Organic Background and total solids <50%
PSD Parameters in the % Fines range	L50379-all	0.5%	0.57 to 1.3%	MDL is adjusted for weight of sample analyzed and less than the expected amount was tested.
PSD Parameters in the Sand and Gravel ranges	L50379-all	0.1%	0.11 to 0.25%	

For all samples where the MDL did not meet the SAP MDL, the measured concentrations were above the MDL for nearly all the reported parameters. An exception was sample L50379-5 where the level of silt was <MDL. This is not expected to have compromised the project goals since the MDL reported for that sample (0.61%) was only slightly above the SAP MDL of 0.5%.

Reporting Requirements (significant figures, units, basis and qualifiers)
For analyses performed at the KC Laboratory, data are reported in accordance with laboratory policy at the time the data were generated. Data are reported to three significant figures for results greater than the RDL and two significant figures for results equal to or less than the RDL. For results reported with less than two or three significant figures, significant zeroes are implied. This may not apply to subcontracted data.

In the Comprehensive Report attached, Conventionals parameters are reported in mg/Kg, dry weight basis, for TOC. Particle Size Distribution (PSD) and Total Solids are reported in percent, wet weight basis. For all parameters, the MDL and RDL values for each individual sample are reported in the same units and basis as the sample result. Any result measured at less than the MDL or less than the RDL, a <MDL or <RDL qualifier is added, respectively. Other qualifiers added are based on QA/QC failures and are individually explained in this narrative.

Storage Conditions and Holding Times
Sample storage conditions and holding times have been evaluated using guidelines established in the SAPA (WDOE, 2008). The dates and holding time criteria for the actual storage conditions used for conventional analyses are listed in the table below.

Parameter	Lab ID#	Date Collected	Prep Date	Date Analyzed	Sample Holding Time	Extract Holding Time
Particle Size Distribution	L50379-1,2,3,4,5,7,8	29-Mar-2010	5-Apr-2010	6-Apr-2010	6 Months at 4°C	NA
	L50379-6,9	29-Mar-2010	13-Apr-2010	14-Apr-2010		
Total Organic Carbon	L50379-1,2,3,4	29-Mar-2010	28-Apr-2010	6-May-2010	6 months at -18°C	6 months at -18°C
	L50379-5,6,7,8,9	29-Mar-2010	28-Apr-2010	7-May-2010		
Total Solids	L50379-1,2,3,4,5,6,7,8,9	29-Mar-2010	29-Apr-2010	3-May-2010	6 months at -18°C	NA

Sample storage conditions and holding times were met for all samples in this data submission.

Method Blanks

Method blanks were analyzed in connection with total solids and total organic carbon analyses. All method blanks results were less than the MDL.

Standard Reference Materials

An SRM (Buffalo River Sediment) was analyzed in connection with TOC analysis. The percent recovery for the SRM analysis was within the 80 to 120% QC limits.

Matrix Spikes

The matrix spike recovery for TOC was within the 75 to 125% acceptance limits.

Laboratory Replicate Samples

A set of laboratory triplicates was analyzed for each of the conventional parameters. The percent relative standard deviation (%RSD) for each triplicate set was less than or equal to the 20% acceptance limit.

METALS CHEMISTRY

Completeness
Metal chemistry data are reported for all samples and parameters summarized in Table 1. These samples were analyzed for mercury and other metals in association with the complete set of QC samples outlined in Table 2.

Subcontracted Analyses
Metals analysis was not subcontracted for these sets of samples.

Methods
Mercury analysis was performed in accordance with EPA Method SW846, 7471B. Analysis for other metals was performed in accordance with EPA method SW846, 3050B/6010C.

Target List
The reported target list includes all metals specified in Table 1.

Detection Limits
The detection limits (MDLs) reported for Metals parameters are all within the requirements defined by the SAP with the exception of all elements in samples L50379-2, 3, 8, 9. These samples had less than 50% solids. The element concentrations were detectable with the exception of antimony, selenium and thallium for all 4 samples where the MDL did not meet the SAP MDL. This is not expected to have compromised the project goals since the MDLs reported for those elements were only slightly above the SAP MDLs.

Reporting Requirements (significant figures, units, basis and qualifiers)
For analyses performed at the KC Laboratory, data are reported in accordance with laboratory policy at the time the data were generated. Data are reported to three significant figures for results greater than the RDL and two significant figures for results equal to or less than the RDL. For results reported with less than two or three significant figures, significant zeroes are implied.

In the Comprehensive Report attached, Metals parameters are reported in mg/Kg, dry weight basis, for all elements. The MDL and RDL values for each individual sample are reported in the same units and basis as the sample result. Any result measured at less than the MDL or less than the RDL, a <MDL or <RDL qualifier is added, respectively. Other qualifiers added are based on QA/QC failures and are individually explained in this narrative.

Storage Conditions and Holding Times
Sample storage conditions and holding times have been evaluated using guidelines established during the Third Annual PSDDA Review Meeting. The dates and holding time criteria for the actual storage conditions used for metals analyses are listed in the table below.

Parameter	Lab ID#	Date Collected	Date Digested/ Extracted	Date Analyzed	Sample Holding Time	Digestate/Extract Holding Time
Total Metals	L50379-1 - 9	3/29/2010	4/15/2010	4/16/2010	2 Years at -18°C	6 months
Total Mercury	L50379-1 - 9	3/29/2010	4/12/2010	4/12/2010	28 days at -18°C	NA

Sample storage conditions and holding times were met for all samples in this data submission.

Method Blanks
All metals method blanks results were less than the MDL.

Standard Reference Materials
The SRM analyzed in association with samples included in this data submission is National Research Council of Canada PACS-2. This SRM is not certified for Silver, Arsenic or Cadmium.

Acceptance limits for the certified elements have been developed using historical lab data since the certified SRM values and limits were determined with different analysis techniques. SRM recoveries outside these lab-defined limits indicate the method has not performed as expected and the sample data have been qualified to indicate the expected bias.

All metals SRM recoveries were within the lab defined limits indicated in the SAP.

A laboratory control sample (LCS) ERA Soil was also analyzed with the total metals digestion. All recoveries were within the certified limits of the sample. The LCS is used as a secondary check for the total metals digestion procedure because the certified values for the elements are determined using the same methodology. No results from the LCS are used to qualify data.

Matrix Spikes

All matrix spike recoveries were within the 75% to 125% QC limits with the following exceptions: The reported matrix spike recovery of 26% for Antimony in WG108557 for sample numbers L50379-1 - 9 failed to meet the 75% to 125% QC acceptance criteria. Antimony results for all samples in WG108557 have been qualified with a “JG”.

Laboratory Replicate Samples

The relative percent differences (RPDs) for laboratory duplicate results for all metals were less than or equal to the QC limit of 20%.

ORGANIC CHEMISTRY

Completeness

Organics data are reported for all samples and parameters summarized in Table 1. These samples were analyzed in association with the complete set of QC samples outlined in Table 2.

Methods

BNA analysis was performed in accordance with EPA method 8270D. PCB and chlorinated pesticides analysis was performed in accordance with EPA methods 8082A and 8081B.

Target List

The reported BNA target list includes all compounds specified in *Table 1 - Marine Sediment Quality Standards Chemical Criteria* and *Table 3 - Puget Sound Marine Sediment Cleanup Screening Levels Chemical Criteria* contained in Chapter 173-204 WAC with the exception of benzo(j)fluoranthene. The KC Laboratory has verified that analytical conditions are sufficient to calculate a total benzofluoranthene result using the reported *b* and *k* isomers.

Reported PCB data include Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260.

Detection Limits, Units and Significant Figures

The detection limits (MDLs) reported for Organics parameters are all within the requirements defined in the SAP, except for the following:

BNAs

The MDLs for all compounds with the exception of 2-methylphenol, benzyl alcohol and pyrene were higher than the SAP MDLs for samples L50379-2, 3, 8, 9 due to the total solids being less than 50%. This is not expected to have compromised the project goals since the MDLs reported for those parameters were only slightly above the SAP MDLs.

PCBs

The reported MDL for Aroclors 1016, 1232 and 1248 in selected samples were greater than the MDL values listed in the SAP. The reported MDLs for these Aroclors were elevated to compensate for overlap of PCB congeners from other Aroclors detected in the samples. See Additional QA Issues at the end of this section for further details. All Aroclor MDLs were higher than SAP MDLs for samples L50379-2, 3, 7, 8 due to the total solids being less than 50%. This is not expected to have compromised the project goals since the MDLs reported for those parameters were only slightly above the SAP MDLs and significant levels of Aroclors were detected above the MDL.

Chlorinated Pesticides

The reported MDLs for all pesticides compounds except Endrin Aldehyde were greater than the MDL values listed in the SAP for samples L50379-2, 3, 7, 8 due to total solids being less than 50%. This is not expected to have compromised the project goals since the MDLs reported for those parameters were only slightly above the SAP MDLs.

The attached SMS Organic Carbon (OC) and Dry Weight Normalization MDL Check tables compare the reported MDL value to the SMS requirement. The MDLs for all samples meet the SMS limits.

Reporting Requirements (significant figures, units, basis and qualifiers)

For analyses performed at the KC Laboratory, data are reported in accordance with laboratory policy at the time the data were generated. Data are reported to three significant figures for results greater than the RDL and two significant figures for results equal to or less than the RDL. For results reported with less than two or three significant figures, significant zeroes are implied. This may not apply to subcontracted data.

In the Comprehensive Report attached, Organics parameters are reported in ug/Kg, dry weight basis. In this report format, non-ionizable organic parameters have not been converted to mg/Kg TOC. For all parameters, the MDL and RDL values for each individual sample are reported in the same units and basis as the sample result. Any result measured at less than the MDL or less than the RDL, a <MDL or <RDL qualifier is added, respectively. Other qualifiers added are based on QA/QC failures and are individually explained in this narrative.

Storage Conditions and Holding Times

Sample storage conditions and holding times have been evaluated using guidelines established in the SAPA (WDOE, 2008). The dates and holding time criteria for the actual storage conditions used for organics analyses are listed in the table below.

Parameter	Lab ID#	Date Collected	Date Extracted	Date Analyzed	Sample Holding Time	Extract Holding Time
BNAs	L50379-1 to 9	29-Mar-10	13-Apr-10	06-May-10	1 year at -18°C	40 days at 4°C
Chlorinated Pesticides	L50379-1 to 9	29-mar-10	11-Apr-10	29-Apr-10	1 year at -18°C	40 days at 4°C
PCB	L50379-1 to 9	29-Mar-10	12-Apr-10	06, 07-May-10	1 year at -18°C	40 days at 4°C

Sample storage conditions and holding times were met for all samples in this data submission.

Method Blanks

Method blanks were analyzed for all Organics parameters and all method blank results were less than the MDL, except as noted below:

1. BNAs

The method blank analyzed with BNAs for L50379-1 to 9 had a result above the MDL for Bis (2-ethylhexyl) Phthalate (11.4 ug/Kg) and Di-n-butyl Phthalate (12.5 ug/Kg). Results for Di-n-butyl Phthalate were above the MDL and less than or equal to 5 times the blank response for all samples, therefore all have been qualified with a B flag. All flagged data for Di-n-butyl Phthalate must be treated as estimated values. For 4 samples (L50379-5, -7, -8, -9), the levels of Bis (2-ethylhexyl) Phthalate were greater than 5 times but less than 10 time the blank response so these data have been qualified with the B2 flag and must be treated as estimated values. All other samples showed levels of Bis (2-ethylhexyl) Phthalate that were greater than 10 times the blank response so no qualification was needed.

The method blanks analyzed with PCB and Chlorinated Pesticides were less than MDL for all compounds.

Surrogate Recoveries

Surrogate recovery acceptance limits for sediment samples have been developed based on historical lab performance using the current analytical methods. Recoveries measured above the acceptance limits may be flagged with a JL. Recoveries measured below the acceptance limits may be flagged with a JG.

1. BNAs

For BNA sample data, surrogate recoveries are evaluated separately for the acid and base/neutral fractions. Within each fraction, 2 or more surrogates must be outside the acceptance limits in order to qualify the associated sample data. All sample surrogate recoveries met acceptance limits.

2. PCBs

Sample data are qualified when individual surrogate recoveries are outside lab-specific acceptance limits. For each set of analyses, all surrogate recoveries were within the lab-specific acceptance limits for all samples in this data submission.

3. Chlorinated Pesticides
Sample data are qualified when individual surrogate recoveries are outside lab-specific acceptance limits. For each set of analyses, all surrogate recoveries were within the lab-specific acceptance limits for all samples in this data submission.

Standard Reference Materials (SRMs)
The SRM results associated with these samples are summarized below, according to the analysis method. Acceptance limits for the certified parameters reported in this data set have been developed using historical lab data. SRM recoveries outside these lab-defined limits indicate the method has not performed as expected and the associated sample data have been flagged.

1. BNAs
The sediment SRM analyzed in association with the reported BNA results is 1944, certified by the National Institute of Standards and Technology (NIST). The certified organics parameters in SRM 1944 are only a partial list of all the BNA compounds reported in this analysis. All measured recoveries for this SRM were within acceptance limits.

2. PCBs and Chlorinated Pesticides
The sediment SRM analyzed in association with the reported Chlorinated Pesticides results is 1944, certified by the NIST. SRM 1944 contains certified levels of DDT and Alpha-Chlordane. The sediment SRM analyzed in association with the reported PCB results is HS-2, certified by the National Research Council of Canada. SRM HS-2 contains Aroclor 1254. All measured recoveries for these SRMs were within acceptance limits.

Matrix Spikes
Matrix Spikes have been analyzed for each method. Recovery acceptance limits for each parameter in sediment have been developed based on historical lab performance using the current analytical methods. The acceptance limits may not be applicable when the unspiked sample level was 4 times or greater than the spiked concentration. When applicable, matrix spike recoveries outside these lab-defined limits indicate the method has not performed as expected and the associated sample data have been flagged.

1. BNAs
For the BNA compounds that were included in the matrix spike, the measured recoveries for each were within their acceptance limits.

2. PCBs and Chlorinated Pesticides
Each of the reported Pesticide compounds, except Toxaphene, alpha and gamma Chlordane, was included in the Chlorinated Pesticide matrix spike. Aroclor 1260 and 1016 only are used as the spiking parameters for PCB matrix spike. The measured recovery for each spiked parameter was within their acceptance limits.

Laboratory Replicate Samples
A laboratory duplicate sample(s) was analyzed for each Organics parameter. The relative percent differences (RPDs) for laboratory duplicate for all parameters at or above the RDL were less than or equal to the acceptance limit of 35%.

Additional QC Issues:

PCB Analysis:
PCB data reported for this set of samples include numeric values for only those Aroclors that could be positively identified in each sample and were measured above the detection limit. Identification of Aroclors 1016, 1232 and 1248 may not be possible for samples listed below due to the overlap of the components from Aroclors 1242, 1254 and 1260. For those Aroclors where this overlap has occurred, the result is reported as <MDL with elevated MDL and RDL values. The elevated MDL represents the maximum amount that would have been reported for that aroclor had it been positively identified. The RDL value has also been elevated by the same proportion.

Lab Sample Number	PCB 1016	PCB 1232	PCB 1248
L50379-1	x	x	x
L50379-2	x	x	x
L50379-3	x	x	x
L50379-4	x	x	x
L50379-5	x	x	x
L50379-6	x	x	x
L50379-7	x	x	x
L50379-8	x	x	x
L50379-9	x	x	x

Aroclor 1242 was positively identified this year instead of Aroclor 1248. Both of there Aroclor mixtures have similar patterns, due to the small difference in the percent chlorine (42% vs. 48%), making unequivocal identification difficult when the concentrations are also similar. The same Aroclor identification procedure was used in all years for this project.

TABLE 1
SEDIMENT SAMPLE INVENTORY

Sample	Locator / Description (see SAP)	PSD	Solids	TOC	Metals[1]	BNAs[2]	Pest/ PCBs	Comments
L50379-1	DUD_1A	X	X	X	X	X	X	
L50379-2	DUD_2A	X	X	X	X	X	X	
L50379-3	DUD_3A	X	X	X	X	X	X	
L50379-4	DUD_4A	X	X	X	X	X	X	
L50379-5	DUD_5A	X	X	X	X	X	X	
L50379-6	DUD_4A	X	X	X	X	X	X	field replicate
L50379-7	DUD_1B	X	X	X	X	X	X	
L50379-8	DUD_2B	X	X	X	X	X	X	
L50379-9	DUD_3B	X	X	X	X	X	X	

1 Metals = Hg, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, Tl, Zn, Al, Fe
2 BNAs = includes Chlorobenzenes

TABLE 2
QC SAMPLE FREQUENCY FOR SEDIMENT CHEMICAL AND PHYSICAL PARAMETERS

Parameter	Method Blank	Duplicate	Triplicate	Matrix Spike	SRM	Surrogates
PSD	No	See Triplicate	5% minimum, 1 per QC batch	No	No	No
Total Solids	1 per QC batch	See Triplicate	5% minimum, 1 per QC batch	No	No	No
TOC	1 per QC batch	See Triplicate	5% minimum, 1 per QC batch	5% minimum, 1 per QC batch	1 per QC batch	No
Metals	1 per QC batch	5% minimum, 1 per QC batch	No	5% minimum, 1 per QC batch	1 per QC batch	No
BNAs	1 per QC batch	5% minimum, 1 per QC batch	No	5% minimum, 1 per QC batch	1 per QC batch	Yes
PCBs/Chlorinated Pesticides	1 per QC batch	5% minimum, 1 per QC batch	No	5% minimum, 1 per QC batch	1 per QC batch	Yes

TABLE 3 - SUMMARY OF SEDIMENT DATA QUALIFIERS

Condition to Qualify	King County Data Qualifier	Possible EIM Data Qualifier	Organic QC Limits	Metal QC Limits	Conventional QC Limits	Comment
low matrix spike recovery	JG	JG	Compound specific	< 75%	< 75%	
high matrix spike recovery	JL	JL	Compound specific	>125%	>125%	
low standard reference material recovery	JG	JG	Compound and SRM specific	Element and SRM specific	< 80%	
high standard reference material recovery	JL	JL	Compound and SRM specific	Element and SRM specific	>120%	
high duplicate relative percent difference	JK or J	JK	>35 %	>20%	NA	for organics and metals
high triplicate relative standard deviation	JK or J	JK	NA	NA	> 20%	for conventionals
less than the reporting detection limit	<RDL**	JT	NA	NA	NA	
less than the method detection limit	<MDL	U	NA	NA	NA	
contamination detected in method blank	B	B	MB >/=MDL & Result </= 5x Blank	MB >/=MDL & Result </= 5x Blank	MB >/=MDL & Result </= 5x Blank	
contamination detected in method blank	B2	B	MB >/=MDL & Result > 5x but >/= 10x Blank	MB >/=MDL & Result > 5x but >/= 10x Blank	MB >/=MDL & Result > 5x but >/= 10x Blank	Common Lab Contaminants*
contamination detected in method blank	B3	B	MB >/=MDL & Result > 5x but >/= 10x Blank	MB >/=MDL & Result > 5x but >/= 10x Blank	MB >/=MDL & Result > 5x but >/= 10x Blank	All other parameters
biased data based on low surrogate recoveries	JG	JG	Surrogate specific	NA	NA	At least 2 surrogates < limit for BNAs
biased data based on high surrogate recoveries	JL	JL	Surrogate specific	NA	NA	At least 2 surrogates > limit for BNAs
rejected - unusable for all purposes	R	J or Q	NA	NA	NA	
a sample handling criteria has not been met	SH	JK or J	NA	NA	NA	container, preservation
Holding time not met	H	JK or J				

*Common Lab Contaminants: Acetone, 2-Butanone, Methylene Chloride, Bis(2-ethylhexyl) Phthalate, Butyl Benzyl Phthalate and Di-n-butyl Phthalate

Sample Results Tables

King County Environmental Lab Analytical Report

	Project:	423062-100-4					Project:	423062-100-4					Project:	423062-100-4							
	Locator:	DUD_1A					Locator:	DUD_2A					Locator:	DUD_3A							
	Descrip:	CLEANUP AREA A MON					Descrip:	CLEANUP AREA A MON					Descrip:	CLEANUP AREA A MON							
	Sample:	L50379-1					Sample:	L50379-2					Sample:	L50379-3							
	Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED							
	ColDate:	3/29/10 9:30					ColDate:	3/29/10 9:55					ColDate:	3/29/10 10:11							
	TimeSpan:						TimeSpan:						TimeSpan:								
	TotalSolid:	75.6					TotalSolid:	44.1					TotalSolid:	47.1							
	ClientLoc:						ClientLoc:						ClientLoc:								
	SampDepth:	3.5					SampDepth:	5.5					SampDepth:	8							
	DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**								
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**				
CV ASTM D422																					
Clay*	1.1	RDL	0.57	1.15	%		25.1		1.3	2.51	%		19.3		1.1	2.14	%				
Fines*	5.7		0.57	1.15	%		82.7		1.3	2.51	%		77.1		1.1	2.14	%				
Gravel*	21.9		0.11	1.15	%		0.9	<RDL	0.25	2.51	%		2.5		0.21	2.14	%				
p+0.00*	19.1		0.11	1.15	%		0.5	<RDL	0.25	2.51	%		0.3	<RDL	0.21	2.14	%				
p+1.00*	25.2		0.11	1.15	%		0.8	<RDL	0.25	2.51	%		0.6	<RDL	0.21	2.14	%				
p+10.0(equal/more than)*	1.1	RDL	0.57	1.15	%		15		1.3	2.51	%		15		1.1	2.14	%				
p+2.00*	15.3		0.11	1.15	%		2.8		0.25	2.51	%		4		0.21	2.14	%				
p+3.00*	17.4		0.11	1.15	%		1.7	<RDL	0.25	2.51	%		8.2		0.21	2.14	%				
p+4.00*	1.2		0.11	1.15	%		5.7		0.25	2.51	%		7.7		0.21	2.14	%				
p+5.00*	2.3		0.57	1.15	%		7.5		1.3	2.51	%		12.8		1.1	2.14	%				
p+6.00*	1.1	RDL	0.57	1.15	%		27.6		1.3	2.51	%		21.4		1.1	2.14	%				
p+7.00*		<MDL	0.57	1.15	%		17.5		1.3	2.51	%		15		1.1	2.14	%				
p+8.00*	1.1	RDL	0.57	1.15	%		5		1.3	2.51	%		8.6		1.1	2.14	%				
p+9.00*		<MDL	0.57	1.15	%		10		1.3	2.51	%		4.3		1.1	2.14	%				
p-1.00*	9.8		0.11	1.15	%		0.4	<RDL	0.25	2.51	%		0.9	<RDL	0.21	2.14	%				
p-2.00(less than)*	10.3		0.11	1.15	%		0.5	<RDL	0.25	2.51	%		0.6	<RDL	0.21	2.14	%				
p-2.00*	1.8		0.11	1.15	%			<MDL	0.25	2.51	%		1	<RDL	0.21	2.14	%				
Sand*	78.3		0.11	1.15	%		11.5		0.25	2.51	%		20.9		0.21	2.14	%				
Silt*	4.6		0.57	1.15	%		57.6		1.3	2.51	%		57.8		1.1	2.14	%				
CV SM2540-G																					
Total Solids*	75.6		0.005	0.01	%		44.1		0.005	0.01	%		47.1		0.005	0.01	%				
CV SW846 9060-PSEP96																					
Total Organic Carbon	12800		1900	3800	mg/Kg		27000		3900	7730	mg/Kg		23400		2000	3990	mg/Kg				
MT SW846 3050B*SW846 6010C																					
Aluminum, Total, ICP	9760		6.6	33.3	mg/Kg		28600		11	55.6	mg/Kg		24200		11	54.6	mg/Kg				
Antimony, Total, ICP		<MDL,JG	1	5	mg/Kg			<MDL,JG	1.7	8.32	mg/Kg		2.3	<RDL,JG	1.6	8.17	mg/Kg				
Arsenic, Total, ICP	5.4	<RDL	1.7	8.33	mg/Kg		14.6		2.7	13.9	mg/Kg		14	<RDL	2.8	13.6	mg/Kg				
Beryllium, Total, ICP	0.43		0.066	0.333	mg/Kg		1.15		0.11	0.556	mg/Kg		1		0.11	0.546	mg/Kg				
Cadmium, Total, ICP	0.57	<RDL	0.13	0.667	mg/Kg		0.48	<RDL	0.22	1.11	mg/Kg		0.42	<RDL	0.21	1.09	mg/Kg				
Chromium, Total, ICP	29.8		0.2	1	mg/Kg		32.9		0.34	1.66	mg/Kg		32.7		0.32	1.63	mg/Kg				
Copper, Total, ICP	57.7		0.26	1.34	mg/Kg		77.8		0.45	2.22	mg/Kg		82.8		0.45	2.19	mg/Kg				
Iron, Total, ICP	19200		3.3	16.7	mg/Kg		38500		5.4	27.7	mg/Kg		34600		5.5	27.2	mg/Kg				
Lead, Total, ICP	37		1.3	6.67	mg/Kg		32.7		2.2	11.1	mg/Kg		41.4		2.1	10.9	mg/Kg				
Manganese, Total, ICP	226		0.13	0.667	mg/Kg		395		0.22	1.11	mg/Kg		365		0.21	1.09	mg/Kg				
Nickel, Total, ICP	28		0.33	1.67	mg/Kg		27		0.54	2.77	mg/Kg		25.3		0.55	2.72	mg/Kg				
Selenium, Total, ICP		<MDL	1.7	8.33	mg/Kg			<MDL	2.7	13.9	mg/Kg			<MDL	2.8	13.6	mg/Kg				
Silver, Total, ICP	0.83	<RDL	0.26	1.34	mg/Kg		1.8	<RDL	0.45	2.22	mg/Kg		1.8	<RDL	0.45	2.19	mg/Kg				
Thallium, Total, ICP		<MDL	2.6	13.4	mg/Kg			<MDL	4.5	22.2	mg/Kg			<MDL	4.5	21.9	mg/Kg				
Zinc, Total, ICP	210		0.33	1.67	mg/Kg		149		0.54	2.77	mg/Kg		148		0.55	2.72	mg/Kg				

King County Environmental Lab Analytical Report

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Descrip:	CLEANUP AREA A MON					Descrip:	CLEANUP AREA A MON					Descrip:	CLEANUP AREA A MON								
Sample:	L50379-1					Sample:	L50379-2					Sample:	L50379-3								
Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED								
ColDate:	3/29/10 9:30					ColDate:	3/29/10 9:55					ColDate:	3/29/10 10:11								
TimeSpan:						TimeSpan:						TimeSpan:									
TotalSolid:	75.6					TotalSolid:	44.1					TotalSolid:	47.1								
ClientLoc:						ClientLoc:						ClientLoc:									
SampDepth:	3.5					SampDepth:	5.5					SampDepth:	8								
DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**									
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**					
MT SW846 7471B																					
Mercury, Total, CVAA	0.063	<RDL	0.025	0.257	mg/Kg	0.16	<RDL	0.045	0.454	mg/Kg		0.25	<RDL	0.042	0.418	mg/Kg					
OR SW846 3550B*SW846 8081B																					
4,4'-DDD		<MDL	1.3	2.65	ug/Kg		<MDL	2.3	4.54	ug/Kg			<MDL	2.1	4.25	ug/Kg					
4,4'-DDE		<MDL	1.3	2.65	ug/Kg		<MDL	2.3	4.54	ug/Kg			<MDL	2.1	4.25	ug/Kg					
4,4'-DDT		<MDL	1.3	2.65	ug/Kg		<MDL	2.3	4.54	ug/Kg			<MDL	2.1	4.25	ug/Kg					
Aldrin		<MDL	1.3	2.65	ug/Kg		<MDL	2.3	4.54	ug/Kg			<MDL	2.1	4.25	ug/Kg					
Alpha-BHC		<MDL	0.66	1.32	ug/Kg		<MDL	1.1	2.27	ug/Kg			<MDL	1.1	2.12	ug/Kg					
Alpha-Chlordane		<MDL	0.66	1.32	ug/Kg		<MDL	1.1	2.27	ug/Kg			<MDL	1.1	2.12	ug/Kg					
Beta-BHC		<MDL	0.66	1.32	ug/Kg		<MDL	1.1	2.27	ug/Kg			<MDL	1.1	2.12	ug/Kg					
Delta-BHC		<MDL	0.66	1.32	ug/Kg		<MDL	1.1	2.27	ug/Kg			<MDL	1.1	2.12	ug/Kg					
Dieldrin		<MDL	1.3	2.65	ug/Kg		<MDL	2.3	4.54	ug/Kg			<MDL	2.1	4.25	ug/Kg					
Endosulfan I		<MDL	1.3	2.65	ug/Kg		<MDL	2.3	4.54	ug/Kg			<MDL	2.1	4.25	ug/Kg					
Endosulfan II		<MDL	1.3	2.65	ug/Kg		<MDL	2.3	4.54	ug/Kg			<MDL	2.1	4.25	ug/Kg					
Endosulfan Sulfate		<MDL	1.3	2.65	ug/Kg		<MDL	2.3	4.54	ug/Kg			<MDL	2.1	4.25	ug/Kg					
Endrin		<MDL	1.3	2.65	ug/Kg		<MDL	2.3	4.54	ug/Kg			<MDL	2.1	4.25	ug/Kg					
Endrin Aldehyde		<MDL	1.3	2.65	ug/Kg		<MDL	2.3	4.54	ug/Kg			<MDL	2.1	4.25	ug/Kg					
Gamma-BHC (Lindane)		<MDL	0.66	1.32	ug/Kg		<MDL	1.1	2.27	ug/Kg			<MDL	1.1	2.12	ug/Kg					
Gamma-Chlordane		<MDL	0.66	1.32	ug/Kg		<MDL	1.1	2.27	ug/Kg			<MDL	1.1	2.12	ug/Kg					
Heptachlor		<MDL	0.66	1.32	ug/Kg		<MDL	1.1	2.27	ug/Kg			<MDL	1.1	2.12	ug/Kg					
Heptachlor Epoxide		<MDL	0.66	1.32	ug/Kg		<MDL	1.1	2.27	ug/Kg			<MDL	1.1	2.12	ug/Kg					
Methoxychlor		<MDL	6.6	13.2	ug/Kg		<MDL	11	22.7	ug/Kg			<MDL	11	21.2	ug/Kg					
Toxaphene		<MDL	13	26.5	ug/Kg		<MDL	23	45.4	ug/Kg			<MDL	21	42.5	ug/Kg					
OR SW846 3550B*SW846 8082A																					
Aroclor 1016		<MDL,TA	13	26.5	ug/Kg		<MDL,TA	14	27.2	ug/Kg			<MDL,TA	17	34	ug/Kg					
Aroclor 1221		<MDL	2.6	5.29	ug/Kg		<MDL	4.5	9.07	ug/Kg			<MDL	4.2	8.49	ug/Kg					
Aroclor 1232		<MDL,TA	26	52.9	ug/Kg		<MDL,TA	14	27.2	ug/Kg			<MDL,TA	17	34	ug/Kg					
Aroclor 1242	20		1.3	2.65	ug/Kg	14.3		2.3	4.54	ug/Kg		19.7		2.1	4.25	ug/Kg					
Aroclor 1248		<MDL,TA	21	42.3	ug/Kg		<MDL,TA	18	36.3	ug/Kg			<MDL,TA	25	51	ug/Kg					
Aroclor 1254	32.5		1.3	2.65	ug/Kg	32.2		2.3	4.54	ug/Kg		46.1		2.1	4.25	ug/Kg					
Aroclor 1260	14.8		1.3	2.65	ug/Kg	19.9		2.3	4.54	ug/Kg		24.8		2.1	4.25	ug/Kg					
Total Aroclors	67.2		1.3	2.65	ug/Kg	66.2		2.3	4.54	ug/Kg		90.7		2.1	4.25	ug/Kg					
OR SW846 3550B*SW846 8270D																					
1,2,4-Trichlorobenzene		<MDL	0.13	0.265	ug/Kg		<MDL	0.23	0.454	ug/Kg			<MDL	0.21	0.425	ug/Kg					
1,2-Dichlorobenzene		<MDL	0.26	0.529	ug/Kg		<MDL	0.45	0.907	ug/Kg			<MDL	0.42	0.849	ug/Kg					
1,3-Dichlorobenzene		<MDL	0.26	0.529	ug/Kg		<MDL	0.45	0.907	ug/Kg			<MDL	0.42	0.849	ug/Kg					
1,4-Dichlorobenzene	7.71		0.26	0.529	ug/Kg		<MDL	0.45	0.907	ug/Kg			<MDL	0.42	0.849	ug/Kg					
2,4-Dimethylphenol		<MDL	1.3	2.65	ug/Kg		<MDL	2.3	4.54	ug/Kg			<MDL	2.1	4.25	ug/Kg					
2-Methylnaphthalene	5.63		2.6	5.29	ug/Kg		<MDL	4.5	9.07	ug/Kg			<MDL	4.2	8.49	ug/Kg					
2-Methylphenol		<MDL	2.6	5.29	ug/Kg		<MDL	4.5	9.07	ug/Kg			<MDL	4.2	8.49	ug/Kg					
4-Methylphenol		<MDL	5.3	10.6	ug/Kg		<MDL	9.1	18.1	ug/Kg			<MDL	8.5	17	ug/Kg					

King County Environmental Lab Analytical Report

Project:	423062-100-4					Project:	423062-100-4					Project:	423062-100-4								
Locator:	DUD_1A					Locator:	DUD_2A					Locator:	DUD_3A								
Descrip:	CLEANUP AREA A MON					Descrip:	CLEANUP AREA A MON					Descrip:	CLEANUP AREA A MON								
Sample:	L50379-1					Sample:	L50379-2					Sample:	L50379-3								
Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED								
ColDate:	3/29/10 9:30					ColDate:	3/29/10 9:55					ColDate:	3/29/10 10:11								
TimeSpan:						TimeSpan:						TimeSpan:									
TotalSolid:	75.6					TotalSolid:	44.1					TotalSolid:	47.1								
ClientLoc:						ClientLoc:						ClientLoc:									
SampDepth:	3.5					SampDepth:	5.5					SampDepth:	8								
DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**									
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**					
Acenaphthene	7.06		2.6	5.29	ug/Kg	4.8	<RDL	4.5	9.07	ug/Kg			<MDL	4.2	8.49	ug/Kg					
Acenaphthylene	3.4	<RDL	2.6	5.29	ug/Kg		<MDL	4.5	9.07	ug/Kg		5.3	<RDL	4.2	8.49	ug/Kg					
Anthracene	20.2		2.6	5.29	ug/Kg	25.2		4.5	9.07	ug/Kg		25.9		4.2	8.49	ug/Kg					
Benzo(a)anthracene	70.2		2.6	5.29	ug/Kg	96.4		4.5	9.07	ug/Kg		102		4.2	8.49	ug/Kg					
Benzo(a)pyrene	96		2.6	5.29	ug/Kg	79.8		4.5	9.07	ug/Kg		98.5		4.2	8.49	ug/Kg					
Benzo(b)fluoranthene	124		2.6	5.29	ug/Kg	139		4.5	9.07	ug/Kg		145		4.2	8.49	ug/Kg					
Benzo(g,h,i)perylene	85.2		2.6	5.29	ug/Kg	52.2		4.5	9.07	ug/Kg		62.6		4.2	8.49	ug/Kg					
Benzo(k)fluoranthene	101		2.6	5.29	ug/Kg	77.3		4.5	9.07	ug/Kg		114		4.2	8.49	ug/Kg					
Benzoic Acid	208		13	26.5	ug/Kg	133		23	45.4	ug/Kg		130		21	42.5	ug/Kg					
Benzyl Alcohol		<MDL	2.6	5.29	ug/Kg		<MDL	4.5	9.07	ug/Kg			<MDL	4.2	8.49	ug/Kg					
Benzyl Butyl Phthalate	108		1.3	2.65	ug/Kg	52.8		2.3	4.54	ug/Kg		60.1		2.1	4.25	ug/Kg					
Bis(2-Ethylhexyl)Phthalate	1040		5.3	10.6	ug/Kg	544		9.1	18.1	ug/Kg		514		8.5	17	ug/Kg					
Caffeine		<MDL	5.3	10.6	ug/Kg		<MDL	9.1	18.1	ug/Kg			<MDL	8.5	17	ug/Kg					
Carbazole	18.8		2.6	5.29	ug/Kg	11.9		4.5	9.07	ug/Kg		12.7		4.2	8.49	ug/Kg					
Chrysene	88.5		2.6	5.29	ug/Kg	123		4.5	9.07	ug/Kg		141		4.2	8.49	ug/Kg					
Coprostanol		<MDL	53	106	ug/Kg		<MDL	91	181	ug/Kg			<MDL	85	170	ug/Kg					
Dibenzo(a,h)anthracene	32.5		2.6	5.29	ug/Kg	16.2		4.5	9.07	ug/Kg		22.3		4.2	8.49	ug/Kg					
Dibenzofuran	5.2	<RDL	2.6	5.29	ug/Kg	5.2	<RDL	4.5	9.07	ug/Kg			<MDL	4.2	8.49	ug/Kg					
Diethyl Phthalate		<MDL	5.3	10.6	ug/Kg		<MDL	9.1	18.1	ug/Kg			<MDL	8.5	17	ug/Kg					
Dimethyl Phthalate	7.4	<RDL	5.3	10.6	ug/Kg		<MDL	9.1	18.1	ug/Kg			<MDL	8.5	17	ug/Kg					
Di-N-Butyl Phthalate	32.4	B	5.3	10.6	ug/Kg	39.9	B	9.1	18.1	ug/Kg		41.8	B	8.5	17	ug/Kg					
Di-N-Octyl Phthalate		<MDL	5.3	10.6	ug/Kg		<MDL	9.1	18.1	ug/Kg			<MDL	8.5	17	ug/Kg					
Fluoranthene	283		2.6	5.29	ug/Kg	216		4.5	9.07	ug/Kg		221		4.2	8.49	ug/Kg					
Fluorene	9.06		2.6	5.29	ug/Kg	9.14		4.5	9.07	ug/Kg		6.8	<RDL	4.2	8.49	ug/Kg					
Hexachlorobenzene		<MDL	0.13	0.265	ug/Kg		<MDL	0.23	0.454	ug/Kg			<MDL	0.21	0.425	ug/Kg					
Hexachlorobutadiene		<MDL	0.66	1.32	ug/Kg		<MDL	1.1	2.27	ug/Kg			<MDL	1.1	2.12	ug/Kg					
Hexachloroethane		<MDL	1.3	2.65	ug/Kg		<MDL	2.3	4.54	ug/Kg			<MDL	2.1	4.25	ug/Kg					
Indeno(1,2,3-Cd)Pyrene	67.3		2.6	5.29	ug/Kg	45.6		4.5	9.07	ug/Kg		56.7		4.2	8.49	ug/Kg					
Naphthalene	17.6		2.6	5.29	ug/Kg	12.2		4.5	9.07	ug/Kg			<MDL	4.2	8.49	ug/Kg					
N-Nitrosodiphenylamine		<MDL	5.3	10.6	ug/Kg		<MDL	9.1	18.1	ug/Kg			<MDL	8.5	17	ug/Kg					
Pentachlorophenol		<MDL	13	26.5	ug/Kg		<MDL	23	45.4	ug/Kg			<MDL	21	42.5	ug/Kg					
Phenanthrene	108		2.6	5.29	ug/Kg	61.2		4.5	9.07	ug/Kg		66.5		4.2	8.49	ug/Kg					
Phenol	86.4		5.3	10.6	ug/Kg	1590		9.1	18.1	ug/Kg		633		8.5	17	ug/Kg					
Pyrene	163		2.6	5.29	ug/Kg	151		4.5	9.07	ug/Kg		182		4.2	8.49	ug/Kg					
Total HPAHS	1110		2.6	5.29	ug/Kg	998		4.5	9.07	ug/Kg		1140		4.2	8.49	ug/Kg					
Total LPAHs	171		2.6	5.29	ug/Kg	121		4.5	9.07	ug/Kg		115		4.2	8.49	ug/Kg					

King County Environmental Lab Analytical Report

Project:	423062-100-4	423062-100-4	423062-100-4
Locator:	DUD_4A	DUD_5A	DUD_4A
Descrip:	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON
Sample:	L50379-4	L50379-5	L50379-6
Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
ColDate:	3/29/10 10:28	3/29/10 10:52	3/29/10 10:40
TimeSpan:			
TotalSolid:	67.4	81.3	71.7
ClientLoc:			
SampDepth:	6.5	8.5	6.5
	DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
CV ASTM D422															
Clay*	10.7		0.67	1.34	%	2.5		0.61	1.23	%	6.1		0.76	1.52	%
Fines*	29.4		0.67	1.34	%	2.5		0.61	1.23	%	18.2		0.76	1.52	%
Gravel*	6.9		0.13	1.34	%	23.2		0.12	1.23	%	16.3		0.15	1.52	%
p+0.00*	4.5		0.13	1.34	%	13.1		0.12	1.23	%	7		0.15	1.52	%
p+1.00*	8.6		0.13	1.34	%	17.4		0.12	1.23	%	16		0.15	1.52	%
p+10.0(equal/more than)*	6.7		0.67	1.34	%	1.2	RDL	0.61	1.23	%	3		0.76	1.52	%
p+2.00*	29.2		0.13	1.34	%	26.8		0.12	1.23	%	42.4		0.15	1.52	%
p+3.00*	19.9		0.13	1.34	%	10.6		0.12	1.23	%	7.9		0.15	1.52	%
p+4.00*	1.8		0.13	1.34	%	1.7		0.12	1.23	%	0.7	<RDL	0.15	1.52	%
p+5.00*	4		0.67	1.34	%		<MDL	0.61	1.23	%	2.3		0.76	1.52	%
p+6.00*	5.3		0.67	1.34	%		<MDL	0.61	1.23	%	3.8		0.76	1.52	%
p+7.00*	5.3		0.67	1.34	%		<MDL	0.61	1.23	%	3		0.76	1.52	%
p+8.00*	4		0.67	1.34	%		<MDL	0.61	1.23	%	3		0.76	1.52	%
p+9.00*	4		0.67	1.34	%	1.2	RDL	0.61	1.23	%	3		0.76	1.52	%
p-1.00*	3.2		0.13	1.34	%	11.5		0.12	1.23	%	5.6		0.15	1.52	%
p-2.00(less than)*	2.4		0.13	1.34	%	8.3		0.12	1.23	%	8.5		0.15	1.52	%
p-2.00*	1.4		0.13	1.34	%	3.3		0.12	1.23	%	2.1		0.15	1.52	%
Sand*	64		0.13	1.34	%	69.7		0.12	1.23	%	74		0.15	1.52	%
Silt*	18.7		0.67	1.34	%		<MDL	0.61	1.23	%	12.1		0.76	1.52	%
CV SM2540-G															
Total Solids*	67.4		0.005	0.01	%	81.3		0.005	0.01	%	71.7		0.005	0.01	%
CV SW846 9060-PSEP96															
Total Organic Carbon	11000		2100	4120	mg/Kg	2050		490	995	mg/Kg	8930		2000	3890	mg/Kg
MT SW846 3050B*SW846 6010C															
Aluminum, Total, ICP	15300		7.4	36.8	mg/Kg	11100		6.3	31.1	mg/Kg	13500		6.8	34	mg/Kg
Antimony, Total, ICP		<MDL,JG	1.1	5.52	mg/Kg		<MDL,JG	0.93	4.67	mg/Kg		<MDL,JG	1	5.1	mg/Kg
Arsenic, Total, ICP	6.5	<RDL	1.8	9.18	mg/Kg	3.1	<RDL	1.6	7.8	mg/Kg	6.3	<RDL	1.7	8.51	mg/Kg
Beryllium, Total, ICP	0.657		0.074	0.368	mg/Kg	0.493		0.063	0.311	mg/Kg	0.586		0.068	0.34	mg/Kg
Cadmium, Total, ICP	0.28	<RDL	0.15	0.734	mg/Kg		<MDL	0.12	0.624	mg/Kg	0.28	<RDL	0.14	0.681	mg/Kg
Chromium, Total, ICP	26.7		0.22	1.1	mg/Kg	19.2		0.18	0.935	mg/Kg	22.9		0.21	1.02	mg/Kg
Copper, Total, ICP	58		0.3	1.47	mg/Kg	42.2		0.25	1.24	mg/Kg	62.9		0.28	1.36	mg/Kg
Iron, Total, ICP	24000		3.7	18.4	mg/Kg	19900		3.1	15.6	mg/Kg	22500		3.3	17	mg/Kg
Lead, Total, ICP	27.6		1.5	7.34	mg/Kg	7.38		1.2	6.24	mg/Kg	19.9		1.4	6.81	mg/Kg
Manganese, Total, ICP	274		0.15	0.734	mg/Kg	304		0.12	0.624	mg/Kg	268		0.14	0.681	mg/Kg
Nickel, Total, ICP	22		0.37	1.84	mg/Kg	17.5		0.31	1.56	mg/Kg	20.5		0.33	1.7	mg/Kg
Selenium, Total, ICP		<MDL	1.8	9.18	mg/Kg		<MDL	1.6	7.8	mg/Kg		<MDL	1.7	8.51	mg/Kg
Silver, Total, ICP	1.3	<RDL	0.3	1.47	mg/Kg	1.1	<RDL	0.25	1.24	mg/Kg	1.51		0.28	1.36	mg/Kg
Thallium, Total, ICP		<MDL	3	14.7	mg/Kg		<MDL	2.5	12.4	mg/Kg		<MDL	2.8	13.6	mg/Kg
Zinc, Total, ICP	103		0.37	1.84	mg/Kg	43.1		0.31	1.56	mg/Kg	92.2		0.33	1.7	mg/Kg

King County Environmental Lab Analytical Report

Project:	423062-100-4	423062-100-4	423062-100-4
Locator:	DUD_4A	DUD_5A	DUD_4A
Descrip:	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON
Sample:	L50379-4	L50379-5	L50379-6
Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
ColDate:	3/29/10 10:28	3/29/10 10:52	3/29/10 10:40
TimeSpan:			
TotalSolid:	67.4	81.3	71.7
ClientLoc:			
SampDepth:	6.5	8.5	6.5
	DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
MT SW846 7471B															
Mercury, Total, CVAA	0.1	<RDL	0.03	0.295	mg/Kg	0.028	<RDL	0.023	0.24	mg/Kg	0.089	<RDL	0.028	0.279	mg/Kg
OR SW846 3550B*SW846 8081B															
4,4'-DDD		<MDL	1.5	2.97	ug/Kg		<MDL	1.2	2.46	ug/Kg		<MDL	1.4	2.79	ug/Kg
4,4'-DDE		<MDL	1.5	2.97	ug/Kg		<MDL	1.2	2.46	ug/Kg		<MDL	1.4	2.79	ug/Kg
4,4'-DDT		<MDL	1.5	2.97	ug/Kg		<MDL	1.2	2.46	ug/Kg		<MDL	1.4	2.79	ug/Kg
Aldrin		<MDL	1.5	2.97	ug/Kg		<MDL	1.2	2.46	ug/Kg		<MDL	1.4	2.79	ug/Kg
Alpha-BHC		<MDL	0.74	1.48	ug/Kg		<MDL	0.62	1.23	ug/Kg		<MDL	0.7	1.39	ug/Kg
Alpha-Chlordane		<MDL	0.74	1.48	ug/Kg		<MDL	0.62	1.23	ug/Kg		<MDL	0.7	1.39	ug/Kg
Beta-BHC		<MDL	0.74	1.48	ug/Kg		<MDL	0.62	1.23	ug/Kg		<MDL	0.7	1.39	ug/Kg
Delta-BHC		<MDL	0.74	1.48	ug/Kg		<MDL	0.62	1.23	ug/Kg		<MDL	0.7	1.39	ug/Kg
Dieldrin		<MDL	1.5	2.97	ug/Kg		<MDL	1.2	2.46	ug/Kg		<MDL	1.4	2.79	ug/Kg
Endosulfan I		<MDL	1.5	2.97	ug/Kg		<MDL	1.2	2.46	ug/Kg		<MDL	1.4	2.79	ug/Kg
Endosulfan II		<MDL	1.5	2.97	ug/Kg		<MDL	1.2	2.46	ug/Kg		<MDL	1.4	2.79	ug/Kg
Endosulfan Sulfate		<MDL	1.5	2.97	ug/Kg		<MDL	1.2	2.46	ug/Kg		<MDL	1.4	2.79	ug/Kg
Endrin		<MDL	1.5	2.97	ug/Kg		<MDL	1.2	2.46	ug/Kg		<MDL	1.4	2.79	ug/Kg
Endrin Aldehyde		<MDL	1.5	2.97	ug/Kg		<MDL	1.2	2.46	ug/Kg		<MDL	1.4	2.79	ug/Kg
Gamma-BHC (Lindane)		<MDL	0.74	1.48	ug/Kg		<MDL	0.62	1.23	ug/Kg		<MDL	0.7	1.39	ug/Kg
Gamma-Chlordane		<MDL	0.74	1.48	ug/Kg		<MDL	0.62	1.23	ug/Kg		<MDL	0.7	1.39	ug/Kg
Heptachlor		<MDL	0.74	1.48	ug/Kg		<MDL	0.62	1.23	ug/Kg		<MDL	0.7	1.39	ug/Kg
Heptachlor Epoxide		<MDL	0.74	1.48	ug/Kg		<MDL	0.62	1.23	ug/Kg		<MDL	0.7	1.39	ug/Kg
Methoxychlor		<MDL	7.4	14.8	ug/Kg		<MDL	6.2	12.3	ug/Kg		<MDL	7	13.9	ug/Kg
Toxaphene		<MDL	15	29.7	ug/Kg		<MDL	12	24.6	ug/Kg		<MDL	14	27.9	ug/Kg
OR SW846 3550B*SW846 8082A															
Aroclor 1016		<MDL,TA	8.9	17.8	ug/Kg		<MDL,TA	4.9	9.84	ug/Kg		<MDL,TA	8.4	16.7	ug/Kg
Aroclor 1221		<MDL	3	5.93	ug/Kg		<MDL	2.5	4.92	ug/Kg		<MDL	2.8	5.58	ug/Kg
Aroclor 1232		<MDL,TA	8.9	17.8	ug/Kg		<MDL,TA	4.9	9.84	ug/Kg		<MDL,TA	8.4	16.7	ug/Kg
Aroclor 1242	10.4		1.5	2.97	ug/Kg	5.85		1.2	2.46	ug/Kg	8.79		1.4	2.79	ug/Kg
Aroclor 1248		<MDL,TA	21	41.5	ug/Kg		<MDL,TA	4.9	9.84	ug/Kg		<MDL,TA	14	27.9	ug/Kg
Aroclor 1254	21.7		1.5	2.97	ug/Kg	4.99		1.2	2.46	ug/Kg	22.6		1.4	2.79	ug/Kg
Aroclor 1260	13.9		1.5	2.97	ug/Kg	3.79		1.2	2.46	ug/Kg	14.2		1.4	2.79	ug/Kg
Total Aroclors	46		1.5	2.97	ug/Kg	14.6		1.2	2.46	ug/Kg	45.6		1.4	2.79	ug/Kg
OR SW846 3550B*SW846 8270D															
1,2,4-Trichlorobenzene		<MDL	0.15	0.297	ug/Kg		<MDL	0.12	0.246	ug/Kg		<MDL	0.14	0.279	ug/Kg
1,2-Dichlorobenzene		<MDL	0.3	0.593	ug/Kg		<MDL	0.25	0.492	ug/Kg		<MDL	0.28	0.558	ug/Kg
1,3-Dichlorobenzene		<MDL	0.3	0.593	ug/Kg		<MDL	0.25	0.492	ug/Kg		<MDL	0.28	0.558	ug/Kg
1,4-Dichlorobenzene		<MDL	0.3	0.593	ug/Kg		<MDL	0.25	0.492	ug/Kg		<MDL	0.28	0.558	ug/Kg
2,4-Dimethylphenol		<MDL	1.5	2.97	ug/Kg		<MDL	1.2	2.46	ug/Kg		<MDL	1.4	2.79	ug/Kg
2-Methylnaphthalene	3	<RDL	3	5.93	ug/Kg		<MDL	2.5	4.92	ug/Kg		<MDL	2.8	5.58	ug/Kg
2-Methylphenol		<MDL	3	5.93	ug/Kg		<MDL	2.5	4.92	ug/Kg		<MDL	2.8	5.58	ug/Kg
4-Methylphenol		<MDL	5.9	11.9	ug/Kg		<MDL	4.9	9.84	ug/Kg		<MDL	5.6	11.2	ug/Kg

King County Environmental Lab Analytical Report

Project:	423062-100-4					Project:	423062-100-4					Project:	423062-100-4				
Locator:	DUD_4A					Locator:	DUD_5A					Locator:	DUD_4A				
Descrip:	CLEANUP AREA A MON					Descrip:	CLEANUP AREA A MON					Descrip:	CLEANUP AREA A MON				
Sample:	L50379-4					Sample:	L50379-5					Sample:	L50379-6				
Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED				
ColDate:	3/29/10 10:28					ColDate:	3/29/10 10:52					ColDate:	3/29/10 10:40				
TimeSpan:						TimeSpan:						TimeSpan:					
TotalSolid:	67.4					TotalSolid:	81.3					TotalSolid:	71.7				
ClientLoc:						ClientLoc:						ClientLoc:					
SampDepth:	6.5					SampDepth:	8.5					SampDepth:	6.5				
DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**					
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**
Acenaphthene	7.4		3	5.93	ug/Kg		<MDL	2.5	4.92	ug/Kg	3.3	<RDL	2.8	5.58	ug/Kg
Acenaphthylene	3.6	<RDL	3	5.93	ug/Kg		<MDL	2.5	4.92	ug/Kg		<MDL	2.8	5.58	ug/Kg
Anthracene	39.2		3	5.93	ug/Kg	8.62		2.5	4.92	ug/Kg	16.7		2.8	5.58	ug/Kg
Benzo(a)anthracene	120		3	5.93	ug/Kg	32.8		2.5	4.92	ug/Kg	64.9		2.8	5.58	ug/Kg
Benzo(a)pyrene	102		3	5.93	ug/Kg	29.6		2.5	4.92	ug/Kg	66.2		2.8	5.58	ug/Kg
Benzo(b)fluoranthene	120		3	5.93	ug/Kg	35.7		2.5	4.92	ug/Kg	96.8		2.8	5.58	ug/Kg
Benzo(g,h,i)perylene	61		3	5.93	ug/Kg	18.5		2.5	4.92	ug/Kg	47		2.8	5.58	ug/Kg
Benzo(k)fluoranthene	110		3	5.93	ug/Kg	32.6		2.5	4.92	ug/Kg	67.8		2.8	5.58	ug/Kg
Benzoic Acid	88.4		15	29.7	ug/Kg	61.9		12	24.6	ug/Kg	84.8		14	27.9	ug/Kg
Benzyl Alcohol		<MDL	3	5.93	ug/Kg		<MDL	2.5	4.92	ug/Kg		<MDL	2.8	5.58	ug/Kg
Benzyl Butyl Phthalate	211		1.5	2.97	ug/Kg	17.3		1.2	2.46	ug/Kg	46.7		1.4	2.79	ug/Kg
Bis(2-Ethylhexyl)Phthalate	375		5.9	11.9	ug/Kg	94.3	B2	4.9	9.84	ug/Kg	656		5.6	11.2	ug/Kg
Caffeine		<MDL	5.9	11.9	ug/Kg		<MDL	4.9	9.84	ug/Kg		<MDL	5.6	11.2	ug/Kg
Carbazole	16.6		3	5.93	ug/Kg	5.63		2.5	4.92	ug/Kg	10.2		2.8	5.58	ug/Kg
Chrysene	136		3	5.93	ug/Kg	40.2		2.5	4.92	ug/Kg	84.2		2.8	5.58	ug/Kg
Coprostanol		<MDL	59	119	ug/Kg		<MDL	49	98.4	ug/Kg		<MDL	56	112	ug/Kg
Dibenzo(a,h)anthracene	21.1		3	5.93	ug/Kg	6.84		2.5	4.92	ug/Kg	16.9		2.8	5.58	ug/Kg
Dibenzofuran	4.2	<RDL	3	5.93	ug/Kg		<MDL	2.5	4.92	ug/Kg	3.1	<RDL	2.8	5.58	ug/Kg
Diethyl Phthalate		<MDL	5.9	11.9	ug/Kg		<MDL	4.9	9.84	ug/Kg		<MDL	5.6	11.2	ug/Kg
Dimethyl Phthalate		<MDL	5.9	11.9	ug/Kg		<MDL	4.9	9.84	ug/Kg		<MDL	5.6	11.2	ug/Kg
Di-N-Butyl Phthalate	26.7	B	5.9	11.9	ug/Kg	17.6	B	4.9	9.84	ug/Kg	24.3	B	5.6	11.2	ug/Kg
Di-N-Octyl Phthalate		<MDL	5.9	11.9	ug/Kg		<MDL	4.9	9.84	ug/Kg		<MDL	5.6	11.2	ug/Kg
Fluoranthene	264		3	5.93	ug/Kg	81.1		2.5	4.92	ug/Kg	160		2.8	5.58	ug/Kg
Fluorene	12.5		3	5.93	ug/Kg		<MDL	2.5	4.92	ug/Kg	5.7		2.8	5.58	ug/Kg
Hexachlorobenzene		<MDL	0.15	0.297	ug/Kg		<MDL	0.12	0.246	ug/Kg		<MDL	0.14	0.279	ug/Kg
Hexachlorobutadiene		<MDL	0.74	1.48	ug/Kg		<MDL	0.62	1.23	ug/Kg		<MDL	0.7	1.39	ug/Kg
Hexachloroethane		<MDL	1.5	2.97	ug/Kg		<MDL	1.2	2.46	ug/Kg		<MDL	1.4	2.79	ug/Kg
Indeno(1,2,3-Cd)Pyrene	54.6		3	5.93	ug/Kg	17.7		2.5	4.92	ug/Kg	38.1		2.8	5.58	ug/Kg
Naphthalene	5.2	<RDL	3	5.93	ug/Kg		<MDL	2.5	4.92	ug/Kg	3.2	<RDL	2.8	5.58	ug/Kg
N-Nitrosodiphenylamine		<MDL	5.9	11.9	ug/Kg		<MDL	4.9	9.84	ug/Kg		<MDL	5.6	11.2	ug/Kg
Pentachlorophenol		<MDL	15	29.7	ug/Kg		<MDL	12	24.6	ug/Kg		<MDL	14	27.9	ug/Kg
Phenanthrene	125		3	5.93	ug/Kg	24.6		2.5	4.92	ug/Kg	55.1		2.8	5.58	ug/Kg
Phenol	318		5.9	11.9	ug/Kg		<MDL	4.9	9.84	ug/Kg	435		5.6	11.2	ug/Kg
Pyrene	203		3	5.93	ug/Kg	55.2		2.5	4.92	ug/Kg	124		2.8	5.58	ug/Kg
Total HPAHS	1190		3	5.93	ug/Kg	351		2.5	4.92	ug/Kg	767		2.8	5.58	ug/Kg
Total LPAHs	196		3	5.93	ug/Kg	38.3		2.5	4.92	ug/Kg	88.8		2.8	5.58	ug/Kg

King County Environmental Lab Analytical Report

Project:	423062-100-4					Project:	423062-100-4					Project:	423062-100-4								
Locator:	DUD_1B					Locator:	DUD_2B					Locator:	DUD_3B								
Descrip:	CLEANUP AREA A MON					Descrip:	CLEANUP AREA A MON					Descrip:	CLEANUP AREA A MON								
Sample:	L50379-7					Sample:	L50379-8					Sample:	L50379-9								
Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED								
ColDate:	3/29/10 11:20					ColDate:	3/29/10 12:05					ColDate:	3/29/10 12:24								
TimeSpan:						TimeSpan:						TimeSpan:									
TotalSolid:	51.2					TotalSolid:	45					TotalSolid:	46.3								
ClientLoc:						ClientLoc:						ClientLoc:									
SampDepth:	9					SampDepth:	6					SampDepth:	6.2								
DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**									
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**						
CV ASTM D422																					
Clay*	20.7		1	2.07	%	32		1.1	2.29	%	19.8		1.1	2.2	%						
Fines*	64.1		1	2.07	%	86.8		1.1	2.29	%	74.7		1.1	2.2	%						
Gravel*	0.9	<RDL	0.21	2.07	%	2.3	<RDL	0.23	2.29	%	5		0.22	2.2	%						
p+0.00*	0.5	<RDL	0.21	2.07	%	0.4	<RDL	0.23	2.29	%	0.4	<RDL	0.22	2.2	%						
p+1.00*	1.1	<RDL	0.21	2.07	%	0.4	<RDL	0.23	2.29	%	0.7	<RDL	0.22	2.2	%						
p+10.0(equal/more than)*	14.5		1	2.07	%	21.7		1.1	2.29	%	14.3		1.1	2.2	%						
p+2.00*	6.9		0.21	2.07	%	2.2	<RDL	0.23	2.29	%	2.3		0.22	2.2	%						
p+3.00*	19.9		0.21	2.07	%	7.3		0.23	2.29	%	16.8		0.22	2.2	%						
p+4.00*	4.5		0.21	2.07	%	6.3		0.23	2.29	%	4.7		0.22	2.2	%						
p+5.00*	8.3		1	2.07	%	6.9		1.1	2.29	%	4.4		1.1	2.2	%						
p+6.00*	14.5		1	2.07	%	20.6		1.1	2.29	%	28.6		1.1	2.2	%						
p+7.00*	12.4		1	2.07	%	13.7		1.1	2.29	%	15.4		1.1	2.2	%						
p+8.00*	8.3		1	2.07	%	13.7		1.1	2.29	%	6.6		1.1	2.2	%						
p+9.00*	6.2		1	2.07	%	10.3		1.1	2.29	%	5.5		1.1	2.2	%						
p-1.00*	0.3	<RDL	0.21	2.07	%	0.4	<RDL	0.23	2.29	%	0.7	<RDL	0.22	2.2	%						
p-2.00(less than)*		<MDL	0.21	2.07	%	1.6	<RDL	0.23	2.29	%	3.4		0.22	2.2	%						
p-2.00*	0.6	<RDL	0.21	2.07	%	0.3	<RDL	0.23	2.29	%	0.8	<RDL	0.22	2.2	%						
Sand*	32.9		0.21	2.07	%	16.5		0.23	2.29	%	25		0.22	2.2	%						
Silt*	43.5		1	2.07	%	54.9		1.1	2.29	%	54.9		1.1	2.2	%						
CV SM2540-G																					
Total Solids*	51.2		0.005	0.01	%	45		0.005	0.01	%	46.3		0.005	0.01	%						
CV SW846 9060-PSEP96																					
Total Organic Carbon	17300		2000	3910	mg/Kg	19900		2000	3980	mg/Kg	21000		2000	3910	mg/Kg						
MT SW846 3050B*SW846 6010C																					
Aluminum, Total, ICP	23600		9.8	49.2	mg/Kg	28200		11	56.2	mg/Kg	27200		11	55.5	mg/Kg						
Antimony, Total, ICP		<MDL,JG	1.5	7.4	mg/Kg		<MDL,JG	1.7	8.42	mg/Kg		<MDL,JG	1.7	8.34	mg/Kg						
Arsenic, Total, ICP	10	<RDL	2.5	12.3	mg/Kg	12	<RDL	2.9	14	mg/Kg	12	<RDL	2.8	13.9	mg/Kg						
Beryllium, Total, ICP	0.955		0.098	0.492	mg/Kg	1.14		0.11	0.562	mg/Kg	1.07		0.11	0.555	mg/Kg						
Cadmium, Total, ICP	0.29	<RDL	0.2	0.986	mg/Kg	0.33	<RDL	0.22	1.12	mg/Kg	0.28	<RDL	0.22	1.11	mg/Kg						
Chromium, Total, ICP	27.9		0.29	1.48	mg/Kg	32.2		0.33	1.68	mg/Kg	31.3		0.32	1.67	mg/Kg						
Copper, Total, ICP	62.1		0.39	1.97	mg/Kg	66.2		0.44	2.24	mg/Kg	72.1		0.45	2.22	mg/Kg						
Iron, Total, ICP	31600		4.9	24.6	mg/Kg	36200		5.6	28	mg/Kg	36500		5.6	27.9	mg/Kg						
Lead, Total, ICP	25.4		2	9.86	mg/Kg	24.7		2.2	11.2	mg/Kg	26.6		2.2	11.1	mg/Kg						
Manganese, Total, ICP	328		0.2	0.986	mg/Kg	376		0.22	1.12	mg/Kg	378		0.22	1.11	mg/Kg						
Nickel, Total, ICP	24		0.49	2.46	mg/Kg	27.8		0.56	2.8	mg/Kg	27.6		0.56	2.79	mg/Kg						
Selenium, Total, ICP		<MDL	2.5	12.3	mg/Kg		<MDL	2.9	14	mg/Kg		<MDL	2.8	13.9	mg/Kg						
Silver, Total, ICP	1.6	<RDL	0.39	1.97	mg/Kg	1.8	<RDL	0.44	2.24	mg/Kg	1.9	<RDL	0.45	2.22	mg/Kg						
Thallium, Total, ICP		<MDL	3.9	19.7	mg/Kg		<MDL	4.4	22.4	mg/Kg		<MDL	4.5	22.2	mg/Kg						
Zinc, Total, ICP	104		0.49	2.46	mg/Kg	115		0.56	2.8	mg/Kg	121		0.56	2.79	mg/Kg						

King County Environmental Lab Analytical Report

Project:	423062-100-4	423062-100-4	423062-100-4
Locator:	DUD_1B	DUD_2B	DUD_3B
Descrip:	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON
Sample:	L50379-7	L50379-8	L50379-9
Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
ColDate:	3/29/10 11:20	3/29/10 12:05	3/29/10 12:24
TimeSpan:			
TotalSolid:	51.2	45	46.3
ClientLoc:			
SampDepth:	9	6	6.2
	DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
MT SW846 7471B															
Mercury, Total, CVAA	0.16	<RDL	0.039	0.385	mg/Kg	0.21	<RDL	0.044	0.444	mg/Kg	0.19	<RDL	0.043	0.432	mg/Kg
OR SW846 3550B*SW846 8081B															
4,4'-DDD		<MDL	2	3.91	ug/Kg		<MDL	2.2	4.44	ug/Kg		<MDL	2.2	4.32	ug/Kg
4,4'-DDE		<MDL	2	3.91	ug/Kg		<MDL	2.2	4.44	ug/Kg		<MDL	2.2	4.32	ug/Kg
4,4'-DDT		<MDL	2	3.91	ug/Kg		<MDL	2.2	4.44	ug/Kg		<MDL	2.2	4.32	ug/Kg
Aldrin		<MDL	2	3.91	ug/Kg		<MDL	2.2	4.44	ug/Kg		<MDL	2.2	4.32	ug/Kg
Alpha-BHC		<MDL	0.98	1.95	ug/Kg		<MDL	1.1	2.22	ug/Kg		<MDL	1.1	2.16	ug/Kg
Alpha-Chlordane		<MDL	0.98	1.95	ug/Kg		<MDL	1.1	2.22	ug/Kg		<MDL	1.1	2.16	ug/Kg
Beta-BHC		<MDL	0.98	1.95	ug/Kg		<MDL	1.1	2.22	ug/Kg		<MDL	1.1	2.16	ug/Kg
Delta-BHC		<MDL	0.98	1.95	ug/Kg		<MDL	1.1	2.22	ug/Kg		<MDL	1.1	2.16	ug/Kg
Dieldrin		<MDL	2	3.91	ug/Kg		<MDL	2.2	4.44	ug/Kg		<MDL	2.2	4.32	ug/Kg
Endosulfan I		<MDL	2	3.91	ug/Kg		<MDL	2.2	4.44	ug/Kg		<MDL	2.2	4.32	ug/Kg
Endosulfan II		<MDL	2	3.91	ug/Kg		<MDL	2.2	4.44	ug/Kg		<MDL	2.2	4.32	ug/Kg
Endosulfan Sulfate		<MDL	2	3.91	ug/Kg		<MDL	2.2	4.44	ug/Kg		<MDL	2.2	4.32	ug/Kg
Endrin		<MDL	2	3.91	ug/Kg		<MDL	2.2	4.44	ug/Kg		<MDL	2.2	4.32	ug/Kg
Endrin Aldehyde		<MDL	2	3.91	ug/Kg		<MDL	2.2	4.44	ug/Kg		<MDL	2.2	4.32	ug/Kg
Gamma-BHC (Lindane)		<MDL	0.98	1.95	ug/Kg		<MDL	1.1	2.22	ug/Kg		<MDL	1.1	2.16	ug/Kg
Gamma-Chlordane		<MDL	0.98	1.95	ug/Kg		<MDL	1.1	2.22	ug/Kg		<MDL	1.1	2.16	ug/Kg
Heptachlor		<MDL	0.98	1.95	ug/Kg		<MDL	1.1	2.22	ug/Kg		<MDL	1.1	2.16	ug/Kg
Heptachlor Epoxide		<MDL	0.98	1.95	ug/Kg		<MDL	1.1	2.22	ug/Kg		<MDL	1.1	2.16	ug/Kg
Methoxychlor		<MDL	9.8	19.5	ug/Kg		<MDL	11	22.2	ug/Kg		<MDL	11	21.6	ug/Kg
Toxaphene		<MDL	20	39.1	ug/Kg		<MDL	22	44.4	ug/Kg		<MDL	22	43.2	ug/Kg
OR SW846 3550B*SW846 8082A															
Aroclor 1016		<MDL,TA	12	23.4	ug/Kg		<MDL,TA	13	26.7	ug/Kg		<MDL,TA	13	25.9	ug/Kg
Aroclor 1221		<MDL	3.9	7.81	ug/Kg		<MDL	4.4	8.89	ug/Kg		<MDL	4.3	8.64	ug/Kg
Aroclor 1232		<MDL,TA	16	31.3	ug/Kg		<MDL,TA	13	26.7	ug/Kg		<MDL,TA	13	25.9	ug/Kg
Aroclor 1242	18.3		2	3.91	ug/Kg	15.2		2.2	4.44	ug/Kg	16.1		2.2	4.32	ug/Kg
Aroclor 1248		<MDL,TA	23	46.9	ug/Kg		<MDL,TA	22	44.4	ug/Kg		<MDL,TA	22	43.2	ug/Kg
Aroclor 1254	46.7		2	3.91	ug/Kg	35.8		2.2	4.44	ug/Kg	35.6		2.2	4.32	ug/Kg
Aroclor 1260	24		2	3.91	ug/Kg	22.4		2.2	4.44	ug/Kg	21.8		2.2	4.32	ug/Kg
Total Aroclors	89.1		2	3.91	ug/Kg	73.6		2.2	4.44	ug/Kg	73.4		2.2	4.32	ug/Kg
OR SW846 3550B*SW846 8270D															
1,2,4-Trichlorobenzene		<MDL	0.2	0.391	ug/Kg		<MDL	0.22	0.444	ug/Kg		<MDL	0.22	0.432	ug/Kg
1,2-Dichlorobenzene		<MDL	0.39	0.781	ug/Kg		<MDL	0.44	0.889	ug/Kg		<MDL	0.43	0.864	ug/Kg
1,3-Dichlorobenzene		<MDL	0.39	0.781	ug/Kg		<MDL	0.44	0.889	ug/Kg		<MDL	0.43	0.864	ug/Kg
1,4-Dichlorobenzene		<MDL	0.39	0.781	ug/Kg		<MDL	0.44	0.889	ug/Kg		<MDL	0.43	0.864	ug/Kg
2,4-Dimethylphenol		<MDL	2	3.91	ug/Kg		<MDL	2.2	4.44	ug/Kg		<MDL	2.2	4.32	ug/Kg
2-Methylnaphthalene		<MDL	3.9	7.81	ug/Kg		<MDL	4.4	8.89	ug/Kg		<MDL	4.3	8.64	ug/Kg
2-Methylphenol		<MDL	3.9	7.81	ug/Kg		<MDL	4.4	8.89	ug/Kg		<MDL	4.3	8.64	ug/Kg
4-Methylphenol		<MDL	7.8	15.6	ug/Kg	11	<RDL	8.9	17.8	ug/Kg		<MDL	8.6	17.3	ug/Kg

King County Environmental Lab Analytical Report

Project:	423062-100-4					Project:	423062-100-4					Project:	423062-100-4				
Locator:	DUD_1B					Locator:	DUD_2B					Locator:	DUD_3B				
Descrip:	CLEANUP AREA A MON					Descrip:	CLEANUP AREA A MON					Descrip:	CLEANUP AREA A MON				
Sample:	L50379-7					Sample:	L50379-8					Sample:	L50379-9				
Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED				
ColDate:	3/29/10 11:20					ColDate:	3/29/10 12:05					ColDate:	3/29/10 12:24				
TimeSpan:						TimeSpan:						TimeSpan:					
TotalSolid:	51.2					TotalSolid:	45					TotalSolid:	46.3				
ClientLoc:						ClientLoc:						ClientLoc:					
SampDepth:	9					SampDepth:	6					SampDepth:	6.2				
DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**					
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**
Acenaphthene	8.69		3.9	7.81	ug/Kg		<MDL	4.4	8.89	ug/Kg	4.5	<RDL	4.3	8.64	ug/Kg
Acenaphthylene	3.9	<RDL	3.9	7.81	ug/Kg	4.9	<RDL	4.4	8.89	ug/Kg		<MDL	4.3	8.64	ug/Kg
Anthracene	26.2		3.9	7.81	ug/Kg	25.6		4.4	8.89	ug/Kg	26.1		4.3	8.64	ug/Kg
Benzo(a)anthracene	95.5		3.9	7.81	ug/Kg	91.8		4.4	8.89	ug/Kg	70.2		4.3	8.64	ug/Kg
Benzo(a)pyrene	83.6		3.9	7.81	ug/Kg	69.6		4.4	8.89	ug/Kg	61.8		4.3	8.64	ug/Kg
Benzo(b)fluoranthene	129		3.9	7.81	ug/Kg	125		4.4	8.89	ug/Kg	95.9		4.3	8.64	ug/Kg
Benzo(g,h,i)perylene	49.2		3.9	7.81	ug/Kg	43.6		4.4	8.89	ug/Kg	36.7		4.3	8.64	ug/Kg
Benzo(k)fluoranthene	89.6		3.9	7.81	ug/Kg	88.4		4.4	8.89	ug/Kg	73.4		4.3	8.64	ug/Kg
Benzoic Acid	68		20	39.1	ug/Kg	66.4		22	44.4	ug/Kg	55.1		22	43.2	ug/Kg
Benzyl Alcohol		<MDL	3.9	7.81	ug/Kg		<MDL	4.4	8.89	ug/Kg		<MDL	4.3	8.64	ug/Kg
Benzyl Butyl Phthalate	31.8		2	3.91	ug/Kg	34		2.2	4.44	ug/Kg	32.4		2.2	4.32	ug/Kg
Bis(2-Ethylhexyl)Phthalate	192	B2	7.8	15.6	ug/Kg	242	B2	8.9	17.8	ug/Kg	242	B2	8.6	17.3	ug/Kg
Caffeine		<MDL	7.8	15.6	ug/Kg		<MDL	8.9	17.8	ug/Kg		<MDL	8.6	17.3	ug/Kg
Carbazole	11.5		3.9	7.81	ug/Kg	12.3		4.4	8.89	ug/Kg	6.7	<RDL	4.3	8.64	ug/Kg
Chrysene	136		3.9	7.81	ug/Kg	133		4.4	8.89	ug/Kg	109		4.3	8.64	ug/Kg
Coprostanol		<MDL	78	156	ug/Kg		<MDL	89	178	ug/Kg		<MDL	86	173	ug/Kg
Dibenzo(a,h)anthracene	19.7		3.9	7.81	ug/Kg	18.1		4.4	8.89	ug/Kg	17.4		4.3	8.64	ug/Kg
Dibenzofuran	7	<RDL	3.9	7.81	ug/Kg		<MDL	4.4	8.89	ug/Kg		<MDL	4.3	8.64	ug/Kg
Diethyl Phthalate		<MDL	7.8	15.6	ug/Kg		<MDL	8.9	17.8	ug/Kg		<MDL	8.6	17.3	ug/Kg
Dimethyl Phthalate		<MDL	7.8	15.6	ug/Kg		<MDL	8.9	17.8	ug/Kg		<MDL	8.6	17.3	ug/Kg
Di-N-Butyl Phthalate	32	B	7.8	15.6	ug/Kg	34.7	B	8.9	17.8	ug/Kg	36.5	B	8.6	17.3	ug/Kg
Di-N-Octyl Phthalate		<MDL	7.8	15.6	ug/Kg		<MDL	8.9	17.8	ug/Kg		<MDL	8.6	17.3	ug/Kg
Fluoranthene	191		3.9	7.81	ug/Kg	320		4.4	8.89	ug/Kg	151		4.3	8.64	ug/Kg
Fluorene	9.67		3.9	7.81	ug/Kg	7.6	<RDL	4.4	8.89	ug/Kg	8	<RDL	4.3	8.64	ug/Kg
Hexachlorobenzene		<MDL	0.2	0.391	ug/Kg		<MDL	0.22	0.444	ug/Kg		<MDL	0.22	0.432	ug/Kg
Hexachlorobutadiene		<MDL	0.98	1.95	ug/Kg		<MDL	1.1	2.22	ug/Kg		<MDL	1.1	2.16	ug/Kg
Hexachloroethane		<MDL	2	3.91	ug/Kg		<MDL	2.2	4.44	ug/Kg		<MDL	2.2	4.32	ug/Kg
Indeno(1,2,3-Cd)Pyrene	47.1		3.9	7.81	ug/Kg	39.8		4.4	8.89	ug/Kg	36.5		4.3	8.64	ug/Kg
Naphthalene		<MDL	3.9	7.81	ug/Kg		<MDL	4.4	8.89	ug/Kg		<MDL	4.3	8.64	ug/Kg
N-Nitrosodiphenylamine		<MDL	7.8	15.6	ug/Kg		<MDL	8.9	17.8	ug/Kg		<MDL	8.6	17.3	ug/Kg
Pentachlorophenol		<MDL	20	39.1	ug/Kg		<MDL	22	44.4	ug/Kg		<MDL	22	43.2	ug/Kg
Phenanthrene	61.1		3.9	7.81	ug/Kg	72.7		4.4	8.89	ug/Kg	48.8		4.3	8.64	ug/Kg
Phenol	209		7.8	15.6	ug/Kg	760		8.9	17.8	ug/Kg	607		8.6	17.3	ug/Kg
Pyrene	147		3.9	7.81	ug/Kg	194		4.4	8.89	ug/Kg	115		4.3	8.64	ug/Kg
Total HPAHS	988		3.9	7.81	ug/Kg	1120		4.4	8.89	ug/Kg	767		4.3	8.64	ug/Kg
Total LPAHs	116		3.9	7.81	ug/Kg	120		4.4	8.89	ug/Kg	96.3		4.3	8.64	ug/Kg

SAP MDL Comparison Table

King County Environmental Laboratory
SAP MDL Comparison

		Project:	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4
		Locator:	DUD_1A	DUD_2A	DUD_3A	DUD_4A	DUD_5A	DUD_4A	DUD_1B	DUD_2B	DUD_3B
		Descrip:	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON
		Sample:	L50379-1	L50379-2	L50379-3	L50379-4	L50379-5	L50379-6	L50379-7	L50379-8	L50379-9
		Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
		ColDate:	3/29/10 9:30	3/29/10 9:55	3/29/10 10:11	3/29/10 10:28	3/29/10 10:52	3/29/10 10:40	3/29/10 11:20	3/29/10 12:05	3/29/10 12:24
		TimeSpan:									
		TotalSolid:	75.6	44.1	47.1	67.4	81.3	71.7	51.2	45	46.3
		ClientLoc:									
		SampDepth:	3.5	5.5	8	6.5	8.5	6.5	9	6	6.2
			DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**
Parameters	Units	SAP MDL (@50% TS)	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**
CV ASTM D422											
Fines*	%	NA	0.57	1.3	1.1	0.67	0.61	0.76	1	1.1	1.1
Clay*	%	NA	0.57	1.3	1.1	0.67	0.61	0.76	1	1.1	1.1
Silt*	%	NA	0.57	1.3	1.1	0.67	0.61	0.76	1	1.1	1.1
Sand*	%	NA	0.11	0.25	0.21	0.13	0.12	0.15	0.21	0.23	0.22
Gravel*	%	NA	0.11	0.25	0.21	0.13	0.12	0.15	0.21	0.23	0.22
p+0.00*	%	0.1	0.11	0.25	0.21	0.13	0.12	0.15	0.21	0.23	0.22
p+1.00*	%	0.1	0.11	0.25	0.21	0.13	0.12	0.15	0.21	0.23	0.22
p+10.0(equal/more than)*	%	0.5	0.57	1.3	1.1	0.67	0.61	0.76	1	1.1	1.1
p+2.00*	%	0.1	0.11	0.25	0.21	0.13	0.12	0.15	0.21	0.23	0.22
p+3.00*	%	0.1	0.11	0.25	0.21	0.13	0.12	0.15	0.21	0.23	0.22
p+4.00*	%	0.1	0.11	0.25	0.21	0.13	0.12	0.15	0.21	0.23	0.22
p+5.00*	%	0.5	0.57	1.3	1.1	0.67	0.61	0.76	1	1.1	1.1
p+6.00*	%	0.5	0.57	1.3	1.1	0.67	0.61	0.76	1	1.1	1.1
p+7.00*	%	0.5	0.57	1.3	1.1	0.67	0.61	0.76	1	1.1	1.1
p+8.00*	%	0.5	0.57	1.3	1.1	0.67	0.61	0.76	1	1.1	1.1
p+9.00*	%	0.5	0.57	1.3	1.1	0.67	0.61	0.76	1	1.1	1.1
p-1.00*	%	0.1	0.11	0.25	0.21	0.13	0.12	0.15	0.21	0.23	0.22
p-2.00(less than)*	%	0.1	0.11	0.25	0.21	0.13	0.12	0.15	0.21	0.23	0.22
p-2.00*	%	0.1	0.11	0.25	0.21	0.13	0.12	0.15	0.21	0.23	0.22
CV SW846 9060-PSEP96											
Total Organic Carbon	mg/Kg	1000	1900	3900	2000	2100	490	2000	2000	2000	2000
CV SM2540-G											
Total Solids*	%	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
MT SW846 7471B											
Mercury, Total, CVAA	mg/Kg	0.04	0.025	0.045	0.042	0.03	0.023	0.028	0.039	0.044	0.043
MT SW846 3050B*SW846 6010C											
Aluminum, Total, ICP	mg/Kg	10	6.6	11	11	7.4	6.3	6.8	9.8	11	11
Antimony, Total, ICP	mg/Kg	1.5	1	1.7	1.6	1.1	0.93	1	1.5	1.7	1.7
Arsenic, Total, ICP	mg/Kg	2.6	1.7	2.7	2.8	1.8	1.6	1.7	2.5	2.9	2.8
Beryllium, Total, ICP	mg/Kg	0.1	0.066	0.11	0.11	0.074	0.063	0.068	0.098	0.11	0.11
Cadmium, Total, ICP	mg/Kg	0.2	0.13	0.22	0.21	0.15	0.12	0.14	0.2	0.22	0.22
Chromium, Total, ICP	mg/Kg	0.3	0.2	0.34	0.32	0.22	0.18	0.21	0.29	0.33	0.32
Copper, Total, ICP	mg/Kg	0.4	0.26	0.45	0.45	0.3	0.25	0.28	0.39	0.44	0.45
Iron, Total, ICP	mg/Kg	5	3.3	5.4	5.5	3.7	3.1	3.3	4.9	5.6	5.6
Lead, Total, ICP	mg/Kg	2	1.3	2.2	2.1	1.5	1.2	1.4	2	2.2	2.2
Manganese, Total, ICP	mg/Kg	0.2	0.13	0.22	0.21	0.15	0.12	0.14	0.2	0.22	0.22
Nickel, Total, ICP	mg/Kg	0.5	0.33	0.54	0.55	0.37	0.31	0.33	0.49	0.56	0.56
Selenium, Total, ICP	mg/Kg	2.6	1.7	2.7	2.8	1.8	1.6	1.7	2.5	2.9	2.8
Silver, Total, ICP	mg/Kg	0.4	0.26	0.45	0.45	0.3	0.25	0.28	0.39	0.44	0.45
Thallium, Total, ICP	mg/Kg	4	2.6	4.5	4.5	3	2.5	2.8	3.9	4.4	4.5
Zinc, Total, ICP	mg/Kg	0.5	0.33	0.54	0.55	0.37	0.31	0.33	0.49	0.56	0.56
OR SW846 3550B*SW846 8081B											
4,4'-DDD	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
4,4'-DDE	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
4,4'-DDT	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2

King County Environmental Laboratory
SAP MDL Comparison

		Project:	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4
		Locator:	DUD_1A	DUD_2A	DUD_3A	DUD_4A	DUD_5A	DUD_4A	DUD_1B	DUD_2B	DUD_3B
		Descrip:	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON
		Sample:	L50379-1	L50379-2	L50379-3	L50379-4	L50379-5	L50379-6	L50379-7	L50379-8	L50379-9
		Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
		ColDate:	3/29/10 9:30	3/29/10 9:55	3/29/10 10:11	3/29/10 10:28	3/29/10 10:52	3/29/10 10:40	3/29/10 11:20	3/29/10 12:05	3/29/10 12:24
		TimeSpan:									
		TotalSolid:	75.6	44.1	47.1	67.4	81.3	71.7	51.2	45	46.3
		ClientLoc:									
		SampDepth:	3.5	5.5	8	6.5	8.5	6.5	9	6	6.2
			DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**
Parameters	Units	SAP MDL (@50% TS)	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**
Aldrin	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
Alpha-BHC	ug/Kg	1	0.66	1.1	1.1	0.74	0.62	0.7	0.98	1.1	1.1
Alpha-Chlordane	ug/Kg	1	0.66	1.1	1.1	0.74	0.62	0.7	0.98	1.1	1.1
Beta-BHC	ug/Kg	1	0.66	1.1	1.1	0.74	0.62	0.7	0.98	1.1	1.1
Delta-BHC	ug/Kg	1	0.66	1.1	1.1	0.74	0.62	0.7	0.98	1.1	1.1
Dieldrin	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
Endosulfan I	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
Endosulfan II	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
Endosulfan Sulfate	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
Endrin	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
Endrin Aldehyde	ug/Kg	4	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
Gamma-BHC (Lindane)	ug/Kg	1	0.66	1.1	1.1	0.74	0.62	0.7	0.98	1.1	1.1
Gamma-Chlordane	ug/Kg	1	0.66	1.1	1.1	0.74	0.62	0.7	0.98	1.1	1.1
Heptachlor	ug/Kg	1	0.66	1.1	1.1	0.74	0.62	0.7	0.98	1.1	1.1
Heptachlor Epoxide	ug/Kg	1	0.66	1.1	1.1	0.74	0.62	0.7	0.98	1.1	1.1
Methoxychlor	ug/Kg	10	6.6	11	11	7.4	6.2	7	9.8	11	11
Toxaphene	ug/Kg	20	13	23	21	15	12	14	20	22	22
OR SW846 3550B*SW846 8082A											
Aroclor 1016	ug/Kg	2	13	14	17	8.9	4.9	8.4	12	13	13
Aroclor 1221	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Aroclor 1232	ug/Kg	4	26	14	17	8.9	4.9	8.4	16	13	13
Aroclor 1242	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
Aroclor 1248	ug/Kg	2	21	18	25	21	4.9	14	23	22	22
Aroclor 1254	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
Aroclor 1260	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
Total Aroclors	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
OR SW846 3550B*SW846 8270D											
1,2,4-Trichlorobenzene	ug/Kg	0.2	0.13	0.23	0.21	0.15	0.12	0.14	0.2	0.22	0.22
1,2-Dichlorobenzene	ug/Kg	0.4	0.26	0.45	0.42	0.3	0.25	0.28	0.39	0.44	0.43
1,3-Dichlorobenzene	ug/Kg	0.4	0.26	0.45	0.42	0.3	0.25	0.28	0.39	0.44	0.43
1,4-Dichlorobenzene	ug/Kg	0.4	0.26	0.45	0.42	0.3	0.25	0.28	0.39	0.44	0.43
2,4-Dimethylphenol	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
2-Methylnaphthalene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
2-Methylphenol	ug/Kg	8	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
4-Methylphenol	ug/Kg	8	5.3	9.1	8.5	5.9	4.9	5.6	7.8	8.9	8.6
Acenaphthene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Acenaphthylene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Anthracene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Benzo(a)anthracene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Benzo(a)pyrene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Benzo(b)fluoranthene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Benzo(g,h,i)perylene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Benzo(k)fluoranthene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Benzoic Acid	ug/Kg	20	13	23	21	15	12	14	20	22	22
Benzyl Alcohol	ug/Kg	8	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Benzyl Butyl Phthalate	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
Bis(2-Ethylhexyl)Phthalate	ug/Kg	8	5.3	9.1	8.5	5.9	4.9	5.6	7.8	8.9	8.6

King County Environmental Laboratory
SAP MDL Comparison

		Project:	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4	423062-100-4
		Locator:	DUD_1A	DUD_2A	DUD_3A	DUD_4A	DUD_5A	DUD_4A	DUD_1B	DUD_2B	DUD_3B
		Descrip:	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON	CLEANUP AREA A MON
		Sample:	L50379-1	L50379-2	L50379-3	L50379-4	L50379-5	L50379-6	L50379-7	L50379-8	L50379-9
		Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
		ColDate:	3/29/10 9:30	3/29/10 9:55	3/29/10 10:11	3/29/10 10:28	3/29/10 10:52	3/29/10 10:40	3/29/10 11:20	3/29/10 12:05	3/29/10 12:24
		TimeSpan:									
		TotalSolid:	75.6	44.1	47.1	67.4	81.3	71.7	51.2	45	46.3
		ClientLoc:									
		SampDepth:	3.5	5.5	8	6.5	8.5	6.5	9	6	6.2
			DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**
Parameters	Units	SAP MDL (@50% TS)	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**
Caffeine	ug/Kg	8	5.3	9.1	8.5	5.9	4.9	5.6	7.8	8.9	8.6
Carbazole	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Chrysene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Coprostanol	ug/Kg	80	53	91	85	59	49	56	78	89	86
Dibenzo(a,h)anthracene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Dibenzofuran	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Diethyl Phthalate	ug/Kg	8	5.3	9.1	8.5	5.9	4.9	5.6	7.8	8.9	8.6
Dimethyl Phthalate	ug/Kg	8	5.3	9.1	8.5	5.9	4.9	5.6	7.8	8.9	8.6
Di-N-Butyl Phthalate	ug/Kg	8	5.3	9.1	8.5	5.9	4.9	5.6	7.8	8.9	8.6
Di-N-Octyl Phthalate	ug/Kg	8	5.3	9.1	8.5	5.9	4.9	5.6	7.8	8.9	8.6
Fluoranthene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Fluorene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Hexachlorobenzene	ug/Kg	0.2	0.13	0.23	0.21	0.15	0.12	0.14	0.2	0.22	0.22
Hexachlorobutadiene	ug/Kg	1	0.66	1.1	1.1	0.74	0.62	0.7	0.98	1.1	1.1
Hexachloroethane	ug/Kg	2	1.3	2.3	2.1	1.5	1.2	1.4	2	2.2	2.2
Indeno(1,2,3-Cd)Pyrene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Naphthalene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
N-Nitrosodiphenylamine	ug/Kg	8	5.3	9.1	8.5	5.9	4.9	5.6	7.8	8.9	8.6
Pentachlorophenol	ug/Kg	20	13	23	21	15	12	14	20	22	22
Phenanthrene	ug/Kg	4	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Phenol	ug/Kg	8	5.3	9.1	8.5	5.9	4.9	5.6	7.8	8.9	8.6
Pyrene	ug/Kg	8	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Total HPAHS	ug/Kg	8	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3
Total LPAHs	ug/Kg	8	2.6	4.5	4.2	3	2.5	2.8	3.9	4.4	4.3

SAP & SMS OC and Dry Weight Normalization MDL Check Tables

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.21	38	38
2,4-Dimethylphenol	1	1.32	29	28
2-Methylphenol	2	2.65	63	60
4-Methylphenol	4	5.29	670	665
Acenaphthene	2	0.21	16	16
Acenaphthylene	2	0.21	66	66
Anthracene	2	0.21	220	220
Benzo(a)anthracene	2	0.21	110	110
Benzo(a)pyrene	2	0.21	99	99
Benzo(b)fluoranthene	2	0.21	115	115
Benzo(g,h,i)perylene	2	0.21	31	31
Benzo(k)fluoranthene	2	0.21	115	115
Benzoic Acid	10	13.23	650	637
Benzyl Alcohol	2	2.65	57	54
Benzyl Butyl Phthalate	1	0.10	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.41	47	47
Chrysene	2	0.21	110	110
Dibenzo(a,h)anthracene	2	0.21	12	12
Dibenzofuran	2	0.21	15	15
Diethyl Phthalate	4	0.41	61	61
Dimethyl Phthalate	4	0.41	53	53
Di-N-Butyl Phthalate	4	0.41	220	220
Di-N-Octyl Phthalate	4	0.41	58	58
Fluorene	2	0.21	23	23
Fluoranthene	2	0.21	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.05	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.21	34	34
N-Nitrosodiphenylamine	4	0.41	11	11
Naphthalene	2	0.21	99	99
Pentachlorophenol	10	13.23	360	347
Phenanthrene	2	0.21	100	100
Phenol	4	5.29	420	415
Pyrene	2	0.21	1000	1000
Aroclor 1016	10	1.03		
Aroclor 1221	2	0.21		
Aroclor 1232	20	2.06		
Aroclor 1242	1	0.10		
Aroclor 1248	16	1.65		
Aroclor 1254	1	0.10		
Aroclor 1260	1	0.10		
Total Organic Carbon (dry)	12830.68783			
Total Solids	75.6			
HPAH	20	2.06	960	958
LPAH	14	1.44	370	369
Total PCB	20	2.06	12	9.9

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.17	38	38
2,4-Dimethylphenol	1	2.27	29	27
2-Methylphenol	2	4.54	63	58
4-Methylphenol	4	9.07	670	661
Acenaphthene	2	0.17	16	16
Acenaphthylene	2	0.17	66	66
Anthracene	2	0.17	220	220
Benzo(a)anthracene	2	0.17	110	110
Benzo(a)pyrene	2	0.17	99	99
Benzo(b)fluoranthene	2	0.17	115	115
Benzo(g,h,i)perylene	2	0.17	31	31
Benzo(k)fluoranthene	2	0.17	115	115
Benzoic Acid	10	22.68	650	627
Benzyl Alcohol	2	4.54	57	52
Benzyl Butyl Phthalate	1	0.08	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.34	47	47
Chrysene	2	0.17	110	110
Dibenzo(a,h)anthracene	2	0.17	12	12
Dibenzofuran	2	0.17	15	15
Diethyl Phthalate	4	0.34	61	61
Dimethyl Phthalate	4	0.34	53	53
Di-N-Butyl Phthalate	4	0.34	220	220
Di-N-Octyl Phthalate	4	0.34	58	58
Fluorene	2	0.17	23	23
Fluoranthene	2	0.17	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.04	3.9	3.9
Indeno(1,2,3-Cd)Pyrene	2	0.17	34	34
N-Nitrosodiphenylamine	4	0.34	11	11
Naphthalene	2	0.17	99	99
Pentachlorophenol	10	22.68	360	337
Phenanthrene	2	0.17	100	100
Phenol	4	9.07	420	411
Pyrene	2	0.17	1000	1000
Aroclor 1016	6	0.50		
Aroclor 1221	2	0.17		
Aroclor 1232	6	0.50		
Aroclor 1242	1	0.08		
Aroclor 1248	8	0.67		
Aroclor 1254	1	0.08		
Aroclor 1260	1	0.08		
Total Organic Carbon (dry)	26984.12698			
Total Solids	44.1			
HPAH	20	1.68	960	958
LPAH	14	1.18	370	369
Total PCB	8	0.67	12	11.3

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.18	38	38
2,4-Dimethylphenol	1	2.12	29	27
2-Methylphenol	2	4.25	63	59
4-Methylphenol	4	8.49	670	662
Acenaphthene	2	0.18	16	16
Acenaphthylene	2	0.18	66	66
Anthracene	2	0.18	220	220
Benzo(a)anthracene	2	0.18	110	110
Benzo(a)pyrene	2	0.18	99	99
Benzo(b)fluoranthene	2	0.18	115	115
Benzo(g,h,i)perylene	2	0.18	31	31
Benzo(k)fluoranthene	2	0.18	115	115
Benzoic Acid	10	21.23	650	629
Benzyl Alcohol	2	4.25	57	53
Benzyl Butyl Phthalate	1	0.09	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.36	47	47
Chrysene	2	0.18	110	110
Dibenzo(a,h)anthracene	2	0.18	12	12
Dibenzofuran	2	0.18	15	15
Diethyl Phthalate	4	0.36	61	61
Dimethyl Phthalate	4	0.36	53	53
Di-N-Butyl Phthalate	4	0.36	220	220
Di-N-Octyl Phthalate	4	0.36	58	58
Fluorene	2	0.18	23	23
Fluoranthene	2	0.18	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.05	3.9	3.9
Indeno(1,2,3-Cd)Pyrene	2	0.18	34	34
N-Nitrosodiphenylamine	4	0.36	11	11
Naphthalene	2	0.18	99	99
Pentachlorophenol	10	21.23	360	339
Phenanthrene	2	0.18	100	100
Phenol	4	8.49	420	412
Pyrene	2	0.18	1000	1000
Aroclor 1016	8	0.73		
Aroclor 1221	2	0.18		
Aroclor 1232	8	0.73		
Aroclor 1242	1	0.09		
Aroclor 1248	12	1.09		
Aroclor 1254	1	0.09		
Aroclor 1260	1	0.09		
Total Organic Carbon (dry)	23354.56476			
Total Solids	47.1			
HPAH	20	1.82	960	958
LPAH	14	1.27	370	369
Total PCB	12	1.09	12	10.9

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.03	2.3	2.3
1,4-Dichlorobenzene	0.2	0.03	3.1	3.1
2-Methylnaphthalene	2	0.27	38	38
2,4-Dimethylphenol	1	1.48	29	28
2-Methylphenol	2	2.97	63	60
4-Methylphenol	4	5.93	670	664
Acenaphthene	2	0.27	16	16
Acenaphthylene	2	0.27	66	66
Anthracene	2	0.27	220	220
Benzo(a)anthracene	2	0.27	110	110
Benzo(a)pyrene	2	0.27	99	99
Benzo(b)fluoranthene	2	0.27	115	115
Benzo(g,h,i)perylene	2	0.27	31	31
Benzo(k)fluoranthene	2	0.27	115	115
Benzoic Acid	10	14.84	650	635
Benzyl Alcohol	2	2.97	57	54
Benzyl Butyl Phthalate	1	0.13	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.54	47	46
Chrysene	2	0.27	110	110
Dibenzo(a,h)anthracene	2	0.27	12	12
Dibenzofuran	2	0.27	15	15
Diethyl Phthalate	4	0.54	61	60
Dimethyl Phthalate	4	0.54	53	52
Di-N-Butyl Phthalate	4	0.54	220	219
Di-N-Octyl Phthalate	4	0.54	58	57
Fluorene	2	0.27	23	23
Fluoranthene	2	0.27	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.07	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.27	34	34
N-Nitrosodiphenylamine	4	0.54	11	10
Naphthalene	2	0.27	99	99
Pentachlorophenol	10	14.84	360	345
Phenanthrene	2	0.27	100	100
Phenol	4	5.93	420	414
Pyrene	2	0.27	1000	1000
Aroclor 1016	6	0.81		
Aroclor 1221	2	0.27		
Aroclor 1232	6	0.81		
Aroclor 1242	1	0.13		
Aroclor 1248	14	1.89		
Aroclor 1254	1	0.13		
Aroclor 1260	1	0.13		
Total Organic Carbon (dry)	11008.90208			
Total Solids	67.4			
HPAH	20	2.70	960	957
LPAH	14	1.89	370	368
Total PCB	14	1.89	12	10.1

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.06	0.81	0.75
1,2-Dichlorobenzene	0.2	0.12	2.3	2.2
1,4-Dichlorobenzene	0.2	0.12	3.1	3.0
2-Methylnaphthalene	2	1.20	38	37
2,4-Dimethylphenol	1	1.23	29	28
2-Methylphenol	2	2.46	63	61
4-Methylphenol	4	4.92	670	665
Acenaphthene	2	1.20	16	15
Acenaphthylene	2	1.20	66	65
Anthracene	2	1.20	220	219
Benzo(a)anthracene	2	1.20	110	109
Benzo(a)pyrene	2	1.20	99	98
Benzo(b)fluoranthene	2	1.20	115	114
Benzo(g,h,i)perylene	2	1.20	31	30
Benzo(k)fluoranthene	2	1.20	115	114
Benzoic Acid	10	12.30	650	638
Benzyl Alcohol	2	2.46	57	55
Benzyl Butyl Phthalate	1	0.60	4.9	4.3
Bis(2-Ethylhexyl)Phthalate	4	2.40	47	45
Chrysene	2	1.20	110	109
Dibenzo(a,h)anthracene	2	1.20	12	11
Dibenzofuran	2	1.20	15	14
Diethyl Phthalate	4	2.40	61	59
Dimethyl Phthalate	4	2.40	53	51
Di-N-Butyl Phthalate	4	2.40	220	218
Di-N-Octyl Phthalate	4	2.40	58	56
Fluorene	2	1.20	23	22
Fluoranthene	2	1.20	160	159
Hexachlorobenzene	0.1	0.06	0.38	0.32
Hexachlorobutadiene	0.5	0.30	3.9	3.6
Indeno(1,2,3-Cd)Pyrene	2	1.20	34	33
N-Nitrosodiphenylamine	4	2.40	11	9
Naphthalene	2	1.20	99	98
Pentachlorophenol	10	12.30	360	348
Phenanthrene	2	1.20	100	99
Phenol	4	4.92	420	415
Pyrene	2	1.20	1000	999
Aroclor 1016	4	2.40		
Aroclor 1221	2	1.20		
Aroclor 1232	4	2.40		
Aroclor 1242	1	0.60		
Aroclor 1248	4	2.40		
Aroclor 1254	1	0.60		
Aroclor 1260	1	0.60		
Total Organic Carbon (dry)	2054.120541			
Total Solids	81.3			
HPAH	20	11.98	960	948
LPAH	14	8.38	370	362
Total PCB	4	2.40	12	9.6

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.02	0.81	0.79
1,2-Dichlorobenzene	0.2	0.03	2.3	2.3
1,4-Dichlorobenzene	0.2	0.03	3.1	3.1
2-Methylnaphthalene	2	0.31	38	38
2,4-Dimethylphenol	1	1.39	29	28
2-Methylphenol	2	2.79	63	60
4-Methylphenol	4	5.58	670	664
Acenaphthene	2	0.31	16	16
Acenaphthylene	2	0.31	66	66
Anthracene	2	0.31	220	220
Benzo(a)anthracene	2	0.31	110	110
Benzo(a)pyrene	2	0.31	99	99
Benzo(b)fluoranthene	2	0.31	115	115
Benzo(g,h,i)perylene	2	0.31	31	31
Benzo(k)fluoranthene	2	0.31	115	115
Benzoic Acid	10	13.95	650	636
Benzyl Alcohol	2	2.79	57	54
Benzyl Butyl Phthalate	1	0.16	4.9	4.7
Bis(2-Ethylhexyl)Phthalate	4	0.63	47	46
Chrysene	2	0.31	110	110
Dibenzo(a,h)anthracene	2	0.31	12	12
Dibenzofuran	2	0.31	15	15
Diethyl Phthalate	4	0.63	61	60
Dimethyl Phthalate	4	0.63	53	52
Di-N-Butyl Phthalate	4	0.63	220	219
Di-N-Octyl Phthalate	4	0.63	58	57
Fluorene	2	0.31	23	23
Fluoranthene	2	0.31	160	160
Hexachlorobenzene	0.1	0.02	0.38	0.36
Hexachlorobutadiene	0.5	0.08	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.31	34	34
N-Nitrosodiphenylamine	4	0.63	11	10
Naphthalene	2	0.31	99	99
Pentachlorophenol	10	13.95	360	346
Phenanthrene	2	0.31	100	100
Phenol	4	5.58	420	414
Pyrene	2	0.31	1000	1000
Aroclor 1016	6	0.94		
Aroclor 1221	2	0.31		
Aroclor 1232	6	0.94		
Aroclor 1242	1	0.16		
Aroclor 1248	10	1.56		
Aroclor 1254	1	0.16		
Aroclor 1260	1	0.16		
Total Organic Carbon (dry)	8926.080893			
Total Solids	71.7			
HPAH	20	3.13	960	957
LPAH	14	2.19	370	368
Total PCB	10	1.56	12	10.4

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.23	38	38
2,4-Dimethylphenol	1	1.95	29	27
2-Methylphenol	2	3.91	63	59
4-Methylphenol	4	7.81	670	662
Acenaphthene	2	0.23	16	16
Acenaphthylene	2	0.23	66	66
Anthracene	2	0.23	220	220
Benzo(a)anthracene	2	0.23	110	110
Benzo(a)pyrene	2	0.23	99	99
Benzo(b)fluoranthene	2	0.23	115	115
Benzo(g,h,i)perylene	2	0.23	31	31
Benzo(k)fluoranthene	2	0.23	115	115
Benzoic Acid	10	19.53	650	630
Benzyl Alcohol	2	3.91	57	53
Benzyl Butyl Phthalate	1	0.11	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.45	47	47
Chrysene	2	0.23	110	110
Dibenzo(a,h)anthracene	2	0.23	12	12
Dibenzofuran	2	0.23	15	15
Diethyl Phthalate	4	0.45	61	61
Dimethyl Phthalate	4	0.45	53	53
Di-N-Butyl Phthalate	4	0.45	220	220
Di-N-Octyl Phthalate	4	0.45	58	58
Fluorene	2	0.23	23	23
Fluoranthene	2	0.23	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.06	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.23	34	34
N-Nitrosodiphenylamine	4	0.45	11	11
Naphthalene	2	0.23	99	99
Pentachlorophenol	10	19.53	360	340
Phenanthrene	2	0.23	100	100
Phenol	4	7.81	420	412
Pyrene	2	0.23	1000	1000
Aroclor 1016	6	0.68		
Aroclor 1221	2	0.23		
Aroclor 1232	8	0.90		
Aroclor 1242	1	0.11		
Aroclor 1248	12	1.35		
Aroclor 1254	1	0.11		
Aroclor 1260	1	0.11		
Total Organic Carbon (dry)	17343.75			
Total Solids	51.2			
HPAH	20	2.25	960	958
LPAH	14	1.58	370	368
Total PCB	12	1.35	12	10.6

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.22	38	38
2,4-Dimethylphenol	1	2.22	29	27
2-Methylphenol	2	4.44	63	59
4-Methylphenol	4	8.89	670	661
Acenaphthene	2	0.22	16	16
Acenaphthylene	2	0.22	66	66
Anthracene	2	0.22	220	220
Benzo(a)anthracene	2	0.22	110	110
Benzo(a)pyrene	2	0.22	99	99
Benzo(b)fluoranthene	2	0.22	115	115
Benzo(g,h,i)perylene	2	0.22	31	31
Benzo(k)fluoranthene	2	0.22	115	115
Benzoic Acid	10	22.22	650	628
Benzyl Alcohol	2	4.44	57	53
Benzyl Butyl Phthalate	1	0.11	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.45	47	47
Chrysene	2	0.22	110	110
Dibenzo(a,h)anthracene	2	0.22	12	12
Dibenzofuran	2	0.22	15	15
Diethyl Phthalate	4	0.45	61	61
Dimethyl Phthalate	4	0.45	53	53
Di-N-Butyl Phthalate	4	0.45	220	220
Di-N-Octyl Phthalate	4	0.45	58	58
Fluorene	2	0.22	23	23
Fluoranthene	2	0.22	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.06	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.22	34	34
N-Nitrosodiphenylamine	4	0.45	11	11
Naphthalene	2	0.22	99	99
Pentachlorophenol	10	22.22	360	338
Phenanthrene	2	0.22	100	100
Phenol	4	8.89	420	411
Pyrene	2	0.22	1000	1000
Aroclor 1016	6	0.67		
Aroclor 1221	2	0.22		
Aroclor 1232	6	0.67		
Aroclor 1242	1	0.11		
Aroclor 1248	10	1.12		
Aroclor 1254	1	0.11		
Aroclor 1260	1	0.11		
Total Organic Carbon (dry)	19911.11111			
Total Solids	45			
HPAH	20	2.23	960	958
LPAH	14	1.56	370	368
Total PCB	10	1.12	12	10.9

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.21	38	38
2,4-Dimethylphenol	1	2.16	29	27
2-Methylphenol	2	4.32	63	59
4-Methylphenol	4	8.64	670	661
Acenaphthene	2	0.21	16	16
Acenaphthylene	2	0.21	66	66
Anthracene	2	0.21	220	220
Benzo(a)anthracene	2	0.21	110	110
Benzo(a)pyrene	2	0.21	99	99
Benzo(b)fluoranthene	2	0.21	115	115
Benzo(g,h,i)perylene	2	0.21	31	31
Benzo(k)fluoranthene	2	0.21	115	115
Benzoic Acid	10	21.60	650	628
Benzyl Alcohol	2	4.32	57	53
Benzyl Butyl Phthalate	1	0.10	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.41	47	47
Chrysene	2	0.21	110	110
Dibenzo(a,h)anthracene	2	0.21	12	12
Dibenzofuran	2	0.21	15	15
Diethyl Phthalate	4	0.41	61	61
Dimethyl Phthalate	4	0.41	53	53
Di-N-Butyl Phthalate	4	0.41	220	220
Di-N-Octyl Phthalate	4	0.41	58	58
Fluorene	2	0.21	23	23
Fluoranthene	2	0.21	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.05	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.21	34	34
N-Nitrosodiphenylamine	4	0.41	11	11
Naphthalene	2	0.21	99	99
Pentachlorophenol	10	21.60	360	338
Phenanthrene	2	0.21	100	100
Phenol	4	8.64	420	411
Pyrene	2	0.21	1000	1000
Aroclor 1016	6	0.62		
Aroclor 1221	2	0.21		
Aroclor 1232	6	0.62		
Aroclor 1242	1	0.10		
Aroclor 1248	10	1.03		
Aroclor 1254	1	0.10		
Aroclor 1260	1	0.10		
Total Organic Carbon (dry)	21036.71706			
Total Solids	46.3			
HPAH	20	2.05	960	958
LPAH	14	1.44	370	369
Total PCB	10	1.03	12	11.0

CONVENTIONAL ANALYSES QC DATA

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

WG108448 PSD

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50379-1	423062-100-4	Duwamish Diagonal Cap Monitoring	CVPSD	SALTWTRSED	3/29/2010 9:30	4/5/2010 0:00	4/6/2010 0:00	WG108448-1, -2	
L50379-2	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 9:55	4/5/2010 0:00	4/6/2010 0:00		
L50379-3	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 10:11	4/5/2010 0:00	4/6/2010 0:00		
L50379-4	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 10:28	4/5/2010 0:00	4/6/2010 0:00		
L50379-5	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 10:52	4/5/2010 0:00	4/6/2010 0:00		
L50379-6	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 10:40	4/13/2010 0:00	4/14/2010 0:00		FREP @ L50379-4
L50379-7	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 11:20	4/5/2010 0:00	4/6/2010 0:00		
L50379-8	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 12:05	4/5/2010 0:00	4/6/2010 0:00		
L50379-9	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 12:24	4/13/2010 0:00	4/14/2020 0:00		
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	CVPSD	SALTWTRSED	3/29/2010 12:35	4/13/2010 0:00	4/14/2010 0:00		
L50380-3	423062-200-4		CVPSD	SALTWTRSED	3/29/2010 13:10	4/13/2010 0:00	4/14/2010 0:00		
L50380-4	423062-200-4		CVPSD	SALTWTRSED	3/29/2010 14:28	4/13/2010 0:00	4/14/2010 0:00		FREP @ L50380-6
L50380-5	423062-200-4		CVPSD	SALTWTRSED	3/29/2010 13:38	4/13/2010 0:00	4/14/2010 0:00		
L50380-6	423062-200-4		CVPSD	SALTWTRSED	3/29/2010 14:03	4/13/2010 0:00	4/14/2010 0:00		
L50380-7	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 9:10	4/13/2010 0:00	4/14/2010 0:00		
L50380-8	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 9:35	4/13/2010 0:00	4/14/2010 0:00		
L50380-9	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 9:55	4/13/2010 0:00	4/14/2010 0:00		
WG108448-1	LD		CVPSD	SALTWTRSED		4/13/2010 0:00	4/14/2010 0:00		L50379-6
WG108448-2	LT		CVPSD	SALTWTRSED		4/13/2010 0:00	4/14/2010 0:00		WG108448-1 L50379-6

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

WG108840 TOC

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50379-1	423062-100-4	Duwamish Diagonal Cap Monitoring	CVTOC	SALTWTRSED	3/29/2010 9:30	4/28/2010 14:00	5/6/2010 11:38	WG108840-1, -2, -3, -4, -5, -6, -7	
L50379-2	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 9:55	4/28/2010 14:00	5/6/2010 12:00		
L50379-3	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 10:11	4/28/2010 14:00	5/6/2010 13:30		
L50379-4	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 10:28	4/28/2010 14:00	5/6/2010 13:55		
L50379-5	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 10:52	4/28/2010 14:00	5/7/2010 9:51		
L50379-6	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 10:40	4/28/2010 14:00	5/7/2010 10:12		FREP @ L50379-4
L50379-7	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 11:20	4/28/2010 14:00	5/7/2010 10:33		
L50379-8	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 12:05	4/28/2010 14:00	5/7/2010 10:55		
L50379-9	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 12:24	4/28/2010 14:00	5/7/2010 11:17		
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	CVTOC	SALTWTRSED	3/29/2010 12:35	4/28/2010 14:00	5/7/2010 11:39		
L50380-2	423062-200-4		CVTOC	SALTWTRSED	3/29/2010 12:50	4/28/2010 14:00	5/7/2010 12:00		
L50380-3	423062-200-4		CVTOC	SALTWTRSED	3/29/2010 13:10	4/28/2010 14:00	5/7/2010 12:21		
L50380-4	423062-200-4		CVTOC	SALTWTRSED	3/29/2010 14:28	4/28/2010 14:00	5/7/2010 12:42		FREP @ L50380-6
WG108840-1	MB		CVTOC	OTHR SOLID		5/6/2010 10:39	5/6/2010 10:39		MB1 100506
WG108840-2	SB		CVTOC	OTHR SOLID		5/6/2010 10:55	5/6/2010 10:55		WG108840-1
WG108840-3	SRM		CVTOC	OTHR SOLID		5/6/2010 11:14	5/6/2010 11:14		HICONC
WG108840-4	LD		CVTOC	SALTWTRSED		4/28/2010 14:00	5/6/2010 12:22		L50379-2
WG108840-5	LT		CVTOC	SALTWTRSED		4/28/2010 14:00	5/6/2010 12:45		WG108840-4 L50379-2
WG108840-6	MS		CVTOC	SALTWTRSED		4/28/2010 14:00	5/6/2010 13:06		L50379-2
WG108840-7	MB		CVTOC	OTHR SOLID		5/7/2010 9:27	5/7/2010 9:27		MB1 100507

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

WG108912 Total Solids

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50379-1	423062-100-4	Duwamish Diagonal Cap Monitoring	CVTOTS	SALTWTRSED	3/29/2010 9:30	4/29/2010 10:45	5/3/2010 8:19	WG108912-1, -2, -3	
L50379-2	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 9:55	4/29/2010 10:45	5/3/2010 8:20		
L50379-3	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 10:11	4/29/2010 10:45	5/3/2010 8:20		
L50379-4	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 10:28	4/29/2010 10:45	5/3/2010 8:20		
L50379-5	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 10:52	4/29/2010 10:45	5/3/2010 8:13		
L50379-6	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 10:40	4/29/2010 10:45	5/3/2010 8:13		FREP @ L50379-4
L50379-7	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 11:20	4/29/2010 10:45	5/3/2010 8:14		
L50379-8	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 12:05	4/29/2010 10:45	5/3/2010 8:15		
L50379-9	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 12:24	4/29/2010 10:45	5/3/2010 8:15		
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	CVTOTS	SALTWTRSED	3/29/2010 12:35	4/29/2010 10:45	5/3/2010 8:23		
L50380-2	423062-200-4		CVTOTS	SALTWTRSED	3/29/2010 12:50	4/29/2010 10:45	5/3/2010 8:21		
L50380-3	423062-200-4		CVTOTS	SALTWTRSED	3/29/2010 13:10	4/29/2010 10:45	5/3/2010 8:21		
L50380-4	423062-200-4		CVTOTS	SALTWTRSED	3/29/2010 14:28	4/29/2010 10:45	5/3/2010 8:16		FREP @ L50380-6
WG108912-1	MB		CVTOTS	OTHR SOLID		4/29/2010 10:45	5/3/2010 8:23		MB1 4/29/10
WG108912-2	LD		CVTOTS	SALTWTRSED		4/29/2010 10:45	5/3/2010 8:14		L50379-7
WG108912-3	LT		CVTOTS	SALTWTRSED		4/29/2010 10:45	5/3/2010 8:14		WG108912-2 L50379-7

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

Workgroup: WG108448 PSD

LT:WG108448-2 LD:WG108448-1 L50379-6 Matrix: SALTWTRSED Listtype: CVPSD Method: ASTM D422 Project: 423062-100-4
(Lab Triplicate, Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	LT Value	RSD	Qual	Lab Limit
Clay	0.79	1.58	%	6.1	6.8	6.3	6		20
Gravel	0.16	1.58	%	16.3	15.9	16.3	1		20
Sand	0.16	1.58	%	74	70.4	73.8	3		20
Silt	0.79	1.58	%	12.1	11.3	12.6	6		20

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

Workgroup: WG108840 TOC

MB:WG108840-1 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Organic Carbon	500	1000	mg/Kg	<MDL	

SB:WG108840-2 MB:WG108840-1 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	500	1000	mg/Kg	<MDL	2500	2560	102		80--120

SRM:WG108840-3 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	2500	4930	mg/Kg	33480	34300	102		80--120

LT:WG108840-5 LD:WG108840-4 L50379-2 Matrix: SALTWTRSED Listtype: CVTOC Method: SW846 9060-PSEP96 Project: 423062-100-4
(Lab Triplicate, Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	LT Value	RSD	Qual	Lab Limit
Total Organic Carbon	1700	3420	mg/Kg	11900	12500	12200	2		20

MS:WG108840-6 L50379-2 Matrix: SALTWTRSED Listtype: CVTOC Method: SW846 9060-PSEP96 Project: 423062-100-4
(Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	1700	3420	mg/Kg	11900	8546	20200	96		75--125

MB:WG108840-7 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Organic Carbon	500	1000	mg/Kg	<MDL	

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

Workgroup: WG108912 Total Solids

MB:WG108912-1 Matrix: OTHR SOLID Listtype: CVTOTS Method: SM2540-G Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Solids	0.005	0.01	%	<MDL	

LT:WG108912-3 LD:WG108912-2 L50379-7 Matrix: SALTWTRSED Listtype: CVTOTS Method: SM2540-G Project: 423062-100-4
(Lab Triplicate, Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	LT Value	RSD	Qual	Lab Limit
Total Solids	0.005	0.01	%	51.2	51.3	51.3	0		20

METAL CHEMISTRY QC DATA

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

WG108486 Total Mercury

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50379-1	423062-100-4	Duwamish Diagonal Cap Monitoring	MTHG-SED	SALTWTRSED	3/29/2010 9:30	4/12/2010 8:20	4/12/2010 14:23	WG108486-1, -2, -3, -4, -5, -6, -7	
L50379-2	423062-100-4		MTHG-SED	SALTWTRSED	3/29/2010 9:55	4/12/2010 8:20	4/12/2010 14:25		
L50379-3	423062-100-4		MTHG-SED	SALTWTRSED	3/29/2010 10:11	4/12/2010 8:20	4/12/2010 14:29		
L50379-4	423062-100-4		MTHG-SED	SALTWTRSED	3/29/2010 10:28	4/12/2010 8:20	4/12/2010 14:31		
L50379-5	423062-100-4		MTHG-SED	SALTWTRSED	3/29/2010 10:52	4/12/2010 8:20	4/12/2010 14:32		
L50379-6	423062-100-4		MTHG-SED	SALTWTRSED	3/29/2010 10:40	4/12/2010 8:20	4/12/2010 14:34		FREP @ L50379-4
L50379-7	423062-100-4		MTHG-SED	SALTWTRSED	3/29/2010 11:20	4/12/2010 8:20	4/12/2010 14:17		
L50379-8	423062-100-4		MTHG-SED	SALTWTRSED	3/29/2010 12:05	4/12/2010 8:20	4/12/2010 14:35		
L50379-9	423062-100-4		MTHG-SED	SALTWTRSED	3/29/2010 12:24	4/12/2010 8:20	4/12/2010 14:37		
WG108486-1	SRM		MTHG-SED	SALTWTRSED		4/12/2010 8:20	4/12/2010 14:10		PACS2
WG108486-2	SRM		MTHG-SED	SALTWTRSED		4/12/2010 8:20	4/12/2010 14:12		PACS2
WG108486-3	MB		MTHG-SED	SOLIDBLANK		4/12/2010 8:20	4/12/2010 14:14		METHOD BLANK
WG108486-4	SB		MTHG-SED	SOLIDBLANK		4/12/2010 8:20	4/12/2010 14:15		WG108486-3 HG-SOL
WG108486-5	MS		MTHG-SED	SALTWTRSED		4/12/2010 8:20	4/12/2010 14:18		L50379-7 HG-SOL
WG108486-6	MSD		MTHG-SED	SALTWTRSED		4/12/2010 8:20	4/12/2010 14:20		WG108486-5 L50379-7 HG-SOL-MSD
WG108486-7	LD		MTHG-SED	SALTWTRSED		4/12/2010 8:20	4/12/2010 14:21		L50379-7 RPD-SOL

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

WG108557 Total Metals

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50379-1	423062-100-4	Duwamish Diagonal Cap Monitoring	MTICP-SED	SALTWTRSED	3/29/2010 9:30	4/15/2010 8:00	4/16/2010 10:25	WG108557-1, -2, -3, -4, -5, -6, -7	
L50379-2	423062-100-4		MTICP-SED	SALTWTRSED	3/29/2010 9:55	4/15/2010 8:00	4/16/2010 10:31		
L50379-3	423062-100-4		MTICP-SED	SALTWTRSED	3/29/2010 10:11	4/15/2010 8:00	4/16/2010 10:47		
L50379-4	423062-100-4		MTICP-SED	SALTWTRSED	3/29/2010 10:28	4/15/2010 8:00	4/16/2010 11:04		
L50379-5	423062-100-4		MTICP-SED	SALTWTRSED	3/29/2010 10:52	4/15/2010 8:00	4/16/2010 11:10		
L50379-6	423062-100-4		MTICP-SED	SALTWTRSED	3/29/2010 10:40	4/15/2010 8:00	4/16/2010 11:15		FREP @ L50379-4
L50379-7	423062-100-4		MTICP-SED	SALTWTRSED	3/29/2010 11:20	4/15/2010 8:00	4/16/2010 11:21		
L50379-8	423062-100-4		MTICP-SED	SALTWTRSED	3/29/2010 12:05	4/15/2010 8:00	4/16/2010 11:26		
L50379-9	423062-100-4		MTICP-SED	SALTWTRSED	3/29/2010 12:24	4/15/2010 8:00	4/16/2010 11:32		
WG108557-1	SB		MTICP-SED	SOLIDBLANK		4/15/2010 8:00	4/16/2010 9:58		WG108557-2 ICPMARINE
WG108557-2	MB		MTICP-SED	SOLIDBLANK		4/15/2010 8:00	4/16/2010 10:03		METHOD BLANK
WG108557-3	LD		MTICP-SED	SALTWTRSED		4/15/2010 8:00	4/16/2010 10:36		L50379-2 RPD-SOL
WG108557-4	MS		MTICP-SED	SALTWTRSED		4/15/2010 8:00	4/16/2010 10:42		L50379-2 ICPMARINE
WG108557-5	LCS		MTICP-SED	SOIL		4/15/2010 8:00	4/16/2010 10:09		ERASOIL
WG108557-6	LCS		MTICP-SED	SOIL		4/15/2010 8:00	4/16/2010 10:14		ERASOIL
WG108557-7	SRM		MTICP-SED	SALTWTRSED		4/15/2010 8:00	4/16/2010 10:20		PACS2

King County Environmental Lab Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

Workgroup: WG108486 Total Mercury

SRM:WG108486-1 Matrix: SALTWTRSED Listtype: MTHG-SED Method: SW846 7471B Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.1	1.02	mg/Kg	3.04	3.52	116		80--120

SRM:WG108486-2 Matrix: SALTWTRSED Listtype: MTHG-SED Method: SW846 7471B Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.1	1	mg/Kg	3.04	3.29	108		80--120

MB:WG108486-3 Matrix: SOLIDBLANK Listtype: MTHG-SED Method: SW846 7471B Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Mercury, Total, CVAA	0.019	0.19	mg/Kg	<MDL	

SB:WG108486-4 MB:WG108486-3 Matrix: SOLIDBLANK Listtype: MTHG-SED Method: SW846 7471B Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.019	0.19	mg/Kg	<MDL	0.476	0.488	102		85--115

MSD:WG108486-6 MS:WG108486-5 L50379-7 Matrix: SALTWTRSED Listtype: MTHG-SED Method: SW846 7471B Project: 423062-100-4
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	Samp Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Mercury, Total, CVAA	0.02	0.2	mg/Kg	0.08	0.491	0.58	102		75--125	0.5	0.583	101		1		20

LD:WG108486-7 L50379-7 Matrix: SALTWTRSED Listtype: MTHG-SED Method: SW846 7471B Project: 423062-100-4
(Lab Duplicate)

Parameter	MDL	RDL	Units	Samp Value	LD Value	RPD^	Qual	Lab Limit
Mercury, Total, CVAA	0.02	0.198	mg/Kg	0.08	0.091			20

King County Environmental Lab Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

Workgroup: WG108557 Total Metals

SB:WG108557-1 MB:WG108557-2 Matrix: SOLIDBLANK Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	4.8	23.8	mg/Kg	<MDL	9570	10000	105		85--115
Antimony, Total, ICP	0.71	3.57	mg/Kg	<MDL	47.6	47.1	99		85--115
Arsenic, Total, ICP	1.2	5.95	mg/Kg	<MDL	47.6	50.1	105		85--115
Beryllium, Total, ICP	0.048	0.238	mg/Kg	<MDL	47.6	50	105		85--115
Cadmium, Total, ICP	0.095	0.476	mg/Kg	<MDL	47.6	49	103		85--115
Chromium, Total, ICP	0.14	0.714	mg/Kg	<MDL	47.6	48.9	103		85--115
Copper, Total, ICP	0.19	0.952	mg/Kg	<MDL	47.6	49.4	104		85--115
Iron, Total, ICP	2.4	11.9	mg/Kg	<MDL	4810	5130	107		85--115
Lead, Total, ICP	0.95	4.76	mg/Kg	<MDL	47.6	47.6	100		85--115
Manganese, Total, ICP	0.095	0.476	mg/Kg	<MDL	238	247	104		85--115
Nickel, Total, ICP	0.24	1.19	mg/Kg	<MDL	47.6	47.2	99		85--115
Selenium, Total, ICP	1.2	5.95	mg/Kg	<MDL	47.6	45.7	96		85--115
Silver, Total, ICP	0.19	0.952	mg/Kg	<MDL	47.6	50	105		85--115
Thallium, Total, ICP	1.9	9.52	mg/Kg	<MDL	47.6	46.8	98		85--115
Zinc, Total, ICP	0.24	1.19	mg/Kg	<MDL	238	239	100		85--115

MB:WG108557-2 Matrix: SOLIDBLANK Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Aluminum, Total, ICP	4.8	23.8	mg/Kg	<MDL	
Antimony, Total, ICP	0.71	3.57	mg/Kg	<MDL	
Arsenic, Total, ICP	1.2	5.95	mg/Kg	<MDL	
Beryllium, Total, ICP	0.048	0.238	mg/Kg	<MDL	
Cadmium, Total, ICP	0.095	0.476	mg/Kg	<MDL	
Chromium, Total, ICP	0.14	0.714	mg/Kg	<MDL	
Copper, Total, ICP	0.19	0.952	mg/Kg	<MDL	
Iron, Total, ICP	2.4	11.9	mg/Kg	<MDL	
Lead, Total, ICP	0.95	4.76	mg/Kg	<MDL	
Manganese, Total, ICP	0.095	0.476	mg/Kg	<MDL	
Nickel, Total, ICP	0.24	1.19	mg/Kg	<MDL	
Selenium, Total, ICP	1.2	5.95	mg/Kg	<MDL	
Silver, Total, ICP	0.19	0.952	mg/Kg	<MDL	
Thallium, Total, ICP	1.9	9.52	mg/Kg	<MDL	
Zinc, Total, ICP	0.24	1.19	mg/Kg	<MDL	

King County Environmental Lab Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

LD:WG108557-3 L50379-2 Matrix: SALTWTRSED Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: 423062-100-4
(Lab Duplicate)

Parameter	MDL	RDL	Units	Samp Value	LD Value	RPD^	Qual	Lab Limit
Aluminum, Total, ICP	4.9	24.3	mg/Kg	12600	12600	0		20
Antimony, Total, ICP	0.73	3.64	mg/Kg	<MDL	<MDL			20
Arsenic, Total, ICP	1.2	6.07	mg/Kg	6.46	6.46	0		20
Beryllium, Total, ICP	0.049	0.243	mg/Kg	0.505	0.503	0		20
Cadmium, Total, ICP	0.097	0.486	mg/Kg	0.21	0.22			20
Chromium, Total, ICP	0.15	0.728	mg/Kg	14.5	14.2	2		20
Copper, Total, ICP	0.19	0.971	mg/Kg	34.3	34.7	1		20
Iron, Total, ICP	2.4	12.1	mg/Kg	17000	17100	1		20
Lead, Total, ICP	0.97	4.86	mg/Kg	14.4	14	3		20
Manganese, Total, ICP	0.097	0.486	mg/Kg	174	176	1		20
Nickel, Total, ICP	0.24	1.21	mg/Kg	11.9	11.7	1		20
Selenium, Total, ICP	1.2	6.07	mg/Kg	<MDL	<MDL			20
Silver, Total, ICP	0.19	0.971	mg/Kg	0.81	0.83			20
Thallium, Total, ICP	1.9	9.71	mg/Kg	<MDL	<MDL			20
Zinc, Total, ICP	0.24	1.21	mg/Kg	65.8	66.4	1		20

MS:WG108557-4 L50379-2 Matrix: SALTWTRSED Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: 423062-100-4
(Matrix Spike)

Parameter	MDL	RDL	Units	Samp Value	True Value	MS Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	5	25.1	mg/Kg	12600	10100	23300	106		75--125
Antimony, Total, ICP	0.75	3.76	mg/Kg	<MDL	50.2	13	26	*	75--125
Arsenic, Total, ICP	1.3	6.27	mg/Kg	6.46	50.2	53.1	93		75--125
Beryllium, Total, ICP	0.05	0.251	mg/Kg	0.505	50.2	47.2	93		75--125
Cadmium, Total, ICP	0.1	0.502	mg/Kg	0.21	50.2	46.7	93		75--125
Chromium, Total, ICP	0.15	0.752	mg/Kg	14.5	50.2	59.8	90		75--125
Copper, Total, ICP	0.2	1	mg/Kg	34.3	50.2	80.6	92		75--125
Iron, Total, ICP	2.5	12.5	mg/Kg	17000	5070	21100	80		75--125
Lead, Total, ICP	1	5.02	mg/Kg	14.4	50.2	57.1	85		75--125
Manganese, Total, ICP	0.1	0.502	mg/Kg	174	251	393	88		75--125
Nickel, Total, ICP	0.25	1.25	mg/Kg	11.9	50.2	55.6	87		75--125
Selenium, Total, ICP	1.3	6.27	mg/Kg	<MDL	50.2	42.6	85		75--125
Silver, Total, ICP	0.2	1	mg/Kg	0.81	50.2	49.1	96		75--125
Thallium, Total, ICP	2	10	mg/Kg	<MDL	50.2	44.7	89		75--125
Zinc, Total, ICP	0.25	1.25	mg/Kg	65.8	251	284	87		75--125

King County Environmental Lab Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

LCS:WG108557-5 Matrix: SOIL Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: NONE
(Lab Control Sample)

Parameter	MDL	RDL	Units	True Value	LCS Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	21	105	mg/Kg	8260	7450	90		61--139
Antimony, Total, ICP	3.2	15.8	mg/Kg	90.2	90.4	100		10--211
Arsenic, Total, ICP	5.3	26.3	mg/Kg	132	140	106		80--120
Beryllium, Total, ICP	0.21	1.05	mg/Kg	89.5	94.4	105		80--120
Cadmium, Total, ICP	0.42	2.1	mg/Kg	66.5	65.3	98		80--120
Chromium, Total, ICP	0.63	3.15	mg/Kg	72.9	71.1	97		79--121
Copper, Total, ICP	0.84	4.2	mg/Kg	68.5	70.1	102		80--120
Iron, Total, ICP	11	52.5	mg/Kg	13400	12400	93		50--149
Lead, Total, ICP	4.2	21	mg/Kg	130	128	98		80--120
Manganese, Total, ICP	0.42	2.1	mg/Kg	453	470	104		80--120
Nickel, Total, ICP	1.1	5.25	mg/Kg	55.6	56.8	102		80--120
Selenium, Total, ICP	5.3	26.3	mg/Kg	161	165	102		78--122
Silver, Total, ICP	0.84	4.2	mg/Kg	101	107	106		66--134
Thallium, Total, ICP	8.4	42	mg/Kg	133	132	99		77--123
Zinc, Total, ICP	1.1	5.25	mg/Kg	177	181	102		79--121

LCS:WG108557-6 Matrix: SOIL Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: NONE
(Lab Control Sample)

Parameter	MDL	RDL	Units	True Value	LCS Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	21	106	mg/Kg	8260	7210	87		61--139
Antimony, Total, ICP	3.2	15.8	mg/Kg	90.2	85.2	94		10--211
Arsenic, Total, ICP	5.3	26.4	mg/Kg	132	134	101		80--120
Beryllium, Total, ICP	0.21	1.06	mg/Kg	89.5	89.5	100		80--120
Cadmium, Total, ICP	0.42	2.11	mg/Kg	66.5	66.1	99		80--120
Chromium, Total, ICP	0.63	3.17	mg/Kg	72.9	68.5	94		79--121
Copper, Total, ICP	0.84	4.22	mg/Kg	68.5	66.1	96		80--120
Iron, Total, ICP	11	52.8	mg/Kg	13400	11900	89		50--149
Lead, Total, ICP	4.2	21.1	mg/Kg	130	124	96		80--120
Manganese, Total, ICP	0.42	2.11	mg/Kg	453	447	99		80--120
Nickel, Total, ICP	1.1	5.28	mg/Kg	55.6	53.6	96		80--120
Selenium, Total, ICP	5.3	26.4	mg/Kg	161	159	99		78--122
Silver, Total, ICP	0.84	4.22	mg/Kg	101	105	104		66--134
Thallium, Total, ICP	8.4	42.2	mg/Kg	133	136	102		77--123
Zinc, Total, ICP	1.1	5.28	mg/Kg	177	168	95		79--121

King County Environmental Lab Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

SRM:WG108557-7 Matrix: SALTWTRSED Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	21	107	mg/Kg	66200	15700	24		10--43
Chromium, Total, ICP	0.64	3.2	mg/Kg	90.7	47	52		30--70
Copper, Total, ICP	0.85	4.26	mg/Kg	310	313	101		78--118
Iron, Total, ICP	11	53.3	mg/Kg	40900	31600	77		55--95
Lead, Total, ICP	4.3	21.3	mg/Kg	183	176	96		74--114
Manganese, Total, ICP	0.43	2.13	mg/Kg	440	250	57		35--75
Nickel, Total, ICP	1.1	5.33	mg/Kg	39.5	34.9	88		51--91
Zinc, Total, ICP	1.1	5.33	mg/Kg	364	352	97		73--113

ORGANIC CHEMISTRY QC DATA

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation, Main Cap, 2010, L50379

WG108498 Semi Volatile Organics

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50379-1	423062-100-4	Duwamish Diagonal Cap Monitoring	ORBNASMS	SALTWTRSED	3/29/2010 9:30	4/13/2010 6:00	5/6/2010 15:04	WG108498-2, -5, -4, -3, -1, -6	
L50379-2	423062-100-4		ORBNASMS	SALTWTRSED	3/29/2010 9:55	4/13/2010 6:00	5/6/2010 15:43		
L50379-3	423062-100-4		ORBNASMS	SALTWTRSED	3/29/2010 10:11	4/13/2010 6:00	5/6/2010 16:21		
L50379-4	423062-100-4		ORBNASMS	SALTWTRSED	3/29/2010 10:28	4/13/2010 6:00	5/6/2010 14:26		
L50379-5	423062-100-4		ORBNASMS	SALTWTRSED	3/29/2010 10:52	4/13/2010 6:00	5/6/2010 17:00		
L50379-6	423062-100-4		ORBNASMS	SALTWTRSED	3/29/2010 10:40	4/13/2010 6:00	5/6/2010 17:39		FREP @ L50379-4
L50379-7	423062-100-4		ORBNASMS	SALTWTRSED	3/29/2010 11:20	4/13/2010 6:00	5/6/2010 18:17		
L50379-8	423062-100-4		ORBNASMS	SALTWTRSED	3/29/2010 12:05	4/13/2010 6:00	5/6/2010 18:55		
L50379-9	423062-100-4		ORBNASMS	SALTWTRSED	3/29/2010 12:24	4/13/2010 6:00	5/6/2010 19:34		
WG108498-1	MB		ORBNASMS	OTHR SOLID		4/13/2010 6:00	5/4/2010 10:13		MB100413
WG108498-2	SB		ORBNASMS	OTHR SOLID		4/13/2010 6:00	5/4/2010 10:51		WG108498-1
WG108498-3	MS		ORBNASMS	SALTWTRSED		4/13/2010 6:00	5/6/2010 9:57		L50379-5
WG108498-4	MSD		ORBNASMS	SALTWTRSED		4/13/2010 6:00	5/6/2010 10:36		WG108498-3 L50379-5
WG108498-5	LD		ORBNASMS	SALTWTRSED		4/13/2010 6:00	5/6/2010 13:47		L50379-4
WG108498-6	SRM		ORBNASMS	SALTWTRSED		4/13/2010 6:00	5/4/2010 14:03		1944

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation, Main Cap, 2010, L50379

WG108473 PCB

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50379-1	423062-100-4	Duwamish Diagonal Cap Monitoring	ORPCBLL	SALTWTRSED	3/29/2010 9:30	4/12/2010 9:00	5/6/2010 14:33	WG108473-1, -5, -6, -7, -8, -9	
L50379-2	423062-100-4		ORPCBLL	SALTWTRSED	3/29/2010 9:55	4/12/2010 9:00	5/6/2010 17:01		
L50379-3	423062-100-4		ORPCBLL	SALTWTRSED	3/29/2010 10:11	4/12/2010 9:00	5/6/2010 21:22		
L50379-4	423062-100-4		ORPCBLL	SALTWTRSED	3/29/2010 10:28	4/12/2010 9:00	5/6/2010 20:44		
L50379-5	423062-100-4		ORPCBLL	SALTWTRSED	3/29/2010 10:52	4/12/2010 9:00	5/6/2010 21:59		
L50379-6	423062-100-4		ORPCBLL	SALTWTRSED	3/29/2010 10:40	4/12/2010 9:00	5/6/2010 22:36		FREP @ L50379-4
L50379-7	423062-100-4		ORPCBLL	SALTWTRSED	3/29/2010 11:20	4/12/2010 9:00	5/6/2010 23:13		
L50379-8	423062-100-4		ORPCBLL	SALTWTRSED	3/29/2010 12:05	4/12/2010 9:00	5/6/2010 23:50		
L50379-9	423062-100-4		ORPCBLL	SALTWTRSED	3/29/2010 12:24	4/12/2010 9:00	5/7/2010 0:27		
WG108473-1	MB		ORPCBLL	OTHR SOLID		4/12/2010 9:00	5/6/2010 12:04		MB100412
WG108473-5	SB		ORPCBLL	OTHR SOLID		4/12/2010 9:00	5/6/2010 15:10		WG108473-1
WG108473-6	MS		ORPCBLL	SALTWTRSED		4/12/2010 9:00	5/6/2010 15:47		L50379-2
WG108473-7	MSD		ORPCBLL	SALTWTRSED		4/12/2010 9:00	5/6/2010 16:24		WG108473-6 L50379-2
WG108473-8	LD		ORPCBLL	SALTWTRSED		4/12/2010 9:00	5/6/2010 20:07		L50379-4
WG108473-9	SRM		ORPCBLL	OTHR SOLID		4/12/2010 9:00	5/6/2010 17:39		HS-2

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation, Main Cap, 2010, L50379

WG108462 Pesticides

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50379-1	423062-100-4	Duwamish Diagonal Cap Monitoring	ORPESTLL	SALTWTRSED	3/29/2010 9:30	4/11/2010 6:00	4/29/2010 9:31	WG108462-1, -2, -3, -4, -5, -6	
L50379-2	423062-100-4		ORPESTLL	SALTWTRSED	3/29/2010 9:55	4/11/2010 6:00	4/29/2010 10:45		
L50379-3	423062-100-4		ORPESTLL	SALTWTRSED	3/29/2010 10:11	4/11/2010 6:00	4/29/2010 13:51		
L50379-4	423062-100-4		ORPESTLL	SALTWTRSED	3/29/2010 10:28	4/11/2010 6:00	4/29/2010 14:28		
L50379-5	423062-100-4		ORPESTLL	SALTWTRSED	3/29/2010 10:52	4/11/2010 6:00	4/29/2010 15:05		
L50379-6	423062-100-4		ORPESTLL	SALTWTRSED	3/29/2010 10:40	4/11/2010 6:00	4/29/2010 15:42		FREP @ L50379-4
L50379-7	423062-100-4		ORPESTLL	SALTWTRSED	3/29/2010 11:20	4/11/2010 6:00	4/29/2010 16:20		
L50379-8	423062-100-4		ORPESTLL	SALTWTRSED	3/29/2010 12:05	4/11/2010 6:00	4/29/2010 16:57		
L50379-9	423062-100-4		ORPESTLL	SALTWTRSED	3/29/2010 12:24	4/11/2010 6:00	4/29/2010 17:34		
WG108462-1	MB		ORPESTLL	OTHR SOLID		4/11/2010 6:00	4/29/2010 7:02		MB100411
WG108462-2	SB		ORPESTLL	OTHR SOLID		4/11/2010 6:00	4/29/2010 7:39		WG108462-1
WG108462-3	MS		ORPESTLL	SALTWTRSED		4/11/2010 6:00	4/29/2010 8:16		L50379-1
WG108462-4	MSD		ORPESTLL	SALTWTRSED		4/11/2010 6:00	4/29/2010 8:54		WG108462-3 L50379-1
WG108462-5	LD		ORPESTLL	SALTWTRSED		4/11/2010 6:00	4/29/2010 10:08		L50379-2
WG108462-6	SRM		ORPESTLL	OTHR SOLID		4/11/2010 6:00	4/29/2010 13:14		1944

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

Workgroup: WG108498 Semi Volatile Organics

MB:WG108498-1 Matrix: OTHR SOLID Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: NONE
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
1,2,4-Trichlorobenzene	0.1	0.2	ug/Kg	<MDL	
1,2-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	
1,3-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	
1,4-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	
2,4-Dimethylphenol	1	2	ug/Kg	<MDL	
2-Methylnaphthalene	2	4	ug/Kg	<MDL	
2-Methylphenol	2	4	ug/Kg	<MDL	
4-Methylphenol	4	8	ug/Kg	<MDL	
Acenaphthene	2	4	ug/Kg	<MDL	
Acenaphthylene	2	4	ug/Kg	<MDL	
Anthracene	2	4	ug/Kg	<MDL	
Benzo(a)anthracene	2	4	ug/Kg	<MDL	
Benzo(a)pyrene	2	4	ug/Kg	<MDL	
Benzo(b)fluoranthene	2	4	ug/Kg	<MDL	
Benzo(g,h,i)perylene	2	4	ug/Kg	<MDL	
Benzo(k)fluoranthene	2	4	ug/Kg	<MDL	
Benzoic Acid	10	20	ug/Kg	<MDL	
Benzyl Alcohol	2	4	ug/Kg	<MDL	
Benzyl Butyl Phthalate	1	2	ug/Kg	<MDL	
Bis(2-Ethylhexyl)Phthalate	4	8	ug/Kg	11.4	B
Caffeine	4	8	ug/Kg	<MDL	
Carbazole	2	4	ug/Kg	<MDL	
Chrysene	2	4	ug/Kg	<MDL	
Coprostanol	40	80	ug/Kg	<MDL	
Di-N-Butyl Phthalate	4	8	ug/Kg	12.5	B
Di-N-Octyl Phthalate	4	8	ug/Kg	<MDL	
Dibenzo(a,h)anthracene	2	4	ug/Kg	<MDL	
Dibenzofuran	2	4	ug/Kg	<MDL	
Diethyl Phthalate	4	8	ug/Kg	<MDL	
Dimethyl Phthalate	4	8	ug/Kg	<MDL	
Fluoranthene	2	4	ug/Kg	<MDL	
Fluorene	2	4	ug/Kg	<MDL	
Hexachlorobenzene	0.1	0.2	ug/Kg	<MDL	
Hexachlorobutadiene	0.5	1	ug/Kg	<MDL	
Hexachloroethane	1	2	ug/Kg	<MDL	
Indeno(1,2,3-Cd)Pyrene	2	4	ug/Kg	<MDL	
N-Nitrosodiphenylamine	4	8	ug/Kg	<MDL	
Naphthalene	2	4	ug/Kg	<MDL	
Pentachlorophenol	10	20	ug/Kg	<MDL	
Phenanthrene	2	4	ug/Kg	<MDL	

Phenol	4	8	ug/Kg	<MDL
Pyrene	2	4	ug/Kg	<MDL
Total HPAHS	2	4	ug/Kg	<MDL
Total LPAHs	2	4	ug/Kg	<MDL

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

SB:WG108498-2 MB:WG108498-1 Matrix: OTHR SOLID Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
1,2,4-Trichlorobenzene	0.1	0.2	ug/Kg	<MDL	375	180	48		30--110
1,2-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	228	61		10--116
1,3-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	234	62		18--95
1,4-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	204	54		21--99
2,4-Dimethylphenol	1	2	ug/Kg	<MDL	375	78.7	21		10--81
2-Methylnaphthalene	2	4	ug/Kg	<MDL	375	195	52		22--99
2-Methylphenol	2	4	ug/Kg	<MDL	375	161	43		16--91
4-Methylphenol	4	8	ug/Kg	<MDL	375	209	56		10--125
Acenaphthene	2	4	ug/Kg	<MDL	375	277	74		29--102
Acenaphthylene	2	4	ug/Kg	<MDL	375	285	76		31--101
Anthracene	2	4	ug/Kg	<MDL	375	309	82		45--114
Benzo(a)anthracene	2	4	ug/Kg	<MDL	375	371	99		69--117
Benzo(a)pyrene	2	4	ug/Kg	<MDL	375	331	88		15--137
Benzo(b)fluoranthene	2	4	ug/Kg	<MDL	375	347	92		50--121
Benzo(g,h,i)perylene	2	4	ug/Kg	<MDL	375	336	90		46--126
Benzo(k)fluoranthene	2	4	ug/Kg	<MDL	375	354	94		58--128
Benzoic Acid	10	20	ug/Kg	<MDL	375	162	43		10--170
Benzyl Alcohol	2	4	ug/Kg	<MDL	375	282	75		10--119
Benzyl Butyl Phthalate	1	2	ug/Kg	<MDL	375	415	111		15--183
Bis(2-Ethylhexyl)Phthalate	4	8	ug/Kg	11.4	375	395	102		10--182
Caffeine	4	8	ug/Kg	<MDL	375	349	93		45--159
Carbazole	2	4	ug/Kg	<MDL	375	346	92		44--179
Chrysene	2	4	ug/Kg	<MDL	375	322	86		69--111
Coprostanol	40	80	ug/Kg	<MDL	3750	789	21		10--159
Di-N-Butyl Phthalate	4	8	ug/Kg	12.5	375	345	89		17--180
Di-N-Octyl Phthalate	4	8	ug/Kg	<MDL	375	405	108		10--200
Dibenzo(a,h)anthracene	2	4	ug/Kg	<MDL	375	361	96		53--129
Dibenzofuran	2	4	ug/Kg	<MDL	375	275	73		37--97
Diethyl Phthalate	4	8	ug/Kg	<MDL	375	360	96		51--118
Dimethyl Phthalate	4	8	ug/Kg	<MDL	375	348	93		38--114
Fluoranthene	2	4	ug/Kg	<MDL	375	358	96		55--132
Fluorene	2	4	ug/Kg	<MDL	375	314	84		39--106
Hexachlorobenzene	0.1	0.2	ug/Kg	<MDL	375	297	79		40--111
Hexachlorobutadiene	0.5	1	ug/Kg	<MDL	375	186	50		10--97
Hexachloroethane	1	2	ug/Kg	<MDL	375	244	65		17--92
Indeno(1,2,3-Cd)Pyrene	2	4	ug/Kg	<MDL	375	361	96		51--132
N-Nitrosodiphenylamine	4	8	ug/Kg	<MDL	375	302	80		11--148
Naphthalene	2	4	ug/Kg	<MDL	375	193	51		17--94
Pentachlorophenol	10	20	ug/Kg	<MDL	375	309	82		38--124
Phenanthrene	2	4	ug/Kg	<MDL	375	312	83		57--104
Phenol	4	8	ug/Kg	<MDL	375	219	58		10--107
Pyrene	2	4	ug/Kg	<MDL	375	342	91		48--132

Total HPAHS	2	4	ug/Kg	<MDL	3750	3480	93	50--150
Total LPAHs	2	4	ug/Kg	<MDL	2630	1890	72	50--150

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

MSD:WG108498-4 MS:WG108498-3 L50379-5 Matrix: SALTWTRSED Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: NONE
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
1,2,4-Trichlorobenzene	0.1	0.2	ug/Kg	<MDL	375	165	44		10--115	375	171	46		4		100
1,2-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	199	53		10--105	375	206	55		4		100
1,3-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	205	55		10--103	375	207	55		0		100
1,4-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	178	48		10--104	375	184	49		2		100
2,4-Dimethylphenol	1	2	ug/Kg	<MDL	375	131	35		10--150	375	152	40		13		100
2-Methylnaphthalene	2	4	ug/Kg	<MDL	375	192	51		22--112	375	192	51		0		100
2-Methylphenol	2	4	ug/Kg	<MDL	375	209	56		10--142	375	216	57		2		100
4-Methylphenol	4	8	ug/Kg	<MDL	375	223	59		10--163	375	239	64		8		100
Acenaphthene	2	4	ug/Kg	<MDL	375	293	78		25--130	375	290	77		1		100
Acenaphthylene	2	4	ug/Kg	<MDL	375	302	81		27--132	375	301	80		1		100
Anthracene	2	4	ug/Kg	7.01	375	355	93		10--181	375	342	89		4		100
Benzo(a)anthracene	2	4	ug/Kg	26.7	375	452	113		32--168	375	395	98		14		100
Benzo(a)pyrene	2	4	ug/Kg	24.1	375	404	101		10--200	375	365	91		10		100
Benzo(b)fluoranthene	2	4	ug/Kg	29	375	427	106		10--199	375	387	96		10		100
Benzo(g,h,i)perylene	2	4	ug/Kg	15	375	341	87		10--173	375	302	77		12		100
Benzo(k)fluoranthene	2	4	ug/Kg	26.5	375	391	97		10--192	375	357	88		10		100
Benzoic Acid	10	20	ug/Kg	50.3	375	271	59		10--158	375	283	62		5		100
Benzyl Alcohol	2	4	ug/Kg	<MDL	375	228	61		10--138	375	255	68		11		100
Benzyl Butyl Phthalate	1	2	ug/Kg	14.1	375	464	120		41--145	375	449	116		3		100
Bis(2-Ethylhexyl)Phthalate	4	8	ug/Kg	76.7	375	490	110		10--189	375	513	116		5		100
Caffeine	4	8	ug/Kg	<MDL	375	387	103		17--195	375	398	106		3		100
Carbazole	2	4	ug/Kg	4.58	375	362	95		16--200	375	360	95		0		100
Chrysene	2	4	ug/Kg	32.7	375	384	94		14--184	375	341	82		14		100
Coprostanol	40	80	ug/Kg	<MDL	3750	2080	56		10--183	3750	1870	50		11		100
Di-N-Butyl Phthalate	4	8	ug/Kg	14.3	375	375	96		10--194	375	378	97		1		100
Di-N-Octyl Phthalate	4	8	ug/Kg	<MDL	375	448	119		52--151	375	476	127		7		100
Dibenzo(a,h)anthracene	2	4	ug/Kg	5.56	375	363	95		10--166	375	331	87		9		100
Dibenzofuran	2	4	ug/Kg	<MDL	375	289	77		21--134	375	288	77		0		100
Diethyl Phthalate	4	8	ug/Kg	<MDL	375	381	102		31--150	375	383	102		0		100
Dimethyl Phthalate	4	8	ug/Kg	<MDL	375	346	92		13--162	375	353	94		2		100
Fluoranthene	2	4	ug/Kg	65.9	375	551	129		12--188	375	435	98		27		100
Fluorene	2	4	ug/Kg	<MDL	375	335	89		22--147	375	325	87		2		100
Hexachlorobenzene	0.1	0.2	ug/Kg	<MDL	375	314	84		18--151	375	309	82		2		100
Hexachlorobutadiene	0.5	1	ug/Kg	<MDL	375	170	45		10--97	375	176	47		4		100
Hexachloroethane	1	2	ug/Kg	<MDL	375	208	55		10--89	375	221	59		7		100
Indeno(1,2,3-Cd)Pyrene	2	4	ug/Kg	14.4	375	377	97		10--177	375	333	85		13		100
N-Nitrosodiphenylamine	4	8	ug/Kg	<MDL	375	301	80		10--169	375	332	89		11		100
Naphthalene	2	4	ug/Kg	<MDL	375	182	48		12--97	375	182	48		0		100
Pentachlorophenol	10	20	ug/Kg	<MDL	375	387	103		17--170	375	390	104		1		100
Phenanthrene	2	4	ug/Kg	20	375	425	108		10--200	375	339	85		24		100
Phenol	4	8	ug/Kg	<MDL	375	235	63		10--127	375	250	67		6		100
Pyrene	2	4	ug/Kg	44.9	375	476	115		20--174	375	352	82		34		100

Total HPAHS	2	4	ug/Kg	285	3750	4170	104	50--150	3750	3600	88	17	100
Total LPAHs	2	4	ug/Kg	31.1	2630	2080	78	50--150	2630	1970	74	5	100

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

LD:WG108498-5 L50379-4 Matrix: SALTWTRSED Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: 423062-100-4
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD^	Qual	Lab Limit
1,2,4-Trichlorobenzene	0.1	0.2	ug/Kg	<MDL	<MDL			35
1,2-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	<MDL			35
1,3-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	<MDL			35
1,4-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	<MDL			35
2,4-Dimethylphenol	1	2	ug/Kg	<MDL	<MDL			35
2-Methylnaphthalene	2	4	ug/Kg	2	<MDL			35
2-Methylphenol	2	4	ug/Kg	<MDL	<MDL			35
4-Methylphenol	4	8	ug/Kg	<MDL	<MDL			35
Acenaphthene	2	4	ug/Kg	4.99	4.44	12		35
Acenaphthylene	2	4	ug/Kg	2.4	2.1			35
Anthracene	2	4	ug/Kg	26.4	22	18		35
Benzo(a)anthracene	2	4	ug/Kg	80.8	71.7	12		35
Benzo(a)pyrene	2	4	ug/Kg	68.7	70.9	3		35
Benzo(b)fluoranthene	2	4	ug/Kg	81	86.4	7		35
Benzo(g,h,i)perylene	2	4	ug/Kg	41.1	46.4	12		35
Benzo(k)fluoranthene	2	4	ug/Kg	74	79.2	7		35
Benzoic Acid	10	20	ug/Kg	59.6	58.7	2		35
Benzyl Alcohol	2	4	ug/Kg	<MDL	<MDL			35
Benzyl Butyl Phthalate	1	2	ug/Kg	142	128	10		35
Bis(2-Ethylhexyl)Phthalate	4	8	ug/Kg	253	285	12		35
Caffeine	4	8	ug/Kg	<MDL	<MDL			35
Carbazole	2	4	ug/Kg	11.2	14.8	27		35
Chrysene	2	4	ug/Kg	91.5	98.8	8		35
Coprostanol	40	80	ug/Kg	<MDL	<MDL			35
Di-N-Butyl Phthalate	4	8	ug/Kg	18	20.5	13		35
Di-N-Octyl Phthalate	4	8	ug/Kg	<MDL	<MDL			35
Dibenzo(a,h)anthracene	2	4	ug/Kg	14.2	15.7	10		35
Dibenzofuran	2	4	ug/Kg	2.8	2.5			35
Diethyl Phthalate	4	8	ug/Kg	<MDL	<MDL			35
Dimethyl Phthalate	4	8	ug/Kg	<MDL	<MDL			35
Fluoranthene	2	4	ug/Kg	178	181	2		35
Fluorene	2	4	ug/Kg	8.4	6.51	25		35
Hexachlorobenzene	0.1	0.2	ug/Kg	<MDL	<MDL			35
Hexachlorobutadiene	0.5	1	ug/Kg	<MDL	<MDL			35
Hexachloroethane	1	2	ug/Kg	<MDL	<MDL			35
Indeno(1,2,3-Cd)Pyrene	2	4	ug/Kg	36.8	40.6	10		35
N-Nitrosodiphenylamine	4	8	ug/Kg	<MDL	<MDL			35
Naphthalene	2	4	ug/Kg	3.5	2.6			35
Pentachlorophenol	10	20	ug/Kg	<MDL	<MDL			35
Phenanthrene	2	4	ug/Kg	84.2	65.2	25		35
Phenol	4	8	ug/Kg	214	176	20		35
Pyrene	2	4	ug/Kg	137	140	3		35

Total HPAHS	2	4	ug/Kg	803	831	3	35
Total LPAHs	2	4	ug/Kg	132	104	24	35

SRM:WG108498-6 Matrix: SALTWTRSED Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Anthracene	270	533	ug/Kg	1750	628	36		28--98
Benzo(a)anthracene	270	533	ug/Kg	4660	3420	73		66--124
Benzo(a)pyrene	270	533	ug/Kg	4240	2880	68		60--116
Benzo(b)fluoranthene	270	533	ug/Kg	3820	2610	68		52--190
Benzo(g,h,i)perylene	270	533	ug/Kg	2800	1820	65		15--120
Benzo(k)fluoranthene	270	533	ug/Kg	2270	1980	87		60--146
Chrysene	270	533	ug/Kg	4800	4080	85		77--136
Dibenzo(a,h)anthracene	270	533	ug/Kg	419	693	166		10--200
Fluoranthene	270	533	ug/Kg	8800	5490	62		45--126
Indeno(1,2,3-Cd)Pyrene	270	533	ug/Kg	2740	1690	62		33--121
Naphthalene	130	533	ug/Kg	1630	260	16		10--29
Phenanthrene	270	533	ug/Kg	5200	2930	56		51--106
Pyrene	270	533	ug/Kg	9570	6960	73		36--135

Surrogate: (Lab Limits)	2,4,6-Tribromo phenol 29--112	2-Fluoro biphenyl 31--101	2-Fluoro phenol 10--112	d14-Ter phenyl 51--130	d4-1,2-Dichloro benzene 24--91	d4-2-Chloro phenol 11--105	d5-Nitro benzene 28--94	d5-Phenol 10--106
L50379-1	79	69	44	59	39	49	57	62
L50379-2	105	66	49	89	39	50	56	63
L50379-3	109	63	44	93	41	49	53	59
L50379-4	103	73	63	87	57	64	71	74
L50379-5	75	46	52	85	39	44	50	50
L50379-6	100	77	32	93	50	57	65	71
L50379-7	106	57	46	88	36	42	55	49
L50379-8	105	62	32	87	39	46	53	54
L50379-9	87	67	44	88	43	45	54	49
WG108498-1	33	75	33	89	71	48	82	61
WG108498-2	86	68	47	87	89	65	55	71
WG108498-3	93	62	53	85	82	53	46	58
WG108498-4	103	65	60	83	86	57	48	64
WG108498-5	96	59	44	84	40	48	54	55
WG108498-6	66	46	48	64	44	50	55	55

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

Workgroup: WG108473 PCB

MB:WG108473-1 Matrix: OTHR SOLID Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: NONE
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Aroclor 1016	1	2	ug/Kg	<MDL	
Aroclor 1221	2	4	ug/Kg	<MDL	
Aroclor 1232	2	4	ug/Kg	<MDL	
Aroclor 1242	1	2	ug/Kg	<MDL	
Aroclor 1248	1	2	ug/Kg	<MDL	
Aroclor 1254	1	2	ug/Kg	<MDL	
Aroclor 1260	1	2	ug/Kg	<MDL	
Total Aroclors	1	2	ug/Kg	<MDL	

SB:WG108473-5 MB:WG108473-1 Matrix: OTHR SOLID Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Aroclor 1016	1	2	ug/Kg	<MDL	100	67.8	68		39--121
Aroclor 1260	1	2	ug/Kg	<MDL	100	72.3	72		53--140

MSD:WG108473-7 MS:WG108473-6 L50379-2 Matrix: SALTWTRSED Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: 423062-100-4
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Aroclor 1016	1	2	ug/Kg	<MDL	100	66.1	66		32--164	100	66.9	67		2		35
Aroclor 1260	1	2	ug/Kg	8.78	100	72.5	64		28--144	100	77.6	69		8		35

LD:WG108473-8 L50379-4 Matrix: SALTWTRSED Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: 423062-100-4
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD^	Qual	Lab Limit
Aroclor 1016	6	12	ug/Kg	<MDL	<MDL			35
Aroclor 1221	2	4	ug/Kg	<MDL	<MDL			35
Aroclor 1232	6	12	ug/Kg	<MDL	<MDL			35
Aroclor 1242	1	2	ug/Kg	7	6.06	14		35
Aroclor 1248	18	36	ug/Kg	<MDL	<MDL			35
Aroclor 1254	1	2	ug/Kg	14.6	15.8	8		35
Aroclor 1260	1	2	ug/Kg	9.34	10.2	9		35
Total Aroclors	1	2	ug/Kg	31	32.1	4		35

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

SRM:WG108473-9 Matrix: OTHR SOLID Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Aroclor 1254	2.7	5.33	ug/Kg	112	92.7	83		57--139

Surrogate: (Lab Limits)	2,4,5,6-Tetra chloro m-xylene 10--118	Deca chloro biphenyl 12--158
L50379-1	59	85
L50379-2	61	80
L50379-3	64	75
L50379-4	63	81
L50379-5	64	88
L50379-6	73	80
L50379-7	75	86
L50379-8	67	79
L50379-9	75	79
WG108473-1	43	87
WG108473-5	58	78
WG108473-6	60	76
WG108473-7	61	81
WG108473-8	62	79
WG108473-9	57	94

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

Workgroup: WG108462 Pesticides

MB:WG108462-1 Matrix: OTHR SOLID Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: NONE
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
4,4'-DDD	1	2	ug/Kg	<MDL	
4,4'-DDE	1	2	ug/Kg	<MDL	
4,4'-DDT	1	2	ug/Kg	<MDL	
Aldrin	1	2	ug/Kg	<MDL	
Alpha-BHC	0.5	1	ug/Kg	<MDL	
Alpha-Chlordane	0.5	1	ug/Kg	<MDL	
Beta-BHC	0.5	1	ug/Kg	<MDL	
Delta-BHC	0.5	1	ug/Kg	<MDL	
Dieldrin	1	2	ug/Kg	<MDL	
Endosulfan I	1	2	ug/Kg	<MDL	
Endosulfan II	1	2	ug/Kg	<MDL	
Endosulfan Sulfate	1	2	ug/Kg	<MDL	
Endrin	1	2	ug/Kg	<MDL	
Endrin Aldehyde	1	2	ug/Kg	<MDL	
Gamma-BHC (Lindane)	0.5	1	ug/Kg	<MDL	
Gamma-Chlordane	0.5	1	ug/Kg	<MDL	
Heptachlor	0.5	1	ug/Kg	<MDL	
Heptachlor Epoxide	0.5	1	ug/Kg	<MDL	
Methoxychlor	5	10	ug/Kg	<MDL	
Toxaphene	10	20	ug/Kg	<MDL	

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

SB:WG108462-2 MB:WG108462-1 Matrix: OTHR SOLID Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
4,4'-DDD	1	2	ug/Kg	<MDL	10	8.87	89		78--121
4,4'-DDE	1	2	ug/Kg	<MDL	10	9.06	91		75--111
4,4'-DDT	1	2	ug/Kg	<MDL	10	7.95	80		57--145
Aldrin	1	2	ug/Kg	<MDL	10	7.01	70		28--113
Alpha-BHC	0.5	1	ug/Kg	<MDL	10	7.4	74		20--99
Beta-BHC	0.5	1	ug/Kg	<MDL	10	8.63	86		66--102
Delta-BHC	0.5	1	ug/Kg	<MDL	10	8.83	88		63--108
Dieldrin	1	2	ug/Kg	<MDL	10	8.88	89		58--139
Endosulfan I	1	2	ug/Kg	<MDL	10	8.3	83		62--104
Endosulfan II	1	2	ug/Kg	<MDL	10	8.83	88		72--109
Endosulfan Sulfate	1	2	ug/Kg	<MDL	10	7.91	79		61--104
Endrin	1	2	ug/Kg	<MDL	10	10.5	105		60--160
Endrin Aldehyde	1	2	ug/Kg	<MDL	10	1.2	12		10--77
Gamma-BHC (Lindane)	0.5	1	ug/Kg	<MDL	10	7.8	78		27--130
Heptachlor	0.5	1	ug/Kg	<MDL	10	12.1	121		20--137
Heptachlor Epoxide	0.5	1	ug/Kg	<MDL	10	8.39	84		59--107
Methoxychlor	5	10	ug/Kg	<MDL	10	10.1	101		72--131

MSD:WG108462-4 MS:WG108462-3 L50379-1 Matrix: SALTWTRSED Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: 423062-100-4
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
4,4'-DDD	1	2	ug/Kg	<MDL	10	8.61	86		41--157	10	8.89	89		3		35
4,4'-DDE	1	2	ug/Kg	<MDL	10	9.31	93		59--125	10	8.95	90		3		35
4,4'-DDT	1	2	ug/Kg	<MDL	10	7.51	75		50--144	10	6.7	67		11		35
Aldrin	1	2	ug/Kg	<MDL	10	7.49	75		61--119	10	7.2	72		4		35
Alpha-BHC	0.5	1	ug/Kg	<MDL	10	9.52	95		59--111	10	9.36	94		1		35
Beta-BHC	0.5	1	ug/Kg	<MDL	10	8.47	85		60--119	10	8.4	84		1		35
Delta-BHC	0.5	1	ug/Kg	<MDL	10	8.7	87		54--126	10	8.44	84		4		35
Dieldrin	1	2	ug/Kg	<MDL	10	8.1	81		60--139	10	7.7	77		5		35
Endosulfan I	1	2	ug/Kg	<MDL	10	7.74	77		64--113	10	7.41	74		4		35
Endosulfan II	1	2	ug/Kg	<MDL	10	6.41	64		36--146	10	6.88	69		8		35
Endosulfan Sulfate	1	2	ug/Kg	<MDL	10	6.3	63		46--113	10	6.06	61		3		35
Endrin	1	2	ug/Kg	<MDL	10	9.46	95		62--166	10	9.11	91		4		35
Endrin Aldehyde	1	2	ug/Kg	<MDL	10	1.5	15		10--66	10	1.2	12		22		35
Gamma-BHC (Lindane)	0.5	1	ug/Kg	<MDL	10	8.74	87		61--135	10	8.51	85		2		35
Heptachlor	0.5	1	ug/Kg	<MDL	10	8.64	86		52--157	10	8.19	82		5		35
Heptachlor Epoxide	0.5	1	ug/Kg	<MDL	10	7.77	78		61--118	10	7.52	75		4		35
Methoxychlor	5	10	ug/Kg	<MDL	10	9.1	91		53--129	10	8.3	83		9		35

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

LD:WG108462-5 L50379-2 Matrix: SALTWTRSED Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: 423062-100-4
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD^	Qual	Lab Limit
4,4'-DDD	1	2	ug/Kg	<MDL	<MDL			35
4,4'-DDE	1	2	ug/Kg	<MDL	<MDL			35
4,4'-DDT	1	2	ug/Kg	<MDL	<MDL			35
Aldrin	1	2	ug/Kg	<MDL	<MDL			35
Alpha-BHC	0.5	1	ug/Kg	<MDL	<MDL			35
Alpha-Chlordane	0.5	1	ug/Kg	<MDL	<MDL			35
Beta-BHC	0.5	1	ug/Kg	<MDL	<MDL			35
Delta-BHC	0.5	1	ug/Kg	<MDL	<MDL			35
Dieldrin	1	2	ug/Kg	<MDL	<MDL			35
Endosulfan I	1	2	ug/Kg	<MDL	<MDL			35
Endosulfan II	1	2	ug/Kg	<MDL	<MDL			35
Endosulfan Sulfate	1	2	ug/Kg	<MDL	<MDL			35
Endrin	1	2	ug/Kg	<MDL	<MDL			35
Endrin Aldehyde	1	2	ug/Kg	<MDL	<MDL			35
Gamma-BHC (Lindane)	0.5	1	ug/Kg	<MDL	<MDL			35
Gamma-Chlordane	0.5	1	ug/Kg	<MDL	<MDL			35
Heptachlor	0.5	1	ug/Kg	<MDL	<MDL			35
Heptachlor Epoxide	0.5	1	ug/Kg	<MDL	<MDL			35
Methoxychlor	5	10	ug/Kg	<MDL	<MDL			35
Toxaphene	10	20	ug/Kg	<MDL	<MDL			35

SRM:WG108462-6 Matrix: OTHR SOLID Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
4,4'-DDT	5.3	10.7	ug/Kg	119	135	113		10--200
Alpha-Chlordane	2.7	5.33	ug/Kg	16.5	19.5	118		48--144

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
Main Cap, 2010, L50379

Surrogate: (Lab Limits)	2,4,5,6-Tetra chloro m-xylene 10--118	Deca chloro biphenyl 12--158
L50379-1	81	86
L50379-2	81	84
L50379-3	67	85
L50379-4	85	88
L50379-5	75	83
L50379-6	76	82
L50379-7	81	87
L50379-8	74	75
L50379-9	74	87
WG108462-1	47	85
WG108462-2	62	87
WG108462-3	76	77
WG108462-4	76	76
WG108462-5	65	82
WG108462-6	81	108

CHAIN OF CUSTODY FORMS

Login: P50379 DUDI SEDS, STAS. A,B, ON-CAP Personnel:_____

Project: 423062-100-4

CHAIN OF CUSTODY

RELINQUISHED BY	Date 3/29/10	Time 1545
RECEIVED BY	Date 3/29/10	Time 1545
Sample Number(s) 50379-1 → 9		(All)

SAMPLENUM	P50379-1	P50379-2	P50379-3
QC LINK			
LOCATOR	DUD_1A	DUD_2A	DUD_3A
Short Loc. Desc.	DUD_1A	DUD_2A	DUD_3A
Locator Desc	CLEANUP AREA A MONITORING LOCATION 1A	CLEANUP AREA A MONITORING LOCATION 2A	CLEANUP AREA A MONITORING LOCATION 3A
SITE	DUWAMISH RIVER	DUWAMISH RIVER	DUWAMISH RIVER
COMMENTS	3 Grab Comp, 0-10 cm	3 Grab Comp, 0-10 cm	3 Grab Comp, 0-10 cm
Start Date/Time	3/29/10 0930	→ 0955	→ 1011
End Date/Time			
Time Span			
Sample Depth			
SAMP FUNC	**********	**********	**********
PERSONNEL	SH, JO, JB, BK, JDD	→	→
SAMP METH	20143		
SED DEPTH	11, 11, 12	15, 15, 15	15, 15, 12
SED SAMP RANGE	0-10	0-10	0-10
SED TYPE	34W17	12W31	12N32
TIDE COND	E	E	E
TIDE HT	3.2	2.3	1.8
Dept. Matrix Prod	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL

several small Crabs + polychaetes in all grabs

some tube worms

a few tube worms

SAMPLENUM	P50379-4	P50379-5	P50379-6
QC LINK			
LOCATOR	DUD_4A	DUD_5A	DUD_~~5A~~ 4A
Short Loc. Desc.	DUD_4A	DUD_5A	DUD_~~5A~~ 4A
Locator Desc	CLEANUP AREA A MONITORING LOCATION 4A	CLEANUP AREA A MONITORING LOCATION 5A	CLEANUP AREA A MONITORING LOCATION ~~5A~~ 4A
SITE	DUWAMISH RIVER	DUWAMISH RIVER	DUWAMISH RIVER
COMMENTS	3 Grab Comp, 0-10 cm	3 Grab Comp, 0-10 cm, AREP	3 Grab Comp, 0-10 cm, FREP
Start Date/Time	3/29/10 1028	→ 1052	→ 1040
End Date/Time			
Time Span		Multiple tries to get fuller grabs accepting < 11 cm	
Sample Depth			
SAMP FUNC	**********	**********	FREP @ 50379-4
PERSONNEL	SH, JO, BK, JB, JDD	→	→
SAMP METH			
SED DEPTH	12, 11, 12	9, 10, 10	11, 12, 11
SED SAMP RANGE	0-10	0-10 cm	0-10
SED TYPE	13N32	34S21	13N32
TIDE COND	S	S	S
TIDE HT	1.6	1.2	1.4
Dept. Matrix Prod	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL

no critters observed

a bit more gravel than AREP

no critters observed

Login: P50379 DUDI SEDS, STAS. A,B, ON-CAP Personnel:_____

Project: 423062-100-4

SAMPLENUM	P50379-7	P50379-8	P50379-9
QC LINK			
LOCATOR	DUD_1B	DUD_2B	DUD_3B
Short Loc. Desc.	DUD_1B	DUD_2B	DUD_3B
Locator Desc	CLEANUP AREA A MONITORING LOCATION 1B	CLEANUP AREA A MONITORING LOCATION 2B	CLEANUP AREA A MONITORING LOCATION 3B
SITE	DUWAMISH RIVER	DUWAMISH RIVER	DUWAMISH RIVER
COMMENTS	3 Grab Comp, 0-10 cm	3 Grab Comp, 0-10 cm	3 Grab Comp, 0-10 cm
Start Date/Time	3/29/10 1120	→ 1205	→ 1224
End Date/Time			
Time Span			
Sample Depth			
SAMP FUNC	**********	**********	**********
PERSONNEL	JO, SH, JB, BK, JDD	→	→
SAMP METH			
SED DEPTH	15, 15, 15	13, 15, 15	15, 15, 15
SED SAMP RANGE	0-10 cm	0-10 cm	0-10 cm
SED TYPE	12N31	12N31	12N31
TIDE COND	S	F	F
TIDE HT	1.1	1.6	2.0
Dept. Matrix Prod	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL

a few tube worms

LABORATORY WORK ORDER
Chain of Custody

Project Name: Duwamish/Diagonal Sediments
Project Number: 423062-200-4
Laboratory Project Manager: Fritz Grothkopp/Bob Kruger
Telephone Number: 684 2327/2384

King County Department of Natural Resources
Water and Land Resources Division
Environmental Laboratory
322 West Ewing Street
Seattle, Washington 98119-1507

Sample Number (Note: Use only one Login No. per sheet.)	Client Locator	Collect Date	Collect Time	TOC/TOTS	PSD	Metals-ICP/HG-CVAA-M	BNASMS/PESTLL/PCBLL											Number of Containers	Comments
L 50379 - 1	DUD-1A	3/29/10	0930	X	X	X	X											4	
L 50379 - 2	DUD-2A	3/29/10	0955	X	X	X	X											4	
L 50379 - 3	DUD-3A	3/29/10	1011	X	X	X	X											4	
L 50379 - 4	DUD-4A	3/29/10	1028	X	X	X	X											4	
L 50379 - 5	DUD-5A	3/29/10	1052	X	X	X	X											4	
L 50379 - 6	DUD-4A	3/29/10	1040	X	X	X	X											5	FREP
L 50379 - 7	DUD-1B	3/29/10	1120	X	X	X	X											4	
L 50379 - 8	DUD-2B	3/29/10	1205	X	X	X	X											4	
L 50379 - 9	DUD-3B	3/29/10	1224	X	X	X	X											4	
L -																			
L -																			

Analyses

Additional Comments:

Total Number of Containers 37

Sampled By: SH JB JD, JDD BH

Relinquished By:
Signature [signature] Date 3/29/10
Printed Name Bob Kruger Time 1545
Organization King County Environmental Laboratory

Received By:
Signature [signature] Date 3-29-10
Printed Name 3 Jason Kinnard Time 1545
Organization King County Environmental Laboratory

Appendix A2 – ENR 2010

KING COUNTY ENVIRONMENTAL LABORATORY
QUALITY ASSURANCE REVIEW

For

ESTUARINE SEDIMENT ANALYTICAL DATA

DUWAMISH/DIAGONAL SEDIMENT REMEDIATION PROJECT
YEAR FIVE, ENR CAP SEDIMENT CHARACTERIZATION
MARCH 2010 SAMPLING EVENT

Prepared by:

Fritz Grothkopp
Laboratory Project Manager

Date: 7-28-10

Reviewed by:

Colin Elliott
Quality Assurance Officer

Date: 7-28-2010

King County Environmental Laboratory
322 West Ewing Street
Seattle, Washington 98119-1507
(206) 684-2300

INTRODUCTION

This quality assurance (QA) narrative is intended to document the QA review conducted on the chemistry analyses performed for the Duwamish/Diagonal Sediment Remediation Project Year Five, ENR Cap Sediment Characterization, March 2010 Sampling Event. The QA narrative is organized into the five sections listed below.

- General Comments
- Sample Collection
- Conventional Analyses
- Metal Chemistry
- Organic Chemistry

An overview of the approach used for the QA review is detailed in the *General Comments* section. Additional information specific to each analysis is included in the appropriate analytical section.

This QA review and narrative (specifically defined as QA1) have been conducted in accordance with guidelines established through the Puget Sound Dredged Disposal Analysis (PSDDA) program, Sediment Management Standards (WAC 173-204-610) and the Sediment Sampling and Analysis Appendix (SAPA), WDOE 2008. Other approaches incorporated in the QA review have been established through collaboration between the King County Environmental Laboratory (KC Laboratory) and the Washington State Department of Ecology (Ecology) Sediment Management Unit.

GENERAL COMMENTS

Scope of Samples Submitted

This QA review is associated with marine sediment samples collected on March 30, 2010 as part of the Duwamish/Diagonal Sediment Remediation Project Year Five, ENR Cap Sediment Characterization Sampling Event. The Sampling and Analysis Plan (SAP) in effect for this sampling event is titled: Duwamish/Diagonal Sediment Remediation Dredging and Capping Operations, Sediment Monitoring Sampling and Analysis Plan. March 2010. (KCEL document # 943)

Except where noted in the subcontracting sections of this QA review, all analyses have been conducted by the King County Environmental Laboratory (KCEL). Sediment analytical data are reported with associated data qualifiers and have undergone QA1 review, as summarized in this narrative report.

Completeness

Completeness has been evaluated for this data submission and QA review by considering the following criteria:

- Comparing reported data to the planned project analyses summarized in Table 1.
- Compliance with storage conditions and holding times.
- Frequency of analysis of the complete set of quality control (QC) samples outlined in Table 2.

Subcontracted Analyses

Analyses that have been subcontracted and the issues associated with these subcontracted analyses are noted in this narrative.

Methods

Analytical methods are noted in the applicable analytical sections of this QA review.

Target Lists

The reported target lists have been compared to the target analytes listed in *Table 1 - Marine Sediment Quality Standards Chemical Criteria* and *Table 3 - Puget Sound Marine Sediment Cleanup Screening Levels Chemical Criteria* contained in Chapter 173-204 WAC.

Detection Limits

As part of the QA1 review, the detection limits reported for each parameter have been reviewed against the detection limit requirements defined in the SAP. When sample results have been reported as less than the Method Detection Limit (<MDL) and the associated detection limits are higher than those defined in the SAP, the particular samples and parameters have been identified and the circumstances explained. These summaries are included with each analytical section of this QA review.

The KC Laboratory reports include both the reporting detection limit (RDL) and the method detection limit (MDL) for each sample and parameter, where applicable. The RDL is defined as *the minimum concentration of a chemical constituent that can be reliably quantified while t*he MDL is defined as *the minimum concentration of a chemical constituent that can be detected.* Some subcontracted laboratory data are available with an MDL only, in accordance with the subcontracting laboratory policies. For some methods the detection limits reported may vary from sample to sample depending on the amount of sample analyzed and any additional dilutions required.

Storage Conditions and Holding Times

Storage conditions and holding times have been evaluated using guidelines defined in the 2008 SAPA. Preparation and analysis holding times for each method are summarized in each analytical section.

Method Blanks

Method blank results have been used to evaluate the possible laboratory contamination of samples. Method blank results have been reviewed for the presence of analytes detected at or greater than the MDL. For analytes where the method blank response was at or above the MDL all associated sample results have been qualified with a B flag based on the rules below.

1. Add a "B" flag to all parameters if the associated blank is ≥ the MDL and the sample result is ≥ MDL but ≤ 5 times the blank.
2. Add a "B2" flag to common organic lab contaminants (Acetone, 2-Butanone, Methylene Chloride, Bis (2-ethylhexyl) Phthalate, Butyl Benzyl Phthalate and Di-n-butyl Phthalate) if the method blank is ≥ the MDL and the sample result is > 5 and ≤ 10 times the blank.
3. Add a "B3" flag to all other parameters if the associated blank is ≥ the MDL and the sample result is > 5 and ≤ 10 times the blank.

Standard Reference Materials

Standard reference material (SRM) recoveries have been used to evaluate possible low or high analytical bias on a batch-specific basis. SRM analysis is included with metals and selected organic and conventional parameters (see Table 2). SRMs are purchased from outside agencies (NIST or NRCC) and must have a certified analyte value in order for a particular parameter to be evaluated. All associated sample results for the certified analytes are flagged if the SRM recoveries are unacceptable. Associated sample results may be flagged with a JL whenever recoveries are measured above the acceptance limits and may be flagged with a JG when recoveries are measured below the acceptance limits.

Matrix Spikes

Matrix spike recoveries have been used to evaluate possible low or high analytical bias on a matrix and batch-specific basis. Matrix spikes are analyzed with metals, organics and selected conventionals parameters (see Table 2). Associated sample results may be flagged with a JL whenever recoveries are measured above the acceptance limits and may be flagged with a JG when recoveries are measured below the acceptance limits (but at or above 10%). Flags are applied to specific sample results based on matrix spike recoveries only if the unacceptable recovery is indicative of a consistent bias for all associated samples.

For Metals only, matrix spike recovery results are used to qualify sample data only when the sample levels in the spiked sample are less than 4 times the spiked concentration. High sample levels relative to the spiked concentration can compromise the measurement of accurate spike recoveries.

Laboratory Replicate Samples

Replicate analysis (laboratory duplicates or triplicates) is used as an indicator of method precision and is used to qualify data on an analyte and batch-specific basis. Not all replicate data are used, however, as an indicator for data qualification. Only sets of replicate results which include at least one result greater than the RDL are considered for data qualification. These guidelines have been used to account for the fact that precision obtained near the detection limit is not representative of precision obtained throughout the entire analytical range. The original sample are flagged with a J or JK whenever the measured precision is unacceptable (greater than the acceptance limit).). Associated sample data will also be flagged if the unacceptable precision is expected in samples of the same matrix and composition.

Surrogates

Surrogate recoveries have been used to evaluate possible low or high analytical bias on a sample-specific basis. Surrogates are only analyzed for organic parameters. Individual sample results may be flagged with a JL whenever recoveries are measured above the acceptance limits and may be flagged with a JG when recoveries are measured below the acceptance limits (but at

or above 10%). Flags are applied to reported results based on surrogate recoveries only if the unacceptable recovery is indicative of a bias for the associated parameters.

Data Qualifiers

The data qualification guidelines described above has been summarized in Table 3. This table conforms to the guidelines in the 2008 SAPA and also shows the data qualifiers used for the Washington Dept of Ecology EIM electronic data format.

Units and Significant Figures

Units and the reporting basis vary, depending on the parameter and are explained in the analytical sections below. Data generally have been reported to three significant figures if above the RDL and two significant figures if equal to or below the RDL.

SAMPLE COLLECTION

This section describes sampling activities associated with the collection of eight thin-layer cap saltwater sediment samples in March 30, 2010. These samples were collected for the Duwamish/Diagonal Sediment Remediation Program. All sampling activities were conducted following guidance suggested in the Puget Sound Protocols (PSEP, 1996 and 1998).

Sampling Locations and Station Positioning

Sampling locations (stations) were selected and the prescribed coordinates determined prior to field activities. Samples consisted of sediment aliquots collected from only one sampler deployment to minimize bottom disturbance at each of these thin-capped stations. Both the prescribed station coordinates and the actual coordinates recorded during sampling activities are presented in the following table (see below). The coordinate system, as shown, is in U.S. State Plane, Washington North 4601, NAD83.

Duwamish/Diagonal Sediment Sampling, Thin Layer Stations
Actual and Prescribed Sample Coordinates, March 2010

Lab Number	Locator	Cast	# Grabs	Prescribed Northing	Actual Northing	Prescribed Easting	Actual Easting	Ofrset > 3 m
L50381-1	DUD_3C	1	1	208144	208140	1267146	1267144	
L50381-2	DUD_4C	1	1	208239	208244	1267116	1267120	
L50381-3	DUD_6C, Frep	1	1	208501	208502	1266950	1266950	
L50381-4	DUD_5C	1	1	208263	208262	1267025	1267019	
L50381-5	DUD_6C	1	1	208501	208500	1266950	1266944	
L50381-6	DUD_7C	1	1	208486	208490	1266902	1266901	
L50381-7	DUD_14C	1	1	208002	207999	1267193	1267197	
L50381-8	DUD_15C	1	1	207968	207969	1267057	1267051	

Sediment grab samples were collected from the King County research vessel *Liberty*, which is equipped with a differential global positioning system (DGPS). Using DGPS, field coordinates were recorded for each cast of the two grab samplers, deployed in tandem, as they contacted the sediment. All field coordinates for each cast listed in the above table are within the +/- 3 meter accuracy limits, as defined in the SAP.

Sample Description Table

Lab Sample #	Station	Sample Collection	Average Sediment Depth (cm)	Sample Usage
L50381-1	DUD_3C	Surface Grabs	12	Chemistry
L50381-2	DUD_4C	Surface Grabs	10	Chemistry
L50381-3	DUD_6C	Surface Grabs (field replicate)	8	Chemistry
L50381-4	DUD_5C	Surface Grabs	8	Chemistry
L50381-5	DUD_6C	Surface Grabs	8	Chemistry
L50381-6	DUD_7C	Surface Grabs	11	Chemistry
L50381-7	DUD_14C	Surface Grabs	17	Chemistry
L50381-8	DUD_15C	Surface Grabs	13	Chemistry

Sample Collection

Sediment was collected at each station using two stainless steel, modified, 0.1 m^2 Van Veen grab samplers deployed in tandem via hydrowire. For each acceptable deployment, average depths ranging between 8 - 17 cm of sediment were collected within each grab, allowing for sub-sampling within the upper 7-10 cm of material. Samples consisted of sediment aliquots collected

from only one sampler deployment to minimize bottom disturbance at each of these thin-capped stations.

Water depth at the eight subtidal cap sample stations ranged between 8 - 11 meters (not corrected for tide).

Sample Handling

Sediment aliquots were sub-sampled from a single grab from a single deployment at each station. For chemistry testing, 10 cm deep aliquots, as measured from the sediment surface, were collected using a stainless steel spoon. Sediment that had touched the sides or bottom of the grab sampler was excluded. Less than the top 10 cm of sediment was sub-sampled in those instances where it was not possible to collect material down to the minimum sediment penetration depth. All aliquots were placed in a covered stainless-steel compositing bowl, specific for that station. The sediment was thoroughly homogenized, then split out into pre-labeled containers. All sample containers were supplied by the King County Environmental Laboratory, first having been pre-cleaned according to analytical specifications.

Decontamination

Individual sets of the sub-sampling and mixing equipment were dedicated to each station, precluding the need for decontamination of said equipment. The Van Veen grab samplers were decontaminated between stations by scrubbing with a brush using ambient water and Detergent 8, followed by a thorough *in situ* rinsing.

Sample Storage and Preservation

Samples were stored in ice-filled coolers from the time of collection until delivery to the King County Environmental Laboratory. They were delivered under chain-of-custody and were maintained as such throughout the analytical process. Samples were stored frozen (-18°C) by the laboratory until analysis with the exception of samples for particle size distribution (PSD) analysis. PSD samples were stored refrigerated at approximately 4°C. A more complete description of sample handling and storage can be found in each analytical chemistry section of this narrative.

Copies of chain-of-custody forms and field notes are included as an appendix to this QA review narrative. The collect time is defined as that time that sampling commences at each station.

CONVENTIONAL ANALYSES

Completeness
Conventional data are reported for all samples and parameters summarized in Table 1. These samples were analyzed in association with the complete set of QC samples outlined in Table 2.

Subcontracted Analyses
All analyses were performed at the King County Environmental Laboratory.

Methods
PSD analysis was performed in accordance with ASTM D422 and Puget Sound Protocols methodologies (*Recommended Protocols for Measuring Conventional Sediment Variables in Puget Sound* - page 9 - PSEP, 1986). TOC analysis was performed in accordance with EPA 9060 and PSEP 1996. Total solids analyses were performed in accordance with SM2540-G.

Detection Limits
The detection limits (MDLs) reported for Conventionals parameters are all within the requirements defined in the SAP (after appropriate dry weight adjustment), except for the following:

Parameter	Sample ID	SAP MDL	Reported MDL	Reason for higher MDL Value
TOC	L50381-1, -2, -7, -8	1000	2000	Reduced sample size analyzed due to High Organic Background
PSD Parameters in the % Fines range	L50381-all	0.5%	0.56 to 0.94%	MDL is adjusted for weight of sample analyzed and less than the expected amount was tested.
PSD Parameters in the Sand and Gravel ranges	L50381-all	0.1%	0.11 to 0.19%	

For all samples where the MDL did not meet the SAP MDL, the measured concentrations were above the MDL for nearly all the reported parameters. An exception was sample L50381-5 where the level of clay was <MDL. This is not expected to have compromised the project goals since the MDL reported for that sample (0.64%) was only slightly above the SAP MDL of 0.5%.

Reporting Requirements (significant figures, units, basis and qualifiers)
For analyses performed at the KC Laboratory, data are reported in accordance with laboratory policy at the time the data were generated. Data are reported to three significant figures for results greater than the RDL and two significant figures for results equal to or less than the RDL. For results reported with less than two or three significant figures, significant zeroes are implied. This may not apply to subcontracted data.

In the Comprehensive Report attached, Conventionals parameters are reported in mg/Kg, dry weight basis, for TOC. Particle Size Distribution (PSD) and Total Solids are reported in percent, wet weight basis. For all parameters, the MDL and RDL values for each individual sample are reported in the same units and basis as the sample result. Any result measured at less than the MDL or less than the RDL, a <MDL or <RDL qualifier is added, respectively. Other qualifiers added are based on QA/QC failures and are individually explained in this narrative.

Storage Conditions and Holding Times
Sample storage conditions and holding times have been evaluated using guidelines established in the SAPA (WDOE, 2008). The dates and holding time criteria for the actual storage conditions used for conventional analyses are listed in the table below.

Parameter	Lab ID#	Date Collected	Prep Date	Date Analyzed	Sample Holding Time	Extract Holding Time
Particle Size Distribution	L50381-1,2,3,4,5,6,7,8	30-Mar-2010	28-Apr-2010	29-Apr-2010	6 Months at 4°C	NA
Total Organic Carbon	L50381-1,2,3,4,5,6,7,8	30-Mar-2010	5-May-2010	11, 12-May-2010	6 months at -18°C	6 months at -18°C
Total Solids	L50381-1,2,3,4,5,6,7,8	30-Mar-2010	4-May-2010	5-May-2010	6 months at -18°C	NA

Sample storage conditions and holding times were met for all samples in this data submission.

Method Blanks

Method blanks were analyzed in connection with total solids/total organic carbon analyses. All method blanks results were less than the MDL.

Standard Reference Materials

An SRM (Buffalo River Sediment) was analyzed in connection with TOC analysis. The percent recovery for the SRM analysis was within the 80 to 120% QC limits.

Matrix Spikes

The matrix spike recovery for TOC was within the 75 to 125% acceptance limits. The acceptance limits are not applicable when the unspiked sample level is 4 times or greater than the spiked concentration.

Laboratory Replicate Samples

A set of laboratory triplicates was analyzed for each of the conventional parameters. The percent relative standard deviation (%RSD) for each triplicate set was less than or equal to the 20% acceptance limit.

Additional QA Issues:

None

METALS CHEMISTRY

Completeness
Metal chemistry data are reported for all samples and parameters summarized in Table 1. These samples were analyzed for mercury and other metals in association with the complete set of QC samples outlined in Table 2.

Subcontracted Analyses
Metals analysis was not subcontracted for these sets of samples.

Methods
Mercury analysis was performed in accordance with EPA Method SW846, 7471B. Analysis for other metals was performed in accordance with EPA method SW846, 3050B/6010C.

Target List
The reported target list includes all metals specified in Table 1.

Detection Limits
The detection limits (MDLs) reported Metals parameters are all within the requirements defined by the SAP (after dry weight adjustment) except for Sample L50381-7. The MDLs for Mercury, Cadmium, Chromium, Copper, Lead, Manganese, Silver and Thallium were slightly above the SAP MDL (adjusted for 50% solids). The measured concentrations were above the MDL for all these elements except for Silver and Thallium. This is not expected to have compromised the project goals since the MDLs reported for those elements were only slightly above the SAP MDLs.

Reporting Requirements (significant figures, units, basis and qualifiers)
For analyses performed at the KC Laboratory, data are reported in accordance with laboratory policy at the time the data were generated. Data are reported to three significant figures for results greater than the RDL and two significant figures for results equal to or less than the RDL. For results reported with less than two or three significant figures, significant zeroes are implied.

In the Comprehensive Report attached, Metals parameters are reported in mg/Kg, dry weight basis, for all elements. The MDL and RDL values for each individual sample are reported in the same units and basis as the sample result. Any result measured at less than the MDL or less than the RDL, a <MDL or <RDL qualifier is added, respectively. Other qualifiers added are based on QA/QC failures and are individually explained in this narrative.

Storage Conditions and Holding Times
Sample storage conditions and holding times have been evaluated using guidelines established during the Third Annual PSDDA Review Meeting. The dates and holding time criteria for the actual storage conditions used for metals analyses are listed in the table below.

Parameter	Lab ID#	Date Collected	Date Digested/ Extracted	Date Analyzed	Sample Holding Time	Digestate/Extract Holding Time
Total Metals	L50381-1 - 8	3/30/2010	4/6/2010	4/7/2010	2 Years at -18°C	6 months
Total Mercury	L50381-1 - 8	3/30/2010	4/7/2010	4/8/2010	28 days at -18°C	NA

Sample storage conditions and holding times were met for all samples in this data submission.

Method Blanks
All metals method blanks results were less than the MDL.

Standard Reference Materials

The SRM analyzed in association with samples included in this data submission is National Research Council of Canada PACS-2. This SRM is not certified for Silver, Arsenic or Cadmium. Acceptance limits for the certified elements have been developed using historical lab data since the certified SRM values and limits were determined with different analysis techniques. SRM recoveries outside these lab-defined limits indicate the method has not performed as expected and the sample data have been qualified to indicate the expected bias.

All metals SRM recoveries were within the lab defined limits indicated in the SAP.

A laboratory control sample (LCS) ERA Soil was also analyzed with the total metals digestion. All recoveries were within the certified limits of the sample. The LCS is used as a secondary check for the total metals digestion procedure because the certified values for the elements are determined using the same methodology. No results from the LCS are used to qualify data.

Matrix Spikes

All matrix spike recoveries were within the 75% to 125% QC limits with the following exceptions:
The reported matrix spike recovery of 20% for Antimony in WG108387 for sample numbers L50381-1 - 8 failed to meet the 75% to 125% QC acceptance criteria. Antimony results for all samples in WG108387 have been qualified with a “JG”.

Laboratory Replicate Samples

The relative percent differences (RPDs) for laboratory duplicate results for all metals were less than or equal to the QC limit of 20%.

ORGANIC CHEMISTRY

Completeness

Organics data are reported for all samples and parameters summarized in Table 1. These samples were analyzed in association with the complete set of QC samples outlined in Table 2.

Methods

BNA analysis was performed in accordance with EPA method 8270D. PCB and chlorinated pesticides analysis was performed in accordance with EPA methods 8082A and 8081B.

Target List

The reported BNA target list includes all compounds specified in *Table 1 - Marine Sediment Quality Standards Chemical Criteria* and *Table 3 - Puget Sound Marine Sediment Cleanup Screening Levels Chemical Criteria* contained in Chapter 173-204 WAC with the exception of benzo(j)fluoranthene. The KC Laboratory has verified that analytical conditions are sufficient to calculate a total benzofluoranthene result using the reported *b* and *k* isomers.

Reported PCB data include Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260.

Detection Limits, Units and Significant Figures

The detection limits (MDLs) reported for Organics parameters are all within the requirements defined in the SAP (after dry weight adjustment), except for the following:

BNAs

For Sample L50381-7, the total solids value of 47.8% was just below 50%, which was used as the target value for adjustment of the SAP MDLs to a dry weight basis. This caused most of the reported MDLs to be above the SAP MDLs for the BNA parameters. This is not expected to have compromised the project goals since the MDLs reported for those parameters were only slightly above the SAP MDLs

PCBs

The reported MDL for Aroclors 1016, 1221, 1232, 1242 and 1248 in selected samples were elevated to levels above the adjusted SAP MDLs. See Additional QA Issues at the end of this section for further details. In addition to these elevated MDLs, Sample L50381-7 showed higher MDLs for all Aroclors due to total solids being slightly less than 50%.

Chlorinated Pesticides

The reported MDLs for half of the pesticides compounds were greater than the MDL values listed in the SAP for samples L50381-7 due to total solids being slightly less than 50%. This is not expected to have compromised the project goals since the MDLs reported for those elements were only slightly above the SAP MDLs

The attached SMS OC and Dry Weight Normalization MDL Check tables compare the reported MDL value to the SMS requirement. All the compounds in the reported MDL met the SMS limits. The reported levels of Total PCBs based on Aroclors detected should be used for comparison to SMS limits rather the MDL values. Since Aroclors were detected in all samples, the elevated MDLs for Total PCBs are not significant.

Reporting Requirements (significant figures, units, basis and qualifiers)

For analyses performed at the KC Laboratory, data are reported in accordance with laboratory policy at the time the data were generated. Data are reported to three significant figures for results greater than the RDL and two significant figures for results equal to or less than the RDL. For results reported with less than two or three significant figures, significant zeroes are implied.

In the Comprehensive Report attached, Organics parameters are reported in ug/Kg, dry weight basis. In this report format, non-ionizable organic parameters have not been converted to mg/Kg

TOC. For all parameters, the MDL and RDL values for each individual sample are reported in the same units and basis as the sample result. Any result measured at less than the MDL or less than the RDL, a <MDL or <RDL qualifier is added, respectively. Other qualifiers added are based on QA/QC failures and are individually explained in this narrative.

Storage Conditions and Holding Times

Sample storage conditions and holding times have been evaluated using guidelines established in the SAPA (WDOE, 2003). The dates and holding time criteria for the actual storage conditions used for organics analyses are listed in the table below.

Parameter	Lab ID	Date Collected	Date Extracted	Date Analyzed	Sample Holding Time	Extract Holding Time
BNAs	L50381-1 to 8	30-Mar-10	13-Apr-10	10-May-10	1 year at -18°C	40 days at 4°C
Chlorinated Pesticides	L50381-1 to 8	30-Mar-10	11-Apr-10	28, 29-Apr-10	1 year at -18°C	40 days at 4°C
PCB	L50381-1 to 8	30-Mar-10	09-Apr-10	05-May-10	1 year at -18°C	40 days at 4°C

Sample storage conditions and holding times were met for all samples in this data submission.

Method Blanks

Method blanks were analyzed for all Organics parameters and all method blank results were less than the MDL, except as noted below:

BNAs

The method blank analyzed with BNA (WG108497) for L503811 to 8had a result above the MDL for Bis (2-ethylhexyl) Phthalate (11.6 ug/Kg) and Butyl Benzyl Phthalate (12.6 ug/Kg). Sample results for Bis (2-ethylhexyl) Phthalate and Butyl Benzyl Phthalate for those samples where the measured levels were above the MDL have been qualified with the appropriate B flag based on Table 3 below. Those Bis (2-ethylhexyl) Phthalate and Butyl Benzyl Phthalate results that are flagged with either a B or B2 qualifier must be treated as estimated values.

Surrogate Recoveries

Surrogate recovery acceptance limits for sediment samples have been developed based on historical lab performance using the current analytical methods. Recoveries measured above the acceptance limits may be flagged with a JL. Recoveries measured below the acceptance limits (but at or above 10%) may be flagged with a JG.

1. BNAs

For BNA sample data, surrogate recoveries are evaluated separately for the acid and base/neutral fractions. Within each fraction, 2 or more surrogates must be outside the acceptance limits in order to qualify the associated sample data. None of the BNA samples had multiple surrogate recovery failures.

2. PCBs

Sample data are qualified when individual surrogate recoveries are outside lab-specific acceptance limits. For each set of analyses, all surrogate recoveries were within the lab-specific acceptance limits for all samples in this data submission.

3. Chlorinated Pesticides

Sample data are qualified when individual surrogate recoveries are outside lab-specific acceptance limits. For each set of analyses, all surrogate recoveries were within the lab-specific acceptance limits for all samples in this data submission.

Standard Reference Materials (SRMs)
The SRM results associated with these samples are summarized below, according to the analysis method. Acceptance limits for the certified parameters reported in this data set have been developed using historical lab data although the SAP lists the obsolete acceptance limits of 80 to 120%. SRM recoveries outside these lab-defined limits indicate the method has not performed as expected and the associated sample data have been flagged.

1. BNAs
The sediment SRM analyzed in association with the reported BNA results is 1944, certified by the National Institute of Standards and Technology (NIST). The certified organics parameters in SRM 1944 are only a partial list of all the BNA compounds reported in this analysis. All measured recoveries for this SRM were within acceptance limits.

2. Chlorinated Pesticides
The sediment SRM analyzed in association with the reported Chlorinated Pesticides results is 1944, certified by the NIST. SRM 1944 contains certified levels of DDT and alpha Chlordane. All measured recoveries for this SRM were within acceptance limits.

2. PCBs
The sediment SRM analyzed in association with the reported PCB results is HS-2, certified by the National Research Council of Canada. SRM HS-2 contains Aroclor 1254. The measured recovery for this SRM was within acceptance limits.

Matrix Spikes
Matrix Spikes have been analyzed for each method. Recovery acceptance limits for each parameter in sediment have been developed based on historical lab performance using the current analytical methods. The acceptance limits are not applicable when the unspiked sample level was 4 times or greater than the spiked concentration. When applicable, matrix spike recoveries outside these lab-defined limits indicate the method has not performed as expected and the associated sample data have been flagged.

1. BNAs
For the BNA compounds that were included in the matrix spike, the measured recoveries for each were within their acceptance limits.

2. PCBs and Chlorinated Pesticides
Each of the reported Pesticide compounds, except Toxaphene, alpha and gamma Chlordane, was included in the Chlorinated Pesticide matrix spike. Aroclor 1260 and 1016 only are used as the spiking parameters for PCB matrix spike. The measured recovery for each spiked parameter was within their acceptance limits.

Laboratory Replicate Samples
A laboratory duplicate sample(s) was analyzed for each Organics parameter. The relative percent differences (RPDs) for the laboratory duplicate for all Organic parameters at or above the RDL were less than or equal to the acceptance limit of 35%.

Additional QA Issues:

PCB Analysis:
PCB data reported for this set of samples include numeric values for only those Aroclors that could be positively identified in each sample and were measured above the detection limit. Identification of Aroclors 1016, 1221, 1232, 1242 and 1248 may not be possible for samples listed below due to the overlap of the components from Aroclors 1242, 1254 and 1260. For those Aroclors where this overlap has occurred, the result is reported as <MDL with elevated MDL and RDL values. The elevated MDL represents the maximum amount that would have been reported

for that Aroclor had it been positively identified. The RDL value has also been elevated by the same proportion.

The table below lists the samples and affected Aroclors.

Lab Sample Number	**PCB 1016**	**PCB-1221**	**PCB 1232**	**PCB-1242**	**PCB 1248**
L50381-1	x		x		x
L50381-2	x	x	x		x
L50381-3	x	x	x	x	x
L50381-4	x	x	x	x	x
L50381-5	x	x	x	x	x
L50381-6	x	x	x	x	x
L50381-7	x	x	x	x	x
L50381-8	x		x		x

Aroclor 1242 was positively identified this year instead of Aroclor 1248. Both of these Aroclor mixtures have similar patterns, due to the small difference in the percent chlorine (42% vs. 48%), making unequivocal identification difficult when the concentrations are also similar. The same Aroclor identification procedure was used in all years for this project.

TABLE 1
SEDIMENT SAMPLE INVENTORY

Sample	Locator / Description (see SAP)	PSD	Solids	TOC	Metals[1]	BNAs[2]	Pest/ PCBs	Comments
L50381-1	DUD_3C	x	x	x	x	x	x	
L50381-2	DUD_4C	x	x	x	x	x	x	
L50381-3	DUD_6C	x	x	x	x	x	x	field replicate
L50381-4	DUD_5C	x	x	x	x	x	x	
L50381-5	DUD_6C	x	x	x	x	x	x	
L50381-6	DUD_7C	x	x	x	x	x	x	
L50381-7	DUD_14C	x	x	x	x	x	x	
L50381-8	DUD_15C	x	x	x	x	x	x	

1 Metals = Hg, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, Tl, Zn, Fe, Al,
2 BNAs = includes Chlorobenzenes

TABLE 2
QC SAMPLE FREQUENCY FOR SEDIMENT CHEMICAL AND PHYSICAL PARAMETERS

Parameter	Method Blank	Duplicate	Triplicate	Matrix Spike	SRM	Surrogates
PSD	No	See Triplicate	5% minimum, 1 per QC batch	No	No	No
Total Solids	1 per QC batch	See Triplicate	5% minimum, 1 per QC batch	No	No	No
TOC	1 per QC batch	See Triplicate	5% minimum, 1 per QC batch	5% minimum, 1 per QC batch	1 per QC batch	No
Metals	1 per QC batch	5% minimum, 1 per QC batch	No	5% minimum, 1 per QC batch	1 per QC batch	No
BNAs	1 per QC batch	5% minimum, 1 per QC batch	No	5% minimum, 1 per QC batch	1 per QC batch	Yes
PCBs/Chlorinated Pesticides	1 per QC batch	5% minimum, 1 per QC batch	No	5% minimum, 1 per QC batch	1 per QC batch	Yes

TABLE 3 - SUMMARY OF SEDIMENT DATA QUALIFIERS

Condition to Qualify	King County Data Qualifier	Possible EIM Data Qualifier	Organic QC Limits	Metal QC Limits	Conventional QC Limits	Comment
low matrix spike recovery	JG	JG	Compound specific	< 75%	< 75% *	
high matrix spike recovery	JL	JL	Compound specific	>125%	>125% *	
low standard reference material recovery	JG	JG	Compound and SRM specific	Element and SRM specific	< 80%	
high standard reference material recovery	JL	JL	Compound and SRM specific	Element and SRM specific	>120%	
high duplicate relative percent difference	JK or J	JK	>35 %	>20%	NA	for organics and metals
high triplicate relative standard deviation	JK or J	JK	NA	NA	> 20%	for conventionals
less than the reporting detection limit	<RDL**	JT	NA	NA	NA	
less than the method detection limit	<MDL	U	NA	NA	NA	
contamination detected in method blank	B	B	MB >/=MDL & Result </= 5x Blank	MB >/=MDL & Result </= 5x Blank	MB >/=MDL & Result </= 5x Blank	
contamination detected in method blank	B2	B	MB >/=MDL & Result > 5x but >/= 10x Blank	MB >/=MDL & Result > 5x but >/= 10x Blank	MB >/=MDL & Result > 5x but >/= 10x Blank	Common Lab Contaminants
contamination detected in method blank	B3	B	MB >/=MDL & Result > 5x but >/= 10x Blank	MB >/=MDL & Result > 5x but >/= 10x Blank	MB >/=MDL & Result > 5x but >/= 10x Blank	All other parameters
biased data based on low surrogate recoveries	JG	JG	Surrogate specific	NA	NA	At least 2 surrogates < limit for BNAs
biased data based on high surrogate recoveries	JL	JL	Surrogate specific	NA	NA	At least 2 surrogates > limit for BNAs
rejected - unusable for all purposes	R	J or Q	NA	NA	NA	
a sample handling criteria has not been met	SH	JK or J	NA	NA	NA	container, preservation
Holding time not met	H	JK or J				hold time

- Common Lab Contaminants: Acetone, 2-Butanone, Methylene Chloride, Bis(2-ethylhexyl) Phthalate, Butyl Benzyl Phthalate and Di-n-butyl Phthalate

Sample Results Tables

King County Environmental Lab Analytical Report

	Project:	423062-200-4					Project:	423062-200-4					Project:	423062-200-4							
	Locator:	DUD_3C					Locator:	DUD_4C					Locator:	DUD_6C							
	Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM							
	Sample:	L50381-1					Sample:	L50381-2					Sample:	L50381-3							
	Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED							
	ColDate:	3/30/10 10:15					ColDate:	3/30/10 10:27					ColDate:	3/30/10 11:32							
	TimeSpan:						TimeSpan:						TimeSpan:								
	TotalSolid:	55.4					TotalSolid:	64.9					TotalSolid:	84.5							
	ClientLoc:						ClientLoc:						ClientLoc:								
	SampDepth:	9					SampDepth:	9					SampDepth:	10							
	DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**								
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**				
CV ASTM D422																					
Clay*	10.9		0.84	1.68	%		13.8		0.77	1.53	%		2.3		0.56	1.13	%				
Fines*	50.5		0.84	1.68	%		41.4		0.77	1.53	%		5.6		0.56	1.13	%				
Gravel*	11.9		0.17	1.68	%		18		0.15	1.53	%		60.9		0.11	1.13	%				
p+0.00*	1	<RDL	0.17	1.68	%		2.5		0.15	1.53	%		3.4		0.11	1.13	%				
p+1.00*	2.3		0.17	1.68	%		5.2		0.15	1.53	%		7		0.11	1.13	%				
p+10.0(equal/more than)*	7.6		0.84	1.68	%		11.5		0.77	1.53	%		0.6	<RDL	0.56	1.13	%				
p+2.00*	17.6		0.17	1.68	%		20.7		0.15	1.53	%		19.1		0.11	1.13	%				
p+3.00*		<MDL	0.17	1.68	%		16.9		0.15	1.53	%		6.8		0.11	1.13	%				
p+4.00*	24.6		0.17	1.68	%			<MDL	0.15	1.53	%		1.8		0.11	1.13	%				
p+5.00*	10.1		0.84	1.68	%		7.7		0.77	1.53	%		2.3		0.56	1.13	%				
p+6.00*	15.1		0.84	1.68	%		13.8		0.77	1.53	%		0.6	<RDL	0.56	1.13	%				
p+7.00*	9.3		0.84	1.68	%		5.4		0.77	1.53	%		0.6	<RDL	0.56	1.13	%				
p+8.00*	5		0.84	1.68	%		0.8	<RDL	0.77	1.53	%			<MDL	0.56	1.13	%				
p+9.00*	3.4		0.84	1.68	%		2.3		0.77	1.53	%		1.7		0.56	1.13	%				
p-1.00*	1.1	<RDL	0.17	1.68	%		5		0.15	1.53	%		10.4		0.11	1.13	%				
p-2.00(less than)*	9.1		0.17	1.68	%		8.7		0.15	1.53	%		35.1		0.11	1.13	%				
p-2.00*	1.7	<RDL	0.17	1.68	%		4.3		0.15	1.53	%		15.5		0.11	1.13	%				
Sand*	45.5		0.17	1.68	%		45.3		0.15	1.53	%		38		0.11	1.13	%				
Silt*	39.6		0.84	1.68	%		27.6		0.77	1.53	%		3.4		0.56	1.13	%				
CV SM2540-G																					
Total Solids*	55.4		0.005	0.01	%		64.9		0.005	0.01	%		84.5		0.005	0.01	%				
CV SW846 9060-PSEP96																					
Total Organic Carbon	16400		2000	4030	mg/Kg		10200		2000	3880	mg/Kg		3500		1000	2020	mg/Kg				
MT SW846 3050B*SW846 6010C																					
Aluminum, Total, ICP	17400		9.2	46.2	mg/Kg		15400		8	39.8	mg/Kg		9090		5.9	29.7	mg/Kg				
Antimony, Total, ICP	1.5	<RDL,JG	1.4	6.93	mg/Kg			<MDL,JG	1.2	5.96	mg/Kg			<MDL,JG	0.89	4.45	mg/Kg				
Arsenic, Total, ICP	9.7	<RDL	2.3	11.6	mg/Kg		6.2	<RDL	2	9.94	mg/Kg		2.7	<RDL	1.5	7.42	mg/Kg				
Beryllium, Total, ICP	0.632		0.092	0.462	mg/Kg		0.57		0.08	0.398	mg/Kg		0.375		0.059	0.297	mg/Kg				
Cadmium, Total, ICP	0.25	<RDL	0.18	0.924	mg/Kg		0.18	<RDL	0.15	0.795	mg/Kg			<MDL	0.12	0.593	mg/Kg				
Chromium, Total, ICP	25.8		0.27	1.39	mg/Kg		24.7		0.23	1.19	mg/Kg		15.9		0.18	0.89	mg/Kg				
Copper, Total, ICP	66.2		0.36	1.84	mg/Kg		44.2		0.32	1.59	mg/Kg		28.3		0.24	1.18	mg/Kg				
Iron, Total, ICP	25800		4.7	23.1	mg/Kg		21900		4	19.9	mg/Kg		14900		3	14.8	mg/Kg				
Lead, Total, ICP	28.2		1.8	9.24	mg/Kg		14.5		1.5	7.95	mg/Kg		5.9	<RDL	1.2	5.93	mg/Kg				
Manganese, Total, ICP	274		0.18	0.924	mg/Kg		248		0.15	0.795	mg/Kg		191		0.12	0.593	mg/Kg				
Nickel, Total, ICP	20.4		0.47	2.31	mg/Kg		19.4		0.4	1.99	mg/Kg		12.7		0.3	1.48	mg/Kg				
Selenium, Total, ICP		<MDL	2.3	11.6	mg/Kg			<MDL	2	9.94	mg/Kg			<MDL	1.5	7.42	mg/Kg				
Silver, Total, ICP		<MDL	0.36	1.84	mg/Kg			<MDL	0.32	1.59	mg/Kg			<MDL	0.24	1.18	mg/Kg				
Thallium, Total, ICP		<MDL	3.6	18.4	mg/Kg			<MDL	3.2	15.9	mg/Kg			<MDL	2.4	11.8	mg/Kg				
Zinc, Total, ICP	98.7		0.47	2.31	mg/Kg		66.1		0.4	1.99	mg/Kg		34.2		0.3	1.48	mg/Kg				

King County Environmental Lab Analytical Report

Project:	423062-200-4	423062-200-4	423062-200-4
Locator:	DUD_3C	DUD_4C	DUD_6C
Descrip:	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM
Sample:	L50381-1	L50381-2	L50381-3
Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
ColDate:	3/30/10 10:15	3/30/10 10:27	3/30/10 11:32
TimeSpan:			
TotalSolid:	55.4	64.9	84.5
ClientLoc:			
SampDepth:	9	9	10
	DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
MT SW846 7471B															
Mercury, Total, CVAA	0.16	<RDL	0.036	0.354	mg/Kg	0.14	<RDL	0.031	0.304	mg/Kg	0.034	<RDL	0.024	0.234	mg/Kg
OR SW846 3550B*SW846 8081B															
4,4'-DDD		<MDL	1.8	3.61	ug/Kg		<MDL	1.5	3.08	ug/Kg		<MDL	1.2	2.37	ug/Kg
4,4'-DDE		<MDL	1.8	3.61	ug/Kg		<MDL	1.5	3.08	ug/Kg		<MDL	1.2	2.37	ug/Kg
4,4'-DDT		<MDL	1.8	3.61	ug/Kg		<MDL	1.5	3.08	ug/Kg		<MDL	1.2	2.37	ug/Kg
Aldrin		<MDL	1.8	3.61	ug/Kg		<MDL	1.5	3.08	ug/Kg		<MDL	1.2	2.37	ug/Kg
Alpha-BHC		<MDL	0.9	1.81	ug/Kg		<MDL	0.77	1.54	ug/Kg		<MDL	0.59	1.18	ug/Kg
Alpha-Chlordane		<MDL	0.9	1.81	ug/Kg		<MDL	0.77	1.54	ug/Kg		<MDL	0.59	1.18	ug/Kg
Beta-BHC		<MDL	0.9	1.81	ug/Kg		<MDL	0.77	1.54	ug/Kg		<MDL	0.59	1.18	ug/Kg
Delta-BHC		<MDL	0.9	1.81	ug/Kg		<MDL	0.77	1.54	ug/Kg		<MDL	0.59	1.18	ug/Kg
Dieldrin		<MDL	1.8	3.61	ug/Kg		<MDL	1.5	3.08	ug/Kg		<MDL	1.2	2.37	ug/Kg
Endosulfan I		<MDL	1.8	3.61	ug/Kg		<MDL	1.5	3.08	ug/Kg		<MDL	1.2	2.37	ug/Kg
Endosulfan II		<MDL	1.8	3.61	ug/Kg		<MDL	1.5	3.08	ug/Kg		<MDL	1.2	2.37	ug/Kg
Endosulfan Sulfate		<MDL	1.8	3.61	ug/Kg		<MDL	1.5	3.08	ug/Kg		<MDL	1.2	2.37	ug/Kg
Endrin		<MDL	1.8	3.61	ug/Kg		<MDL	1.5	3.08	ug/Kg		<MDL	1.2	2.37	ug/Kg
Endrin Aldehyde		<MDL	1.8	3.61	ug/Kg		<MDL	1.5	3.08	ug/Kg		<MDL	1.2	2.37	ug/Kg
Gamma-BHC (Lindane)		<MDL	0.9	1.81	ug/Kg		<MDL	0.77	1.54	ug/Kg		<MDL	0.59	1.18	ug/Kg
Gamma-Chlordane		<MDL	0.9	1.81	ug/Kg		<MDL	0.77	1.54	ug/Kg		<MDL	0.59	1.18	ug/Kg
Heptachlor		<MDL	0.9	1.81	ug/Kg		<MDL	0.77	1.54	ug/Kg		<MDL	0.59	1.18	ug/Kg
Heptachlor Epoxide		<MDL	0.9	1.81	ug/Kg		<MDL	0.77	1.54	ug/Kg		<MDL	0.59	1.18	ug/Kg
Methoxychlor		<MDL	9	18.1	ug/Kg		<MDL	7.7	15.4	ug/Kg		<MDL	5.9	11.8	ug/Kg
Toxaphene		<MDL	18	36.1	ug/Kg		<MDL	15	30.8	ug/Kg		<MDL	12	23.7	ug/Kg
OR SW846 3550B*SW846 8082A															
Aroclor 1016		<MDL,TA	18	36.1	ug/Kg		<MDL,TA	9.2	18.5	ug/Kg		<MDL,TA	7.1	14.2	ug/Kg
Aroclor 1221		<MDL	3.6	7.22	ug/Kg		<MDL,TA	12	24.7	ug/Kg		<MDL,TA	7.1	14.2	ug/Kg
Aroclor 1232		<MDL,TA	18	36.1	ug/Kg		<MDL,TA	12	24.7	ug/Kg		<MDL,TA	7.1	14.2	ug/Kg
Aroclor 1242	24.5		1.8	3.61	ug/Kg	12.4		1.5	3.08	ug/Kg		<MDL,TA	7.1	14.2	ug/Kg
Aroclor 1248		<MDL,TA	36	72.2	ug/Kg		<MDL,TA	18	37	ug/Kg		<MDL,TA	7.1	14.2	ug/Kg
Aroclor 1254	62.1		1.8	3.61	ug/Kg	29.3		1.5	3.08	ug/Kg	8.8		1.2	2.37	ug/Kg
Aroclor 1260	28.3		1.8	3.61	ug/Kg	16		1.5	3.08	ug/Kg	4.63		1.2	2.37	ug/Kg
Total Aroclors	115		1.8	3.61	ug/Kg	57.6		1.5	3.08	ug/Kg	13.4		1.2	2.37	ug/Kg
OR SW846 3550B*SW846 8270D															
1,2,4-Trichlorobenzene		<MDL	0.18	0.361	ug/Kg		<MDL	0.15	0.308	ug/Kg		<MDL	0.12	0.237	ug/Kg
1,2-Dichlorobenzene		<MDL	0.36	0.722	ug/Kg		<MDL	0.31	0.616	ug/Kg		<MDL	0.24	0.473	ug/Kg
1,3-Dichlorobenzene		<MDL	0.36	0.722	ug/Kg		<MDL	0.31	0.616	ug/Kg		<MDL	0.24	0.473	ug/Kg
1,4-Dichlorobenzene		<MDL	0.36	0.722	ug/Kg		<MDL	0.31	0.616	ug/Kg		<MDL	0.24	0.473	ug/Kg
2,4-Dimethylphenol		<MDL	1.8	3.61	ug/Kg		<MDL	1.5	3.08	ug/Kg		<MDL	1.2	2.37	ug/Kg
2-Methylnaphthalene		<MDL	3.6	7.22	ug/Kg		<MDL	3.1	6.16	ug/Kg		<MDL	2.4	4.73	ug/Kg
2-Methylphenol		<MDL	3.6	7.22	ug/Kg		<MDL	3.1	6.16	ug/Kg		<MDL	2.4	4.73	ug/Kg
4-Methylphenol		<MDL	7.2	14.4	ug/Kg		<MDL	6.2	12.3	ug/Kg		<MDL	4.7	9.47	ug/Kg

King County Environmental Lab Analytical Report

Project:	423062-200-4					Project:	423062-200-4					Project:	423062-200-4								
Locator:	DUD_3C					Locator:	DUD_4C					Locator:	DUD_6C								
Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM								
Sample:	L50381-1					Sample:	L50381-2					Sample:	L50381-3								
Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED								
ColDate:	3/30/10 10:15					ColDate:	3/30/10 10:27					ColDate:	3/30/10 11:32								
TimeSpan:						TimeSpan:						TimeSpan:									
TotalSolid:	55.4					TotalSolid:	64.9					TotalSolid:	84.5								
ClientLoc:						ClientLoc:						ClientLoc:									
SampDepth:	9					SampDepth:	9					SampDepth:	10								
DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**									
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**					
Acenaphthene	5.4	<RDL	3.6	7.22	ug/Kg		<MDL	3.1	6.16	ug/Kg			<MDL	2.4	4.73	ug/Kg					
Acenaphthylene	3.8	<RDL	3.6	7.22	ug/Kg		<MDL	3.1	6.16	ug/Kg			<MDL	2.4	4.73	ug/Kg					
Anthracene	23.8		3.6	7.22	ug/Kg	11.5		3.1	6.16	ug/Kg		7.49		2.4	4.73	ug/Kg					
Benzo(a)anthracene	85.2		3.6	7.22	ug/Kg	32.4		3.1	6.16	ug/Kg		22.6		2.4	4.73	ug/Kg					
Benzo(a)pyrene	75.8		3.6	7.22	ug/Kg	33.1		3.1	6.16	ug/Kg		20.2		2.4	4.73	ug/Kg					
Benzo(b)fluoranthene	119		3.6	7.22	ug/Kg	52.2		3.1	6.16	ug/Kg		32.2		2.4	4.73	ug/Kg					
Benzo(g,h,i)perylene	47.1		3.6	7.22	ug/Kg	21.3		3.1	6.16	ug/Kg		14.4		2.4	4.73	ug/Kg					
Benzo(k)fluoranthene	84.5		3.6	7.22	ug/Kg	37.3		3.1	6.16	ug/Kg		23.8		2.4	4.73	ug/Kg					
Benzoic Acid	86.6		18	36.1	ug/Kg	91.7		15	30.8	ug/Kg		67.1		12	23.7	ug/Kg					
Benzyl Alcohol		<MDL	3.6	7.22	ug/Kg		<MDL	3.1	6.16	ug/Kg			<MDL	2.4	4.73	ug/Kg					
Benzyl Butyl Phthalate	25.8		1.8	3.61	ug/Kg	29.7		1.5	3.08	ug/Kg		15.5		1.2	2.37	ug/Kg					
Bis(2-Ethylhexyl)Phthalate	661		7.2	14.4	ug/Kg	128	B2	6.2	12.3	ug/Kg		115	B2	4.7	9.47	ug/Kg					
Caffeine		<MDL	7.2	14.4	ug/Kg		<MDL	6.2	12.3	ug/Kg			<MDL	4.7	9.47	ug/Kg					
Carbazole	9.53		3.6	7.22	ug/Kg	3.5	<RDL	3.1	6.16	ug/Kg		2.6	<RDL	2.4	4.73	ug/Kg					
Chrysene	122		3.6	7.22	ug/Kg	55.9		3.1	6.16	ug/Kg		33.1		2.4	4.73	ug/Kg					
Coprostanol		<MDL	72	144	ug/Kg		<MDL	62	123	ug/Kg			<MDL	47	94.7	ug/Kg					
Dibenzo(a,h)anthracene	16.3		3.6	7.22	ug/Kg	7.52		3.1	6.16	ug/Kg		4.95		2.4	4.73	ug/Kg					
Dibenzofuran	3.6	<RDL	3.6	7.22	ug/Kg		<MDL	3.1	6.16	ug/Kg			<MDL	2.4	4.73	ug/Kg					
Diethyl Phthalate		<MDL	7.2	14.4	ug/Kg		<MDL	6.2	12.3	ug/Kg			<MDL	4.7	9.47	ug/Kg					
Dimethyl Phthalate		<MDL	7.2	14.4	ug/Kg		<MDL	6.2	12.3	ug/Kg			<MDL	4.7	9.47	ug/Kg					
Di-N-Butyl Phthalate	44.2	B	7.2	14.4	ug/Kg	25.3	B	6.2	12.3	ug/Kg		16.7	B	4.7	9.47	ug/Kg					
Di-N-Octyl Phthalate		<MDL	7.2	14.4	ug/Kg		<MDL	6.2	12.3	ug/Kg			<MDL	4.7	9.47	ug/Kg					
Fluoranthene	182		3.6	7.22	ug/Kg	65.6		3.1	6.16	ug/Kg		48.5		2.4	4.73	ug/Kg					
Fluorene	8.1		3.6	7.22	ug/Kg	3.1	<RDL	3.1	6.16	ug/Kg		2.5	<RDL	2.4	4.73	ug/Kg					
Hexachlorobenzene		<MDL	0.18	0.361	ug/Kg		<MDL	0.15	0.308	ug/Kg			<MDL	0.12	0.237	ug/Kg					
Hexachlorobutadiene		<MDL	0.9	1.81	ug/Kg		<MDL	0.77	1.54	ug/Kg			<MDL	0.59	1.18	ug/Kg					
Hexachloroethane		<MDL	1.8	3.61	ug/Kg		<MDL	1.5	3.08	ug/Kg			<MDL	1.2	2.37	ug/Kg					
Indeno(1,2,3-Cd)Pyrene	44		3.6	7.22	ug/Kg	19.7		3.1	6.16	ug/Kg		12.8		2.4	4.73	ug/Kg					
Naphthalene		<MDL	3.6	7.22	ug/Kg		<MDL	3.1	6.16	ug/Kg			<MDL	2.4	4.73	ug/Kg					
N-Nitrosodiphenylamine		<MDL	7.2	14.4	ug/Kg		<MDL	6.2	12.3	ug/Kg			<MDL	4.7	9.47	ug/Kg					
Pentachlorophenol		<MDL	18	36.1	ug/Kg		<MDL	15	30.8	ug/Kg			<MDL	12	23.7	ug/Kg					
Phenanthrene	59		3.6	7.22	ug/Kg	20.2		3.1	6.16	ug/Kg		13.7		2.4	4.73	ug/Kg					
Phenol	442		7.2	14.4	ug/Kg	333		6.2	12.3	ug/Kg		38.1		4.7	9.47	ug/Kg					
Pyrene	147		3.6	7.22	ug/Kg	57.8		3.1	6.16	ug/Kg		38.3		2.4	4.73	ug/Kg					
Total HPAHS	922		3.6	7.22	ug/Kg	382		3.1	6.16	ug/Kg		251		2.4	4.73	ug/Kg					
Total LPAHs	105		3.6	7.22	ug/Kg	41		3.1	6.16	ug/Kg		28.3		2.4	4.73	ug/Kg					

King County Environmental Lab Analytical Report

	Project:	423062-200-4					Project:	423062-200-4					Project:	423062-200-4							
	Locator:	DUD_5C					Locator:	DUD_6C					Locator:	DUD_7C							
	Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM							
	Sample:	L50381-4					Sample:	L50381-5					Sample:	L50381-6							
	Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED							
	ColDate:	3/30/10 10:40					ColDate:	3/30/10 11:20					ColDate:	3/30/10 11:40							
	TimeSpan:						TimeSpan:						TimeSpan:								
	TotalSolid:	74					TotalSolid:	88.9					TotalSolid:	58.1							
	ClientLoc:						ClientLoc:						ClientLoc:								
	SampDepth:	11					SampDepth:	10					SampDepth:	10							
	DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**								
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**				
CV ASTM D422																					
Clay*	5.5		0.68	1.37	%			<MDL	0.64	1.28	%		15.6		0.82	1.65	%				
Fines*	17.8		0.68	1.37	%		1.3	RDL	0.64	1.28	%		54.3		0.82	1.65	%				
Gravel*	15.8		0.14	1.37	%		68.3		0.13	1.28	%		12.9		0.16	1.65	%				
p+0.00*	2.5		0.14	1.37	%		5.4		0.13	1.28	%		1.9		0.16	1.65	%				
p+1.00*		<MDL	0.14	1.37	%		8.3		0.13	1.28	%		7.3		0.16	1.65	%				
p+10.0(equal/more than)*	3.4		0.68	1.37	%			<MDL	0.64	1.28	%		8.2		0.82	1.65	%				
p+2.00*	33.1		0.14	1.37	%		16.5		0.13	1.28	%		10.4		0.16	1.65	%				
p+3.00*	15.3		0.14	1.37	%		5.8		0.13	1.28	%		3		0.16	1.65	%				
p+4.00*	10.5		0.14	1.37	%		1.4		0.13	1.28	%		5.4		0.16	1.65	%				
p+5.00*	4.1		0.68	1.37	%		1.3	RDL	0.64	1.28	%		5.8		0.82	1.65	%				
p+6.00*	1.4	RDL	0.68	1.37	%			<MDL	0.64	1.28	%		15.6		0.82	1.65	%				
p+7.00*	5.5		0.68	1.37	%			<MDL	0.64	1.28	%		13.2		0.82	1.65	%				
p+8.00*	1.4	RDL	0.68	1.37	%			<MDL	0.64	1.28	%		4.1		0.82	1.65	%				
p+9.00*	2.1		0.68	1.37	%			<MDL	0.64	1.28	%		7.4		0.82	1.65	%				
p-1.00*	2.7		0.14	1.37	%		19.6		0.13	1.28	%		4.4		0.16	1.65	%				
p-2.00(less than)*	6.1		0.14	1.37	%		30.9		0.13	1.28	%		8.5		0.16	1.65	%				
p-2.00*	6.9		0.14	1.37	%		17.8		0.13	1.28	%			<MDL	0.16	1.65	%				
Sand*	61.3		0.14	1.37	%		37.5		0.13	1.28	%		28		0.16	1.65	%				
Silt*	12.3		0.68	1.37	%		1.3	RDL	0.64	1.28	%		38.7		0.82	1.65	%				
CV SM2540-G																					
Total Solids*	74		0.005	0.01	%		88.9		0.005	0.01	%		58.1		0.005	0.01	%				
CV SW846 9060-PSEP96																					
Total Organic Carbon	6590		1000	2040	mg/Kg		1970		490	1000	mg/Kg		13600		980	1960	mg/Kg				
MT SW846 3050B*SW846 6010C																					
Aluminum, Total, ICP	11900		6.8	34.1	mg/Kg		9490		5.6	28.1	mg/Kg		20100		8.6	43.2	mg/Kg				
Antimony, Total, ICP		<MDL,JG	1	5.11	mg/Kg			<MDL,JG	0.84	4.22	mg/Kg		1.3	<RDL,JG	1.3	6.47	mg/Kg				
Arsenic, Total, ICP	4.9	<RDL	1.8	8.5	mg/Kg		4	<RDL	1.3	7.03	mg/Kg		7.2	<RDL	2.2	10.8	mg/Kg				
Beryllium, Total, ICP	0.484		0.068	0.341	mg/Kg		0.327		0.056	0.281	mg/Kg		0.725		0.086	0.432	mg/Kg				
Cadmium, Total, ICP		<MDL	0.14	0.68	mg/Kg			<MDL	0.11	0.562	mg/Kg		0.19	<RDL	0.17	0.864	mg/Kg				
Chromium, Total, ICP	18.6		0.2	1.02	mg/Kg		13.5		0.17	0.844	mg/Kg		25.1		0.26	1.3	mg/Kg				
Copper, Total, ICP	34.6		0.27	1.36	mg/Kg		37.6		0.22	1.12	mg/Kg		49.4		0.34	1.72	mg/Kg				
Iron, Total, ICP	18800		3.4	17	mg/Kg		17400		2.8	14.1	mg/Kg		26200		4.3	21.5	mg/Kg				
Lead, Total, ICP	10.2		1.4	6.8	mg/Kg		3.1	<RDL	1.1	5.62	mg/Kg		17.6		1.7	8.64	mg/Kg				
Manganese, Total, ICP	236		0.14	0.68	mg/Kg		234		0.11	0.562	mg/Kg		279		0.17	0.864	mg/Kg				
Nickel, Total, ICP	15.9		0.34	1.7	mg/Kg		16.1		0.28	1.41	mg/Kg		22		0.43	2.15	mg/Kg				
Selenium, Total, ICP		<MDL	1.8	8.5	mg/Kg			<MDL	1.3	7.03	mg/Kg			<MDL	2.2	10.8	mg/Kg				
Silver, Total, ICP		<MDL	0.27	1.36	mg/Kg			<MDL	0.22	1.12	mg/Kg			<MDL	0.34	1.72	mg/Kg				
Thallium, Total, ICP		<MDL	2.7	13.6	mg/Kg			<MDL	2.2	11.2	mg/Kg			<MDL	3.4	17.2	mg/Kg				
Zinc, Total, ICP	52.2		0.34	1.7	mg/Kg		37.7		0.28	1.41	mg/Kg		78.7		0.43	2.15	mg/Kg				

King County Environmental Lab Analytical Report

Project:	423062-200-4					Project:	423062-200-4					Project:	423062-200-4								
Locator:	DUD_5C					Locator:	DUD_6C					Locator:	DUD_7C								
Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM								
Sample:	L50381-4					Sample:	L50381-5					Sample:	L50381-6								
Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED								
ColDate:	3/30/10 10:40					ColDate:	3/30/10 11:20					ColDate:	3/30/10 11:40								
TimeSpan:						TimeSpan:						TimeSpan:									
TotalSolid:	74					TotalSolid:	88.9					TotalSolid:	58.1								
ClientLoc:						ClientLoc:						ClientLoc:									
SampDepth:	11					SampDepth:	10					SampDepth:	10								
DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**									
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**					
MT SW846 7471B																					
Mercury, Total, CVAA	0.19	<RDL	0.027	0.265	mg/Kg	0.028	<RDL	0.022	0.224	mg/Kg		0.15	<RDL	0.034	0.344	mg/Kg					
OR SW846 3550B*SW846 8081B																					
4,4'-DDD		<MDL	1.4	2.7	ug/Kg		<MDL	1.1	2.25	ug/Kg			<MDL	1.7	3.44	ug/Kg					
4,4'-DDE		<MDL	1.4	2.7	ug/Kg		<MDL	1.1	2.25	ug/Kg			<MDL	1.7	3.44	ug/Kg					
4,4'-DDT		<MDL	1.4	2.7	ug/Kg		<MDL	1.1	2.25	ug/Kg			<MDL	1.7	3.44	ug/Kg					
Aldrin		<MDL	1.4	2.7	ug/Kg		<MDL	1.1	2.25	ug/Kg			<MDL	1.7	3.44	ug/Kg					
Alpha-BHC		<MDL	0.68	1.35	ug/Kg		<MDL	0.56	1.12	ug/Kg			<MDL	0.86	1.72	ug/Kg					
Alpha-Chlordane		<MDL	0.68	1.35	ug/Kg		<MDL	0.56	1.12	ug/Kg			<MDL	0.86	1.72	ug/Kg					
Beta-BHC		<MDL	0.68	1.35	ug/Kg		<MDL	0.56	1.12	ug/Kg			<MDL	0.86	1.72	ug/Kg					
Delta-BHC		<MDL	0.68	1.35	ug/Kg		<MDL	0.56	1.12	ug/Kg			<MDL	0.86	1.72	ug/Kg					
Dieldrin		<MDL	1.4	2.7	ug/Kg		<MDL	1.1	2.25	ug/Kg			<MDL	1.7	3.44	ug/Kg					
Endosulfan I		<MDL	1.4	2.7	ug/Kg		<MDL	1.1	2.25	ug/Kg			<MDL	1.7	3.44	ug/Kg					
Endosulfan II		<MDL	1.4	2.7	ug/Kg		<MDL	1.1	2.25	ug/Kg			<MDL	1.7	3.44	ug/Kg					
Endosulfan Sulfate		<MDL	1.4	2.7	ug/Kg		<MDL	1.1	2.25	ug/Kg			<MDL	1.7	3.44	ug/Kg					
Endrin		<MDL	1.4	2.7	ug/Kg		<MDL	1.1	2.25	ug/Kg			<MDL	1.7	3.44	ug/Kg					
Endrin Aldehyde		<MDL	1.4	2.7	ug/Kg		<MDL	1.1	2.25	ug/Kg			<MDL	1.7	3.44	ug/Kg					
Gamma-BHC (Lindane)		<MDL	0.68	1.35	ug/Kg		<MDL	0.56	1.12	ug/Kg			<MDL	0.86	1.72	ug/Kg					
Gamma-Chlordane		<MDL	0.68	1.35	ug/Kg		<MDL	0.56	1.12	ug/Kg			<MDL	0.86	1.72	ug/Kg					
Heptachlor		<MDL	0.68	1.35	ug/Kg		<MDL	0.56	1.12	ug/Kg			<MDL	0.86	1.72	ug/Kg					
Heptachlor Epoxide		<MDL	0.68	1.35	ug/Kg		<MDL	0.56	1.12	ug/Kg			<MDL	0.86	1.72	ug/Kg					
Methoxychlor		<MDL	6.8	13.5	ug/Kg		<MDL	5.6	11.2	ug/Kg			<MDL	8.6	17.2	ug/Kg					
Toxaphene		<MDL	14	27	ug/Kg		<MDL	11	22.5	ug/Kg			<MDL	17	34.4	ug/Kg					
OR SW846 3550B*SW846 8082A																					
Aroclor 1016		<MDL,TA	11	21.6	ug/Kg		<MDL,TA	4.5	9	ug/Kg			<MDL,TA	17	34.4	ug/Kg					
Aroclor 1221		<MDL,TA	11	21.6	ug/Kg		<MDL,TA	4.5	9	ug/Kg			<MDL,TA	17	34.4	ug/Kg					
Aroclor 1232		<MDL,TA	11	21.6	ug/Kg		<MDL,TA	4.5	9	ug/Kg			<MDL,TA	17	34.4	ug/Kg					
Aroclor 1242		<MDL,TA	11	21.6	ug/Kg		<MDL,TA	4.5	9	ug/Kg			<MDL,TA	17	34.4	ug/Kg					
Aroclor 1248		<MDL,TA	11	21.6	ug/Kg		<MDL,TA	4.5	9	ug/Kg			<MDL,TA	17	34.4	ug/Kg					
Aroclor 1254	19.2		1.4	2.7	ug/Kg	2.89		1.1	2.25	ug/Kg		27.5		1.7	3.44	ug/Kg					
Aroclor 1260	11.1		1.4	2.7	ug/Kg	1.7	<RDL	1.1	2.25	ug/Kg		15.4		1.7	3.44	ug/Kg					
Total Aroclors	30.3		1.4	2.7	ug/Kg	4.53		1.1	2.25	ug/Kg		43		1.7	3.44	ug/Kg					
OR SW846 3550B*SW846 8270D																					
1,2,4-Trichlorobenzene		<MDL	0.14	0.27	ug/Kg		<MDL	0.11	0.225	ug/Kg			<MDL	0.17	0.344	ug/Kg					
1,2-Dichlorobenzene		<MDL	0.27	0.541	ug/Kg		<MDL	0.22	0.45	ug/Kg			<MDL	0.34	0.688	ug/Kg					
1,3-Dichlorobenzene		<MDL	0.27	0.541	ug/Kg		<MDL	0.22	0.45	ug/Kg			<MDL	0.34	0.688	ug/Kg					
1,4-Dichlorobenzene		<MDL	0.27	0.541	ug/Kg		<MDL	0.22	0.45	ug/Kg			<MDL	0.34	0.688	ug/Kg					
2,4-Dimethylphenol		<MDL	1.4	2.7	ug/Kg		<MDL	1.1	2.25	ug/Kg			<MDL	1.7	3.44	ug/Kg					
2-Methylnaphthalene		<MDL	2.7	5.41	ug/Kg		<MDL	2.2	4.5	ug/Kg			<MDL	3.4	6.88	ug/Kg					
2-Methylphenol		<MDL	2.7	5.41	ug/Kg		<MDL	2.2	4.5	ug/Kg			<MDL	3.4	6.88	ug/Kg					
4-Methylphenol		<MDL	5.4	10.8	ug/Kg		<MDL	4.5	9	ug/Kg			<MDL	6.9	13.8	ug/Kg					

King County Environmental Lab Analytical Report

Project:	423062-200-4					Project:	423062-200-4					Project:	423062-200-4				
Locator:	DUD_5C					Locator:	DUD_6C					Locator:	DUD_7C				
Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM				
Sample:	L50381-4					Sample:	L50381-5					Sample:	L50381-6				
Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED				
ColDate:	3/30/10 10:40					ColDate:	3/30/10 11:20					ColDate:	3/30/10 11:40				
TimeSpan:						TimeSpan:						TimeSpan:					
TotalSolid:	74					TotalSolid:	88.9					TotalSolid:	58.1				
ClientLoc:						ClientLoc:						ClientLoc:					
SampDepth:	11					SampDepth:	10					SampDepth:	10				
DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**					
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**
Acenaphthene	4.1	<RDL	2.7	5.41	ug/Kg		<MDL	2.2	4.5	ug/Kg		<MDL	3.4	6.88	ug/Kg
Acenaphthylene		<MDL	2.7	5.41	ug/Kg		<MDL	2.2	4.5	ug/Kg		<MDL	3.4	6.88	ug/Kg
Anthracene	13.6		2.7	5.41	ug/Kg		<MDL	2.2	4.5	ug/Kg	10.6		3.4	6.88	ug/Kg
Benzo(a)anthracene	55.9		2.7	5.41	ug/Kg	7.04		2.2	4.5	ug/Kg	33.6		3.4	6.88	ug/Kg
Benzo(a)pyrene	51.6		2.7	5.41	ug/Kg	6.52		2.2	4.5	ug/Kg	30.5		3.4	6.88	ug/Kg
Benzo(b)fluoranthene	87.7		2.7	5.41	ug/Kg	11		2.2	4.5	ug/Kg	48.5		3.4	6.88	ug/Kg
Benzo(g,h,i)perylene	30.4		2.7	5.41	ug/Kg	5.13		2.2	4.5	ug/Kg	20.3		3.4	6.88	ug/Kg
Benzo(k)fluoranthene	70.4		2.7	5.41	ug/Kg	10.1		2.2	4.5	ug/Kg	37.5		3.4	6.88	ug/Kg
Benzoic Acid	84.9		14	27	ug/Kg	32.7		11	22.5	ug/Kg	67.3		17	34.4	ug/Kg
Benzyl Alcohol		<MDL	2.7	5.41	ug/Kg		<MDL	2.2	4.5	ug/Kg		<MDL	3.4	6.88	ug/Kg
Benzyl Butyl Phthalate	18.9		1.4	2.7	ug/Kg		<MDL	1.1	2.25	ug/Kg	33.4		1.7	3.44	ug/Kg
Bis(2-Ethylhexyl)Phthalate	150	B2	5.4	10.8	ug/Kg	31	B	4.5	9	ug/Kg	81.4	B	6.9	13.8	ug/Kg
Caffeine		<MDL	5.4	10.8	ug/Kg		<MDL	4.5	9	ug/Kg		<MDL	6.9	13.8	ug/Kg
Carbazole	6.53		2.7	5.41	ug/Kg		<MDL	2.2	4.5	ug/Kg	3.6	<RDL	3.4	6.88	ug/Kg
Chrysene	77.7		2.7	5.41	ug/Kg	10.7		2.2	4.5	ug/Kg	43.4		3.4	6.88	ug/Kg
Coprostanol		<MDL	54	108	ug/Kg		<MDL	45	90	ug/Kg		<MDL	69	138	ug/Kg
Dibenzo(a,h)anthracene	13.6		2.7	5.41	ug/Kg		<MDL	2.2	4.5	ug/Kg	7.52		3.4	6.88	ug/Kg
Dibenzofuran	2.8	<RDL	2.7	5.41	ug/Kg		<MDL	2.2	4.5	ug/Kg		<MDL	3.4	6.88	ug/Kg
Diethyl Phthalate		<MDL	5.4	10.8	ug/Kg		<MDL	4.5	9	ug/Kg		<MDL	6.9	13.8	ug/Kg
Dimethyl Phthalate		<MDL	5.4	10.8	ug/Kg		<MDL	4.5	9	ug/Kg		<MDL	6.9	13.8	ug/Kg
Di-N-Butyl Phthalate	19.9	B	5.4	10.8	ug/Kg	14.3	B	4.5	9	ug/Kg	23.6	B	6.9	13.8	ug/Kg
Di-N-Octyl Phthalate		<MDL	5.4	10.8	ug/Kg		<MDL	4.5	9	ug/Kg		<MDL	6.9	13.8	ug/Kg
Fluoranthene	135		2.7	5.41	ug/Kg	13.3		2.2	4.5	ug/Kg	72.8		3.4	6.88	ug/Kg
Fluorene	5	<RDL	2.7	5.41	ug/Kg		<MDL	2.2	4.5	ug/Kg		<MDL	3.4	6.88	ug/Kg
Hexachlorobenzene		<MDL	0.14	0.27	ug/Kg		<MDL	0.11	0.225	ug/Kg		<MDL	0.17	0.344	ug/Kg
Hexachlorobutadiene		<MDL	0.68	1.35	ug/Kg		<MDL	0.56	1.12	ug/Kg		<MDL	0.86	1.72	ug/Kg
Hexachloroethane		<MDL	1.4	2.7	ug/Kg		<MDL	1.1	2.25	ug/Kg		<MDL	1.7	3.44	ug/Kg
Indeno(1,2,3-Cd)Pyrene	30		2.7	5.41	ug/Kg	4.61		2.2	4.5	ug/Kg	19.8		3.4	6.88	ug/Kg
Naphthalene		<MDL	2.7	5.41	ug/Kg		<MDL	2.2	4.5	ug/Kg		<MDL	3.4	6.88	ug/Kg
N-Nitrosodiphenylamine		<MDL	5.4	10.8	ug/Kg		<MDL	4.5	9	ug/Kg		<MDL	6.9	13.8	ug/Kg
Pentachlorophenol		<MDL	14	27	ug/Kg		<MDL	11	22.5	ug/Kg		<MDL	17	34.4	ug/Kg
Phenanthrene	33.8		2.7	5.41	ug/Kg	3.5	<RDL	2.2	4.5	ug/Kg	24.8		3.4	6.88	ug/Kg
Phenol	176		5.4	10.8	ug/Kg	21.3		4.5	9	ug/Kg	208		6.9	13.8	ug/Kg
Pyrene	103		2.7	5.41	ug/Kg	10.9		2.2	4.5	ug/Kg	55.8		3.4	6.88	ug/Kg
Total HPAHS	655		2.7	5.41	ug/Kg	80.9		2.2	4.5	ug/Kg	370		3.4	6.88	ug/Kg
Total LPAHs	64.3		2.7	5.41	ug/Kg	7.56		2.2	4.5	ug/Kg	44.4		3.4	6.88	ug/Kg

King County Environmental Lab Analytical Report

Project:	423062-200-4					Project:	423062-200-4			
Locator:	DUD_14C					Locator:	DUD_15C			
Descrip:	PERIMETER LOCATION					Descrip:	DUDI PERIMETER LOC			
Sample:	L50381-7					Sample:	L50381-8			
Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED			
ColDate:	3/30/10 10:55					ColDate:	3/30/10 11:04			
TimeSpan:						TimeSpan:				
TotalSolid:	47.8					TotalSolid:	55.9			
ClientLoc:						ClientLoc:				
SampDepth:	8					SampDepth:	9			
DRY Weight Basis						**DRY Weight Basis**				
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**
CV ASTM D422										
Clay*	20.8		0.94	1.89	%	14.7		0.86	1.73	%
Fines*	77.4		0.94	1.89	%	57		0.86	1.73	%
Gravel*	4.9		0.19	1.89	%	11.9		0.17	1.73	%
p+0.00*	1	<RDL	0.19	1.89	%	1	<RDL	0.17	1.73	%
p+1.00*	1.7	<RDL	0.19	1.89	%	1.9		0.17	1.73	%
p+10.0(equal/more than)*	13.2		0.94	1.89	%	9.5		0.86	1.73	%
p+2.00*	5		0.19	1.89	%	8		0.17	1.73	%
p+3.00*	0.5	<RDL	0.19	1.89	%	19.1		0.17	1.73	%
p+4.00*	19.2		0.19	1.89	%	0.8	<RDL	0.17	1.73	%
p+5.00*	13.2		0.94	1.89	%	10.4		0.86	1.73	%
p+6.00*	22.7		0.94	1.89	%	13		0.86	1.73	%
p+7.00*	13.2		0.94	1.89	%	13		0.86	1.73	%
p+8.00*	7.6		0.94	1.89	%	6		0.86	1.73	%
p+9.00*	7.6		0.94	1.89	%	5.2		0.86	1.73	%
p-1.00*	2		0.19	1.89	%	2.7		0.17	1.73	%
p-2.00(less than)*	1.4	<RDL	0.19	1.89	%	6.7		0.17	1.73	%
p-2.00*	1.5	<RDL	0.19	1.89	%	2.5		0.17	1.73	%
Sand*	27.4		0.19	1.89	%	30.8		0.17	1.73	%
Silt*	56.6		0.94	1.89	%	42.3		0.86	1.73	%
CV SM2540-G										
Total Solids*	47.8		0.005	0.01	%	55.9		0.005	0.01	%
CV SW846 9060-PSEP96										
Total Organic Carbon	19800		2000	4020	mg/Kg	16200		2000	3950	mg/Kg
MT SW846 3050B*SW846 6010C										
Aluminum, Total, ICP	25100		10	51.3	mg/Kg	20400		9.1	45.3	mg/Kg
Antimony, Total, ICP		<MDL,JG	1.5	7.68	mg/Kg		<MDL,JG	1.4	6.78	mg/Kg
Arsenic, Total, ICP	11	<RDL	2.5	12.8	mg/Kg	8.8	<RDL	2.3	11.3	mg/Kg
Beryllium, Total, ICP	0.868		0.1	0.513	mg/Kg	0.719		0.091	0.453	mg/Kg
Cadmium, Total, ICP	0.27	<RDL	0.21	1.02	mg/Kg	0.2	<RDL	0.18	0.905	mg/Kg
Chromium, Total, ICP	30.1		0.31	1.54	mg/Kg	26.1		0.27	1.36	mg/Kg
Copper, Total, ICP	59.4		0.42	2.05	mg/Kg	53.8		0.36	1.81	mg/Kg
Iron, Total, ICP	32200		5	25.5	mg/Kg	27000		4.5	22.5	mg/Kg
Lead, Total, ICP	24.1		2.1	10.2	mg/Kg	22.2		1.8	9.05	mg/Kg
Manganese, Total, ICP	328		0.21	1.02	mg/Kg	286		0.18	0.905	mg/Kg
Nickel, Total, ICP	26.6		0.5	2.55	mg/Kg	22.7		0.45	2.25	mg/Kg
Selenium, Total, ICP		<MDL	2.5	12.8	mg/Kg		<MDL	2.3	11.3	mg/Kg
Silver, Total, ICP		<MDL	0.42	2.05	mg/Kg		<MDL	0.36	1.81	mg/Kg
Thallium, Total, ICP		<MDL	4.2	20.5	mg/Kg		<MDL	3.6	18.1	mg/Kg
Zinc, Total, ICP	102		0.5	2.55	mg/Kg	87.3		0.45	2.25	mg/Kg

King County Environmental Lab Analytical Report

Project:	423062-200-4	Project:	423062-200-4
Locator:	DUD_14C	Locator:	DUD_15C
Descrip:	PERIMETER LOCATION	Descrip:	DUDI PERIMETER LOC
Sample:	L50381-7	Sample:	L50381-8
Matrix:	SF SALTWTRSED	Matrix:	SF SALTWTRSED
ColDate:	3/30/10 10:55	ColDate:	3/30/10 11:04
TimeSpan:		TimeSpan:	
TotalSolid:	47.8	TotalSolid:	55.9
ClientLoc:		ClientLoc:	
SampDepth:	8	SampDepth:	9
DRY Weight Basis		**DRY Weight Basis**	

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
MT SW846 7471B										
Mercury, Total, CVAA	0.14	<RDL	0.042	0.41	mg/Kg	0.13	<RDL	0.036	0.351	mg/Kg
OR SW846 3550B*SW846 8081B										
4,4'-DDD		<MDL	2.1	4.18	ug/Kg		<MDL	1.8	3.58	ug/Kg
4,4'-DDE		<MDL	2.1	4.18	ug/Kg		<MDL	1.8	3.58	ug/Kg
4,4'-DDT		<MDL	2.1	4.18	ug/Kg		<MDL	1.8	3.58	ug/Kg
Aldrin		<MDL	2.1	4.18	ug/Kg		<MDL	1.8	3.58	ug/Kg
Alpha-BHC		<MDL	1	2.09	ug/Kg		<MDL	0.89	1.79	ug/Kg
Alpha-Chlordane		<MDL	1	2.09	ug/Kg		<MDL	0.89	1.79	ug/Kg
Beta-BHC		<MDL	1	2.09	ug/Kg		<MDL	0.89	1.79	ug/Kg
Delta-BHC		<MDL	1	2.09	ug/Kg		<MDL	0.89	1.79	ug/Kg
Dieldrin		<MDL	2.1	4.18	ug/Kg		<MDL	1.8	3.58	ug/Kg
Endosulfan I		<MDL	2.1	4.18	ug/Kg		<MDL	1.8	3.58	ug/Kg
Endosulfan II		<MDL	2.1	4.18	ug/Kg		<MDL	1.8	3.58	ug/Kg
Endosulfan Sulfate		<MDL	2.1	4.18	ug/Kg		<MDL	1.8	3.58	ug/Kg
Endrin		<MDL	2.1	4.18	ug/Kg		<MDL	1.8	3.58	ug/Kg
Endrin Aldehyde		<MDL	2.1	4.18	ug/Kg		<MDL	1.8	3.58	ug/Kg
Gamma-BHC (Lindane)		<MDL	1	2.09	ug/Kg		<MDL	0.89	1.79	ug/Kg
Gamma-Chlordane		<MDL	1	2.09	ug/Kg		<MDL	0.89	1.79	ug/Kg
Heptachlor		<MDL	1	2.09	ug/Kg		<MDL	0.89	1.79	ug/Kg
Heptachlor Epoxide		<MDL	1	2.09	ug/Kg		<MDL	0.89	1.79	ug/Kg
Methoxychlor		<MDL	10	20.9	ug/Kg		<MDL	8.9	17.9	ug/Kg
Toxaphene		<MDL	21	41.8	ug/Kg		<MDL	18	35.8	ug/Kg
OR SW846 3550B*SW846 8082A										
Aroclor 1016		<MDL,TA	29	58.6	ug/Kg		<MDL,TA	14	28.6	ug/Kg
Aroclor 1221		<MDL,TA	29	58.6	ug/Kg		<MDL	3.6	7.16	ug/Kg
Aroclor 1232		<MDL,TA	29	58.6	ug/Kg		<MDL,TA	14	28.6	ug/Kg
Aroclor 1242		<MDL,TA	29	58.6	ug/Kg	13.3		1.8	3.58	ug/Kg
Aroclor 1248		<MDL,TA	29	58.6	ug/Kg		<MDL,TA	25	50.1	ug/Kg
Aroclor 1254	42.9		2.1	4.18	ug/Kg	38.6		1.8	3.58	ug/Kg
Aroclor 1260	21.8		2.1	4.18	ug/Kg	20		1.8	3.58	ug/Kg
Total Aroclors	64.6		2.1	4.18	ug/Kg	71.9		1.8	3.58	ug/Kg
OR SW846 3550B*SW846 8270D										
1,2,4-Trichlorobenzene		<MDL	0.21	0.418	ug/Kg		<MDL	0.18	0.358	ug/Kg
1,2-Dichlorobenzene		<MDL	0.42	0.837	ug/Kg		<MDL	0.36	0.716	ug/Kg
1,3-Dichlorobenzene		<MDL	0.42	0.837	ug/Kg		<MDL	0.36	0.716	ug/Kg
1,4-Dichlorobenzene		<MDL	0.42	0.837	ug/Kg		<MDL	0.36	0.716	ug/Kg
2,4-Dimethylphenol		<MDL	2.1	4.18	ug/Kg		<MDL	1.8	3.58	ug/Kg
2-Methylnaphthalene		<MDL	4.2	8.37	ug/Kg		<MDL	3.6	7.16	ug/Kg
2-Methylphenol		<MDL	4.2	8.37	ug/Kg		<MDL	3.6	7.16	ug/Kg
4-Methylphenol		<MDL	8.4	16.7	ug/Kg		<MDL	7.2	14.3	ug/Kg

King County Environmental Lab Analytical Report

Project:	423062-200-4	Project:	423062-200-4
Locator:	DUD_14C	Locator:	DUD_15C
Descrip:	PERIMETER LOCATION	Descrip:	DUDI PERIMETER LOC
Sample:	L50381-7	Sample:	L50381-8
Matrix:	SF SALTWTRSED	Matrix:	SF SALTWTRSED
ColDate:	3/30/10 10:55	ColDate:	3/30/10 11:04
TimeSpan:		TimeSpan:	
TotalSolid:	47.8	TotalSolid:	55.9
ClientLoc:		ClientLoc:	
SampDepth:	8	SampDepth:	9
DRY Weight Basis		**DRY Weight Basis**	

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
Acenaphthene	5.9	<RDL	4.2	8.37	ug/Kg		<MDL	3.6	7.16	ug/Kg
Acenaphthylene		<MDL	4.2	8.37	ug/Kg		<MDL	3.6	7.16	ug/Kg
Anthracene	32.4		4.2	8.37	ug/Kg	17.8		3.6	7.16	ug/Kg
Benzo(a)anthracene	93.5		4.2	8.37	ug/Kg	49.4		3.6	7.16	ug/Kg
Benzo(a)pyrene	82.4		4.2	8.37	ug/Kg	48.8		3.6	7.16	ug/Kg
Benzo(b)fluoranthene	132		4.2	8.37	ug/Kg	67.1		3.6	7.16	ug/Kg
Benzo(g,h,i)perylene	43.7		4.2	8.37	ug/Kg	30.4		3.6	7.16	ug/Kg
Benzo(k)fluoranthene	77.4		4.2	8.37	ug/Kg	60.6		3.6	7.16	ug/Kg
Benzoic Acid	129		21	41.8	ug/Kg	96.1		18	35.8	ug/Kg
Benzyl Alcohol		<MDL	4.2	8.37	ug/Kg		<MDL	3.6	7.16	ug/Kg
Benzyl Butyl Phthalate	60.3		2.1	4.18	ug/Kg	29.2		1.8	3.58	ug/Kg
Bis(2-Ethylhexyl)Phthalate	206	B2	8.4	16.7	ug/Kg	112	B2	7.2	14.3	ug/Kg
Caffeine		<MDL	8.4	16.7	ug/Kg		<MDL	7.2	14.3	ug/Kg
Carbazole	10.9		4.2	8.37	ug/Kg	5.2	<RDL	3.6	7.16	ug/Kg
Chrysene	125		4.2	8.37	ug/Kg	73.5		3.6	7.16	ug/Kg
Coprostanol		<MDL	84	167	ug/Kg		<MDL	72	143	ug/Kg
Dibenzo(a,h)anthracene	16.1		4.2	8.37	ug/Kg	11.8		3.6	7.16	ug/Kg
Dibenzofuran	5	<RDL	4.2	8.37	ug/Kg		<MDL	3.6	7.16	ug/Kg
Diethyl Phthalate		<MDL	8.4	16.7	ug/Kg		<MDL	7.2	14.3	ug/Kg
Dimethyl Phthalate		<MDL	8.4	16.7	ug/Kg		<MDL	7.2	14.3	ug/Kg
Di-N-Butyl Phthalate	31.6	B	8.4	16.7	ug/Kg	26.5	B	7.2	14.3	ug/Kg
Di-N-Octyl Phthalate		<MDL	8.4	16.7	ug/Kg		<MDL	7.2	14.3	ug/Kg
Fluoranthene	203		4.2	8.37	ug/Kg	103		3.6	7.16	ug/Kg
Fluorene	11.1		4.2	8.37	ug/Kg	5.9	<RDL	3.6	7.16	ug/Kg
Hexachlorobenzene		<MDL	0.21	0.418	ug/Kg		<MDL	0.18	0.358	ug/Kg
Hexachlorobutadiene		<MDL	1	2.09	ug/Kg		<MDL	0.89	1.79	ug/Kg
Hexachloroethane		<MDL	2.1	4.18	ug/Kg		<MDL	1.8	3.58	ug/Kg
Indeno(1,2,3-Cd)Pyrene	43.5		4.2	8.37	ug/Kg	29.5		3.6	7.16	ug/Kg
Naphthalene		<MDL	4.2	8.37	ug/Kg	7.85		3.6	7.16	ug/Kg
N-Nitrosodiphenylamine		<MDL	8.4	16.7	ug/Kg		<MDL	7.2	14.3	ug/Kg
Pentachlorophenol		<MDL	21	41.8	ug/Kg		<MDL	18	35.8	ug/Kg
Phenanthrene	69.5		4.2	8.37	ug/Kg	38.5		3.6	7.16	ug/Kg
Phenol	143		8.4	16.7	ug/Kg	167		7.2	14.3	ug/Kg
Pyrene	143		4.2	8.37	ug/Kg	83.7		3.6	7.16	ug/Kg
Total HPAHS	960		4.2	8.37	ug/Kg	558		3.6	7.16	ug/Kg
Total LPAHs	131		4.2	8.37	ug/Kg	78		3.6	7.16	ug/Kg

SAP MDL Comparison Table

King County Environmental Laboratory
SAP MDL Comparison

		Project:	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4
		Locator:	DUD_3C	DUD_4C	DUD_6C	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
		Descrip:	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	PERIMETER LOCATION	DUDI PERIMETER LOC
		Sample:	L50381-1	L50381-2	L50381-3	L50381-4	L50381-5	L50381-6	L50381-7	L50381-8
		Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
		ColDate:	3/30/10 10:15	3/30/10 10:27	3/30/10 11:32	3/30/10 10:40	3/30/10 11:20	3/30/10 11:40	3/30/10 10:55	3/30/10 11:04
		TimeSpan:								
		TotalSolid:	55.4	64.9	84.5	74	88.9	58.1	47.8	55.9
		ClientLoc:								
		SampDepth:	9	9	10	11	10	10	8	9
Parameters	Units	SAP MDL (@50% TS)	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**
CV ASTM D422										
Fines*	%	NA	0.84	0.77	0.56	0.68	0.64	0.82	0.94	0.86
Clay*	%	NA	0.84	0.77	0.56	0.68	0.64	0.82	0.94	0.86
Silt*	%	NA	0.84	0.77	0.56	0.68	0.64	0.82	0.94	0.86
Sand*	%	NA	0.17	0.15	0.11	0.14	0.13	0.16	0.19	0.17
Gravel*	%	NA	0.17	0.15	0.11	0.14	0.13	0.16	0.19	0.17
p+0.00*	%	0.1	0.17	0.15	0.11	0.14	0.13	0.16	0.19	0.17
p+1.00*	%	0.1	0.17	0.15	0.11	0.14	0.13	0.16	0.19	0.17
p+10.0(equal/more than)*	%	0.5	0.84	0.77	0.56	0.68	0.64	0.82	0.94	0.86
p+2.00*	%	0.1	0.17	0.15	0.11	0.14	0.13	0.16	0.19	0.17
p+3.00*	%	0.1	0.17	0.15	0.11	0.14	0.13	0.16	0.19	0.17
p+4.00*	%	0.1	0.17	0.15	0.11	0.14	0.13	0.16	0.19	0.17
p+5.00*	%	0.5	0.84	0.77	0.56	0.68	0.64	0.82	0.94	0.86
p+6.00*	%	0.5	0.84	0.77	0.56	0.68	0.64	0.82	0.94	0.86
p+7.00*	%	0.5	0.84	0.77	0.56	0.68	0.64	0.82	0.94	0.86
p+8.00*	%	0.5	0.84	0.77	0.56	0.68	0.64	0.82	0.94	0.86
p+9.00*	%	0.5	0.84	0.77	0.56	0.68	0.64	0.82	0.94	0.86
p-1.00*	%	0.1	0.17	0.15	0.11	0.14	0.13	0.16	0.19	0.17
p-2.00(less than)*	%	0.1	0.17	0.15	0.11	0.14	0.13	0.16	0.19	0.17
p-2.00*	%	0.1	0.17	0.15	0.11	0.14	0.13	0.16	0.19	0.17
CV SW846 9060-PSEP96										
Total Organic Carbon	mg/Kg	1000	2000	2000	1000	1000	490	980	2000	2000
CV SM2540-G										
Total Solids*	%	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
MT SW846 7471B										
Mercury, Total, CVAA	mg/Kg	0.04	0.036	0.031	0.024	0.027	0.022	0.034	0.042	0.036
MT SW846 3050B*SW846 6010C										
Aluminum, Total, ICP	mg/Kg	10	9.2	8	5.9	6.8	5.6	8.6	10	9.1
Antimony, Total, ICP	mg/Kg	1.5	1.4	1.2	0.89	1	0.84	1.3	1.5	1.4
Arsenic, Total, ICP	mg/Kg	2.6	2.3	2	1.5	1.8	1.3	2.2	2.5	2.3
Beryllium, Total, ICP	mg/Kg	0.1	0.092	0.08	0.059	0.068	0.056	0.086	0.1	0.091
Cadmium, Total, ICP	mg/Kg	0.2	0.18	0.15	0.12	0.14	0.11	0.17	0.21	0.18
Chromium, Total, ICP	mg/Kg	0.3	0.27	0.23	0.18	0.2	0.17	0.26	0.31	0.27
Copper, Total, ICP	mg/Kg	0.4	0.36	0.32	0.24	0.27	0.22	0.34	0.42	0.36
Iron, Total, ICP	mg/Kg	5	4.7	4	3	3.4	2.8	4.3	5	4.5
Lead, Total, ICP	mg/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
Manganese, Total, ICP	mg/Kg	0.2	0.18	0.15	0.12	0.14	0.11	0.17	0.21	0.18
Nickel, Total, ICP	mg/Kg	0.5	0.47	0.4	0.3	0.34	0.28	0.43	0.5	0.45
Selenium, Total, ICP	mg/Kg	2.6	2.3	2	1.5	1.8	1.3	2.2	2.5	2.3
Silver, Total, ICP	mg/Kg	0.4	0.36	0.32	0.24	0.27	0.22	0.34	0.42	0.36
Thallium, Total, ICP	mg/Kg	4	3.6	3.2	2.4	2.7	2.2	3.4	4.2	3.6
Zinc, Total, ICP	mg/Kg	0.5	0.47	0.4	0.3	0.34	0.28	0.43	0.5	0.45

King County Environmental Laboratory
SAP MDL Comparison

	Project:	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4
	Locator:	DUD_3C	DUD_4C	DUD_6C	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
	Descrip:	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	PERIMETER LOCATION	DUDI PERIMETER LOC
	Sample:	L50381-1	L50381-2	L50381-3	L50381-4	L50381-5	L50381-6	L50381-7	L50381-8
	Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
	ColDate:	3/30/10 10:15	3/30/10 10:27	3/30/10 11:32	3/30/10 10:40	3/30/10 11:20	3/30/10 11:40	3/30/10 10:55	3/30/10 11:04
	TimeSpan:								
	TotalSolid:	55.4	64.9	84.5	74	88.9	58.1	47.8	55.9
	ClientLoc:								
	SampDepth:	9	9	10	11	10	10	8	9
Parameters	Units	SAP MDL (@50% TS)	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**
OR SW846 3550B*SW846 8081B										
4,4'-DDD	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
4,4'-DDE	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
4,4'-DDT	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
Aldrin	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
Alpha-BHC	ug/Kg	1	0.9	0.77	0.59	0.68	0.56	0.86	1	0.89
Alpha-Chlordane	ug/Kg	1	0.9	0.77	0.59	0.68	0.56	0.86	1	0.89
Beta-BHC	ug/Kg	1	0.9	0.77	0.59	0.68	0.56	0.86	1	0.89
Delta-BHC	ug/Kg	1	0.9	0.77	0.59	0.68	0.56	0.86	1	0.89
Dieldrin	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
Endosulfan I	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
Endosulfan II	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
Endosulfan Sulfate	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
Endrin	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
Endrin Aldehyde	ug/Kg	4	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
Gamma-BHC (Lindane)	ug/Kg	1	0.9	0.77	0.59	0.68	0.56	0.86	1	0.89
Gamma-Chlordane	ug/Kg	1	0.9	0.77	0.59	0.68	0.56	0.86	1	0.89
Heptachlor	ug/Kg	1	0.9	0.77	0.59	0.68	0.56	0.86	1	0.89
Heptachlor Epoxide	ug/Kg	1	0.9	0.77	0.59	0.68	0.56	0.86	1	0.89
Methoxychlor	ug/Kg	10	9	7.7	5.9	6.8	5.6	8.6	10	8.9
Toxaphene	ug/Kg	20	18	15	12	14	11	17	21	18
OR SW846 3550B*SW846 8082A										
Aroclor 1016	ug/Kg	2	18	9.2	7.1	11	4.5	17	29	14
Aroclor 1221	ug/Kg	4	3.6	12	7.1	11	4.5	17	29	3.6
Aroclor 1232	ug/Kg	4	18	12	7.1	11	4.5	17	29	14
Aroclor 1242	ug/Kg	2	1.8	1.5	7.1	11	4.5	17	29	1.8
Aroclor 1248	ug/Kg	2	36	18	7.1	11	4.5	17	29	25
Aroclor 1254	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
Aroclor 1260	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
Total Aroclors	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
OR SW846 3550B*SW846 8270D										
1,2,4-Trichlorobenzene	ug/Kg	0.2	0.18	0.15	0.12	0.14	0.11	0.17	0.21	0.18
1,2-Dichlorobenzene	ug/Kg	0.4	0.36	0.31	0.24	0.27	0.22	0.34	0.42	0.36
1,3-Dichlorobenzene	ug/Kg	0.4	0.36	0.31	0.24	0.27	0.22	0.34	0.42	0.36
1,4-Dichlorobenzene	ug/Kg	0.4	0.36	0.31	0.24	0.27	0.22	0.34	0.42	0.36
2,4-Dimethylphenol	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
2-Methylnaphthalene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
2-Methylphenol	ug/Kg	8	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
4-Methylphenol	ug/Kg	8	7.2	6.2	4.7	5.4	4.5	6.9	8.4	7.2
Acenaphthene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Acenaphthylene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Anthracene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Benzo(a)anthracene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6

King County Environmental Laboratory
SAP MDL Comparison

	Project:	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4
	Locator:	DUD_3C	DUD_4C	DUD_6C	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
	Descrip:	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	PERIMETER LOCATION	DUDI PERIMETER LOC
	Sample:	L50381-1	L50381-2	L50381-3	L50381-4	L50381-5	L50381-6	L50381-7	L50381-8
	Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
	ColDate:	3/30/10 10:15	3/30/10 10:27	3/30/10 11:32	3/30/10 10:40	3/30/10 11:20	3/30/10 11:40	3/30/10 10:55	3/30/10 11:04
	TimeSpan:								
	TotalSolid:	55.4	64.9	84.5	74	88.9	58.1	47.8	55.9
	ClientLoc:								
	SampDepth:	9	9	10	11	10	10	8	9
Parameters	Units	SAP MDL (@50% TS)	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**
Benzo(a)pyrene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Benzo(b)fluoranthene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Benzo(g,h,i)perylene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Benzo(k)fluoranthene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Benzoic Acid	ug/Kg	20	18	15	12	14	11	17	21	18
Benzyl Alcohol	ug/Kg	8	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Benzyl Butyl Phthalate	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
Bis(2-Ethylhexyl)Phthalate	ug/Kg	8	7.2	6.2	4.7	5.4	4.5	6.9	8.4	7.2
Caffeine	ug/Kg	8	7.2	6.2	4.7	5.4	4.5	6.9	8.4	7.2
Carbazole	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Chrysene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Coprostanol	ug/Kg	80	72	62	47	54	45	69	84	72
Dibenzo(a,h)anthracene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Dibenzofuran	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Diethyl Phthalate	ug/Kg	8	7.2	6.2	4.7	5.4	4.5	6.9	8.4	7.2
Dimethyl Phthalate	ug/Kg	8	7.2	6.2	4.7	5.4	4.5	6.9	8.4	7.2
Di-N-Butyl Phthalate	ug/Kg	8	7.2	6.2	4.7	5.4	4.5	6.9	8.4	7.2
Di-N-Octyl Phthalate	ug/Kg	8	7.2	6.2	4.7	5.4	4.5	6.9	8.4	7.2
Fluoranthene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Fluorene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Hexachlorobenzene	ug/Kg	0.2	0.18	0.15	0.12	0.14	0.11	0.17	0.21	0.18
Hexachlorobutadiene	ug/Kg	1	0.9	0.77	0.59	0.68	0.56	0.86	1	0.89
Hexachloroethane	ug/Kg	2	1.8	1.5	1.2	1.4	1.1	1.7	2.1	1.8
Indeno(1,2,3-Cd)Pyrene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Naphthalene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
N-Nitrosodiphenylamine	ug/Kg	8	7.2	6.2	4.7	5.4	4.5	6.9	8.4	7.2
Pentachlorophenol	ug/Kg	20	18	15	12	14	11	17	21	18
Phenanthrene	ug/Kg	4	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Phenol	ug/Kg	8	7.2	6.2	4.7	5.4	4.5	6.9	8.4	7.2
Pyrene	ug/Kg	8	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Total HPAHS	ug/Kg	8	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6
Total LPAHs	ug/Kg	8	3.6	3.1	2.4	2.7	2.2	3.4	4.2	3.6

SAP & SMS OC and Dry Weight Normalization MDL Check Tables

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.22	38	38
2,4-Dimethylphenol	1	1.81	29	27
2-Methylphenol	2	3.61	63	59
4-Methylphenol	4	7.22	670	663
Acenaphthene	2	0.22	16	16
Acenaphthylene	2	0.22	66	66
Anthracene	2	0.22	220	220
Benzo(a)anthracene	2	0.22	110	110
Benzo(a)pyrene	2	0.22	99	99
Benzo(b)fluoranthene	2	0.22	115	115
Benzo(g,h,i)perylene	2	0.22	31	31
Benzo(k)fluoranthene	2	0.22	115	115
Benzoic Acid	10	18.05	650	632
Benzyl Alcohol	2	3.61	57	53
Benzyl Butyl Phthalate	1	0.11	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.44	47	47
Chrysene	2	0.22	110	110
Dibenzo(a,h)anthracene	2	0.22	12	12
Dibenzofuran	2	0.22	15	15
Diethyl Phthalate	4	0.44	61	61
Dimethyl Phthalate	4	0.44	53	53
Di-N-Butyl Phthalate	4	0.44	220	220
Di-N-Octyl Phthalate	4	0.44	58	58
Fluorene	2	0.22	23	23
Fluoranthene	2	0.22	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.06	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.22	34	34
N-Nitrosodiphenylamine	4	0.44	11	11
Naphthalene	2	0.22	99	99
Pentachlorophenol	10	18.05	360	342
Phenanthrene	2	0.22	100	100
Phenol	4	7.22	420	413
Pyrene	2	0.22	1000	1000
Aroclor 1016	10	1.10		
Aroclor 1221	2	0.22		
Aroclor 1232	10	1.10		
Aroclor 1242	1	0.11		
Aroclor 1248	20	2.21		
Aroclor 1254	1	0.11		
Aroclor 1260	1	0.11		
Total Organic Carbon (dry)	16371.84116			
Total Solids	55.4			
HPAH	20	2.21	960	958
LPAH	14	1.54	370	368
Total PCB	20	2.21	12	9.8

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.02	0.81	0.79
1,2-Dichlorobenzene	0.2	0.03	2.3	2.3
1,4-Dichlorobenzene	0.2	0.03	3.1	3.1
2-Methylnaphthalene	2	0.30	38	38
2,4-Dimethylphenol	1	1.54	29	27
2-Methylphenol	2	3.08	63	60
4-Methylphenol	4	6.16	670	664
Acenaphthene	2	0.30	16	16
Acenaphthylene	2	0.30	66	66
Anthracene	2	0.30	220	220
Benzo(a)anthracene	2	0.30	110	110
Benzo(a)pyrene	2	0.30	99	99
Benzo(b)fluoranthene	2	0.30	115	115
Benzo(g,h,i)perylene	2	0.30	31	31
Benzo(k)fluoranthene	2	0.30	115	115
Benzoic Acid	10	15.41	650	635
Benzyl Alcohol	2	3.08	57	54
Benzyl Butyl Phthalate	1	0.15	4.9	4.7
Bis(2-Ethylhexyl)Phthalate	4	0.60	47	46
Chrysene	2	0.30	110	110
Dibenzo(a,h)anthracene	2	0.30	12	12
Dibenzofuran	2	0.30	15	15
Diethyl Phthalate	4	0.60	61	60
Dimethyl Phthalate	4	0.60	53	52
Di-N-Butyl Phthalate	4	0.60	220	219
Di-N-Octyl Phthalate	4	0.60	58	57
Fluorene	2	0.30	23	23
Fluoranthene	2	0.30	160	160
Hexachlorobenzene	0.1	0.02	0.38	0.36
Hexachlorobutadiene	0.5	0.08	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.30	34	34
N-Nitrosodiphenylamine	4	0.60	11	10
Naphthalene	2	0.30	99	99
Pentachlorophenol	10	15.41	360	345
Phenanthrene	2	0.30	100	100
Phenol	4	6.16	420	414
Pyrene	2	0.30	1000	1000
Aroclor 1016	6	0.90		
Aroclor 1221	8	1.20		
Aroclor 1232	8	1.20		
Aroclor 1242	1	0.15		
Aroclor 1248	12	1.80		
Aroclor 1254	1	0.15		
Aroclor 1260	1	0.15		
Total Organic Carbon (dry)	10246.53313			
Total Solids	64.9			
HPAH	20	3.01	960	957
LPAH	14	2.11	370	368
Total PCB	12	1.80	12	10.2

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.03	0.81	0.78
1,2-Dichlorobenzene	0.2	0.07	2.3	2.2
1,4-Dichlorobenzene	0.2	0.07	3.1	3.0
2-Methylnaphthalene	2	0.68	38	37
2,4-Dimethylphenol	1	1.18	29	28
2-Methylphenol	2	2.37	63	61
4-Methylphenol	4	4.73	670	665
Acenaphthene	2	0.68	16	15
Acenaphthylene	2	0.68	66	65
Anthracene	2	0.68	220	219
Benzo(a)anthracene	2	0.68	110	109
Benzo(a)pyrene	2	0.68	99	98
Benzo(b)fluoranthene	2	0.68	115	114
Benzo(g,h,i)perylene	2	0.68	31	30
Benzo(k)fluoranthene	2	0.68	115	114
Benzoic Acid	10	11.83	650	638
Benzyl Alcohol	2	2.37	57	55
Benzyl Butyl Phthalate	1	0.34	4.9	4.6
Bis(2-Ethylhexyl)Phthalate	4	1.35	47	46
Chrysene	2	0.68	110	109
Dibenzo(a,h)anthracene	2	0.68	12	11
Dibenzofuran	2	0.68	15	14
Diethyl Phthalate	4	1.35	61	60
Dimethyl Phthalate	4	1.35	53	52
Di-N-Butyl Phthalate	4	1.35	220	219
Di-N-Octyl Phthalate	4	1.35	58	57
Fluorene	2	0.68	23	22
Fluoranthene	2	0.68	160	159
Hexachlorobenzene	0.1	0.03	0.38	0.35
Hexachlorobutadiene	0.5	0.17	3.9	3.7
Indeno(1,2,3-Cd)Pyrene	2	0.68	34	33
N-Nitrosodiphenylamine	4	1.35	11	10
Naphthalene	2	0.68	99	98
Pentachlorophenol	10	11.83	360	348
Phenanthrene	2	0.68	100	99
Phenol	4	4.73	420	415
Pyrene	2	0.68	1000	999
Aroclor 1016	6	2.03		
Aroclor 1221	6	2.03		
Aroclor 1232	6	2.03		
Aroclor 1242	6	2.03		
Aroclor 1248	6	2.03		
Aroclor 1254	1	0.34		
Aroclor 1260	1	0.34		
Total Organic Carbon (dry)	3502.95858			
Total Solids	84.5			
HPAH	20	6.76	960	953
LPAH	14	4.73	370	365
Total PCB	6	2.03	12	10.0

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.02	0.81	0.79
1,2-Dichlorobenzene	0.2	0.04	2.3	2.3
1,4-Dichlorobenzene	0.2	0.04	3.1	3.1
2-Methylnaphthalene	2	0.41	38	38
2,4-Dimethylphenol	1	1.35	29	28
2-Methylphenol	2	2.70	63	60
4-Methylphenol	4	5.41	670	665
Acenaphthene	2	0.41	16	16
Acenaphthylene	2	0.41	66	66
Anthracene	2	0.41	220	220
Benzo(a)anthracene	2	0.41	110	110
Benzo(a)pyrene	2	0.41	99	99
Benzo(b)fluoranthene	2	0.41	115	115
Benzo(g,h,i)perylene	2	0.41	31	31
Benzo(k)fluoranthene	2	0.41	115	115
Benzoic Acid	10	13.51	650	636
Benzyl Alcohol	2	2.70	57	54
Benzyl Butyl Phthalate	1	0.20	4.9	4.7
Bis(2-Ethylhexyl)Phthalate	4	0.82	47	46
Chrysene	2	0.41	110	110
Dibenzo(a,h)anthracene	2	0.41	12	12
Dibenzofuran	2	0.41	15	15
Diethyl Phthalate	4	0.82	61	60
Dimethyl Phthalate	4	0.82	53	52
Di-N-Butyl Phthalate	4	0.82	220	219
Di-N-Octyl Phthalate	4	0.82	58	57
Fluorene	2	0.41	23	23
Fluoranthene	2	0.41	160	160
Hexachlorobenzene	0.1	0.02	0.38	0.36
Hexachlorobutadiene	0.5	0.10	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.41	34	34
N-Nitrosodiphenylamine	4	0.82	11	10
Naphthalene	2	0.41	99	99
Pentachlorophenol	10	13.51	360	346
Phenanthrene	2	0.41	100	100
Phenol	4	5.41	420	415
Pyrene	2	0.41	1000	1000
Aroclor 1016	8	1.64		
Aroclor 1221	8	1.64		
Aroclor 1232	8	1.64		
Aroclor 1242	8	1.64		
Aroclor 1248	8	1.64		
Aroclor 1254	1	0.20		
Aroclor 1260	1	0.20		
Total Organic Carbon (dry)	6594.594595			
Total Solids	74			
HPAH	20	4.10	960	956
LPAH	14	2.87	370	367
Total PCB	8	1.64	12	10.4

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.06	0.81	0.75
1,2-Dichlorobenzene	0.2	0.11	2.3	2.2
1,4-Dichlorobenzene	0.2	0.11	3.1	3.0
2-Methylnaphthalene	2	1.14	38	37
2,4-Dimethylphenol	1	1.12	29	28
2-Methylphenol	2	2.25	63	61
4-Methylphenol	4	4.50	670	666
Acenaphthene	2	1.14	16	15
Acenaphthylene	2	1.14	66	65
Anthracene	2	1.14	220	219
Benzo(a)anthracene	2	1.14	110	109
Benzo(a)pyrene	2	1.14	99	98
Benzo(b)fluoranthene	2	1.14	115	114
Benzo(g,h,i)perylene	2	1.14	31	30
Benzo(k)fluoranthene	2	1.14	115	114
Benzoic Acid	10	11.25	650	639
Benzyl Alcohol	2	2.25	57	55
Benzyl Butyl Phthalate	1	0.57	4.9	4.3
Bis(2-Ethylhexyl)Phthalate	4	2.29	47	45
Chrysene	2	1.14	110	109
Dibenzo(a,h)anthracene	2	1.14	12	11
Dibenzofuran	2	1.14	15	14
Diethyl Phthalate	4	2.29	61	59
Dimethyl Phthalate	4	2.29	53	51
Di-N-Butyl Phthalate	4	2.29	220	218
Di-N-Octyl Phthalate	4	2.29	58	56
Fluorene	2	1.14	23	22
Fluoranthene	2	1.14	160	159
Hexachlorobenzene	0.1	0.06	0.38	0.32
Hexachlorobutadiene	0.5	0.29	3.9	3.6
Indeno(1,2,3-Cd)Pyrene	2	1.14	34	33
N-Nitrosodiphenylamine	4	2.29	11	9
Naphthalene	2	1.14	99	98
Pentachlorophenol	10	11.25	360	349
Phenanthrene	2	1.14	100	99
Phenol	4	4.50	420	416
Pyrene	2	1.14	1000	999
Aroclor 1016	4	2.29		
Aroclor 1221	4	2.29		
Aroclor 1232	4	2.29		
Aroclor 1242	4	2.29		
Aroclor 1248	4	2.29		
Aroclor 1254	1	0.57		
Aroclor 1260	1	0.57		
Total Organic Carbon (dry)	1968.503937			
Total Solids	88.9			
HPAH	20	11.43	960	949
LPAH	14	8.00	370	362
Total PCB	4	2.29	12	9.7

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.03	2.3	2.3
1,4-Dichlorobenzene	0.2	0.03	3.1	3.1
2-Methylnaphthalene	2	0.25	38	38
2,4-Dimethylphenol	1	1.72	29	27
2-Methylphenol	2	3.44	63	60
4-Methylphenol	4	6.88	670	663
Acenaphthene	2	0.25	16	16
Acenaphthylene	2	0.25	66	66
Anthracene	2	0.25	220	220
Benzo(a)anthracene	2	0.25	110	110
Benzo(a)pyrene	2	0.25	99	99
Benzo(b)fluoranthene	2	0.25	115	115
Benzo(g,h,i)perylene	2	0.25	31	31
Benzo(k)fluoranthene	2	0.25	115	115
Benzoic Acid	10	17.21	650	633
Benzyl Alcohol	2	3.44	57	54
Benzyl Butyl Phthalate	1	0.13	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.51	47	46
Chrysene	2	0.25	110	110
Dibenzo(a,h)anthracene	2	0.25	12	12
Dibenzofuran	2	0.25	15	15
Diethyl Phthalate	4	0.51	61	60
Dimethyl Phthalate	4	0.51	53	52
Di-N-Butyl Phthalate	4	0.51	220	219
Di-N-Octyl Phthalate	4	0.51	58	57
Fluorene	2	0.25	23	23
Fluoranthene	2	0.25	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.06	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.25	34	34
N-Nitrosodiphenylamine	4	0.51	11	10
Naphthalene	2	0.25	99	99
Pentachlorophenol	10	17.21	360	343
Phenanthrene	2	0.25	100	100
Phenol	4	6.88	420	413
Pyrene	2	0.25	1000	1000
Aroclor 1016	10	1.26		
Aroclor 1221	10	1.26		
Aroclor 1232	10	1.26		
Aroclor 1242	10	1.26		
Aroclor 1248	10	1.26		
Aroclor 1254	1	0.13		
Aroclor 1260	1	0.13		
Total Organic Carbon (dry)	13614.45783			
Total Solids	58.1			
HPAH	20	2.53	960	957
LPAH	14	1.77	370	368
Total PCB	10	1.26	12	10.7

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.21	38	38
2,4-Dimethylphenol	1	2.09	29	27
2-Methylphenol	2	4.18	63	59
4-Methylphenol	4	8.37	670	662
Acenaphthene	2	0.21	16	16
Acenaphthylene	2	0.21	66	66
Anthracene	2	0.21	220	220
Benzo(a)anthracene	2	0.21	110	110
Benzo(a)pyrene	2	0.21	99	99
Benzo(b)fluoranthene	2	0.21	115	115
Benzo(g,h,i)perylene	2	0.21	31	31
Benzo(k)fluoranthene	2	0.21	115	115
Benzoic Acid	10	20.92	650	629
Benzyl Alcohol	2	4.18	57	53
Benzyl Butyl Phthalate	1	0.11	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.42	47	47
Chrysene	2	0.21	110	110
Dibenzo(a,h)anthracene	2	0.21	12	12
Dibenzofuran	2	0.21	15	15
Diethyl Phthalate	4	0.42	61	61
Dimethyl Phthalate	4	0.42	53	53
Di-N-Butyl Phthalate	4	0.42	220	220
Di-N-Octyl Phthalate	4	0.42	58	58
Fluorene	2	0.21	23	23
Fluoranthene	2	0.21	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.05	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.21	34	34
N-Nitrosodiphenylamine	4	0.42	11	11
Naphthalene	2	0.21	99	99
Pentachlorophenol	10	20.92	360	339
Phenanthrene	2	0.21	100	100
Phenol	4	8.37	420	412
Pyrene	2	0.21	1000	1000
Aroclor 1016	14	1.48		
Aroclor 1221	14	1.48		
Aroclor 1232	14	1.48		
Aroclor 1242	14	1.48		
Aroclor 1248	14	1.48		
Aroclor 1254	1	0.11		
Aroclor 1260	1	0.11		
Total Organic Carbon (dry)	19811.71548			
Total Solids	47.8			
HPAH	20	2.11	960	958
LPAH	14	1.48	370	369
Total PCB	14	1.48	12	10.5

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.22	38	38
2,4-Dimethylphenol	1	1.79	29	27
2-Methylphenol	2	3.58	63	59
4-Methylphenol	4	7.16	670	663
Acenaphthene	2	0.22	16	16
Acenaphthylene	2	0.22	66	66
Anthracene	2	0.22	220	220
Benzo(a)anthracene	2	0.22	110	110
Benzo(a)pyrene	2	0.22	99	99
Benzo(b)fluoranthene	2	0.22	115	115
Benzo(g,h,i)perylene	2	0.22	31	31
Benzo(k)fluoranthene	2	0.22	115	115
Benzoic Acid	10	17.89	650	632
Benzyl Alcohol	2	3.58	57	53
Benzyl Butyl Phthalate	1	0.11	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.44	47	47
Chrysene	2	0.22	110	110
Dibenzo(a,h)anthracene	2	0.22	12	12
Dibenzofuran	2	0.22	15	15
Diethyl Phthalate	4	0.44	61	61
Dimethyl Phthalate	4	0.44	53	53
Di-N-Butyl Phthalate	4	0.44	220	220
Di-N-Octyl Phthalate	4	0.44	58	58
Fluorene	2	0.22	23	23
Fluoranthene	2	0.22	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.06	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.22	34	34
N-Nitrosodiphenylamine	4	0.44	11	11
Naphthalene	2	0.22	99	99
Pentachlorophenol	10	17.89	360	342
Phenanthrene	2	0.22	100	100
Phenol	4	7.16	420	413
Pyrene	2	0.22	1000	1000
Aroclor 1016	8	0.88		
Aroclor 1221	2	0.22		
Aroclor 1232	8	0.88		
Aroclor 1242	1	0.11		
Aroclor 1248	14	1.54		
Aroclor 1254	1	0.11		
Aroclor 1260	1	0.11		
Total Organic Carbon (dry)	16243.29159			
Total Solids	55.9			
HPAH	20	2.20	960	958
LPAH	14	1.54	370	368
Total PCB	14	1.54	12	10.5

CONVENTIONAL ANALYSES QC DATA

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

WG108848 PSD

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-2	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	CVPSD	SALTWTRSED	3/29/2010 12:50	4/28/2010 0:00	4/29/2010 0:00	WG108848-1, -2	
L50381-1	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 10:15	4/28/2010 0:00	4/29/2010 0:00		
L50381-2	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 10:27	4/28/2010 0:00	4/29/2010 0:00		
L50381-3	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 11:32	4/28/2010 0:00	4/29/2010 0:00		FREP @ L50381-5
L50381-4	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 10:40	4/28/2010 0:00	4/29/2010 0:00		
L50381-5	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 11:20	4/28/2010 0:00	4/29/2010 0:00		
L50381-6	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 11:40	4/28/2010 0:00	4/29/2010 0:00		
L50381-7	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 10:55	4/28/2010 0:00	4/29/2010 0:00		
L50381-8	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 11:04	4/28/2010 0:00	4/29/2010 0:00		
WG108848-1	LD		CVPSD	SALTWTRSED		4/28/2010 0:00	4/29/2010 0:00		L50380-2
WG108848-2	LT		CVPSD	SALTWTRSED		4/28/2010 0:00	4/29/2010 0:00		WG108848-1 L50380-2

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

WG108993 TOC

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-5	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	CVTOC	SALTWTRSED	3/29/2010 13:38	5/5/2010 14:30	5/11/2010 10:39	WG108993-1, -2, -4, -5, -6, -3, -7	
L50380-6	423062-200-4		CVTOC	SALTWTRSED	3/29/2010 14:03	5/5/2010 14:30	5/11/2010 11:01		
L50380-7	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 9:10	5/5/2010 14:30	5/11/2010 12:37		
L50380-8	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 9:35	5/5/2010 14:30	5/11/2010 12:58		
L50380-9	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 9:55	5/5/2010 14:30	5/11/2010 13:40		
L50381-1	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 10:15	5/5/2010 14:30	5/12/2010 8:53		
L50381-2	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 10:27	5/5/2010 14:30	5/12/2010 9:14		
L50381-3	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 11:32	5/5/2010 14:30	5/12/2010 9:35		FREP @ L50381-5
L50381-4	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 10:40	5/5/2010 14:30	5/12/2010 9:57		
L50381-5	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 11:20	5/5/2010 14:30	5/12/2010 10:26		
L50381-6	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 11:40	5/5/2010 14:30	5/12/2010 10:47		
L50381-7	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 10:55	5/5/2010 14:30	5/12/2010 11:09		
L50381-8	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 11:04	5/5/2010 14:30	5/12/2010 11:30		
WG108993-1	MB		CVTOC	OTHR SOLID		5/11/2010 9:46	5/11/2010 9:46		MB1 100511
WG108993-2	SB		CVTOC	OTHR SOLID		5/11/2010 10:00	5/11/2010 10:00		WG108993-1
WG108993-3	SRM		CVTOC	OTHR SOLID		5/11/2010 14:02	5/11/2010 14:02		HICONC
WG108993-4	LD		CVTOC	SALTWTRSED		5/5/2010 14:30	5/11/2010 11:22		L50380-6
WG108993-5	LT		CVTOC	SALTWTRSED		5/5/2010 14:30	5/11/2010 11:44		WG108993-4 L50380-6
WG108993-6	MS		CVTOC	SALTWTRSED		5/5/2010 14:30	5/11/2010 12:14		L50380-6
WG108993-7	MB		CVTOC	OTHR SOLID		5/12/2010 8:26	5/12/2010 8:26		MB1 100512

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

WG108974 Total Solids

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-5	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	CVTOTS	SALTWTRSED	3/29/2010 13:38	5/4/2010 14:55	5/5/2010 10:29	WG108974-1, -2, -3	
L50380-6	423062-200-4		CVTOTS	SALTWTRSED	3/29/2010 14:03	5/4/2010 14:55	5/5/2010 10:29		
L50380-7	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 9:10	5/4/2010 14:55	5/5/2010 10:30		
L50380-8	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 9:35	5/4/2010 14:55	5/5/2010 10:30		
L50380-9	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 9:55	5/4/2010 14:55	5/5/2010 10:32		
L50381-1	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 10:15	5/4/2010 14:55	5/5/2010 10:33		
L50381-2	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 10:27	5/4/2010 14:55	5/5/2010 10:33		
L50381-3	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 11:32	5/4/2010 14:55	5/5/2010 10:33		FREP @ L50381-5
L50381-4	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 10:40	5/4/2010 14:55	5/5/2010 10:35		
L50381-5	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 11:20	5/4/2010 14:55	5/5/2010 10:35		
L50381-6	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 11:40	5/4/2010 14:55	5/5/2010 10:36		
L50381-7	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 10:55	5/4/2010 14:55	5/5/2010 10:36		
L50381-8	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 11:04	5/4/2010 14:55	5/5/2010 10:36		
WG108974-1	MB		CVTOTS	OTHR SOLID		5/4/2010 14:55	5/5/2010 10:29		MB1 5/4/10
WG108974-2	LD		CVTOTS	SALTWTRSED		5/4/2010 14:55	5/5/2010 10:34		L50381-3
WG108974-3	LT		CVTOTS	SALTWTRSED		5/4/2010 14:55	5/5/2010 10:34		WG108974-2 L50381-3

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

Workgroup: WG108848 PSD

LT:WG108848-2 LD:WG108848-1 L50380-2 Matrix: SALTWTRSED Listtype: CVPSD Method: ASTM D422 Project: 423062-200-4
(Lab Triplicate, Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	LT Value	RSD	Qual	Lab Limit
Clay	1.1	2.19	%	23.7	25.5	23	5		20
Gravel	0.22	2.19	%	0.6	<MDL	2			20
Sand	0.22	2.19	%	15.7	10.6	13.7	20		20
Silt	1.1	2.19	%	65.4	73.9	61.2	10		20

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

Workgroup: WG108993 TOC

MB:WG108993-1 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Organic Carbon	500	1000	mg/Kg	<MDL	

SB:WG108993-2 MB:WG108993-1 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	500	1000	mg/Kg	<MDL	2500	2600	104		80--120

SRM:WG108993-3 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	2400	4780	mg/Kg	21900	20800	95		80--120

LT:WG108993-5 LD:WG108993-4 L50380-6 Matrix: SALTWTRSED Listtype: CVTOC Method: SW846 9060-PSEP96 Project: 423062-200-4
(Lab Triplicate, Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	LT Value	RSD	Qual	Lab Limit
Total Organic Carbon	1200	2370	mg/Kg	7020	7990	6840	9		20

MS:WG108993-6 L50380-6 Matrix: SALTWTRSED Listtype: CVTOC Method: SW846 9060-PSEP96 Project: 423062-200-4
(Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	1200	2450	mg/Kg	7020	6135	12800	94		75--125

MB:WG108993-7 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Organic Carbon	500	1000	mg/Kg	<MDL	

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

Workgroup: WG108974 Total Solids

MB:WG108974-1 Matrix: OTHR SOLID Listtype: CVTOTS Method: SM2540-G Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Solids	0.005	0.01	%	<MDL	

LT:WG108974-3 LD:WG108974-2 L50381-3 Matrix: SALTWTRSED Listtype: CVTOTS Method: SM2540-G Project: 423062-200-4
(Lab Triplicate, Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	LT Value	RSD	Qual	Lab Limit
Total Solids	0.005	0.01	%	84.5	83.9	84.2	0		20

METAL CHEMISTRY QC DATA

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

WG108403 Total Mercury

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	MTHG-SED	SALTWTRSED	3/29/2010 12:35	4/7/2010 7:20	4/8/2010 10:13	WG108403-1, -2, -3, -4, -5, -6, -7	
L50380-2	423062-200-4		MTHG-SED	SALTWTRSED	3/29/2010 12:50	4/7/2010 7:20	4/8/2010 10:20		
L50380-3	423062-200-4		MTHG-SED	SALTWTRSED	3/29/2010 13:10	4/7/2010 7:20	4/8/2010 10:21		
L50380-4	423062-200-4		MTHG-SED	SALTWTRSED	3/29/2010 14:28	4/7/2010 7:20	4/8/2010 10:26		FREP @ L50380-6
L50380-5	423062-200-4		MTHG-SED	SALTWTRSED	3/29/2010 13:38	4/7/2010 7:20	4/8/2010 10:27		
L50380-6	423062-200-4		MTHG-SED	SALTWTRSED	3/29/2010 14:03	4/7/2010 7:20	4/8/2010 10:29		
L50380-7	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 9:10	4/7/2010 7:20	4/8/2010 10:31		
L50380-8	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 9:35	4/7/2010 7:20	4/8/2010 10:32		
L50380-9	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 9:55	4/7/2010 7:20	4/8/2010 10:34		
L50381-1	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 10:15	4/7/2010 7:20	4/8/2010 10:35		
L50381-2	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 10:27	4/7/2010 7:20	4/8/2010 10:37		
L50381-3	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 11:32	4/7/2010 7:20	4/8/2010 10:38		FREP @ L50381-5
L50381-4	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 10:40	4/7/2010 7:20	4/8/2010 10:40		
L50381-5	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 11:20	4/7/2010 7:20	4/8/2010 10:45		
L50381-6	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 11:40	4/7/2010 7:20	4/8/2010 10:46		
L50381-7	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 10:55	4/7/2010 7:20	4/8/2010 10:48		
L50381-8	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 11:04	4/7/2010 7:20	4/8/2010 10:49		
WG108403-1	SRM		MTHG-SED	SALTWTRSED		4/7/2010 7:20	4/8/2010 10:07		PACS2
WG108403-2	SRM		MTHG-SED	SALTWTRSED		4/7/2010 7:20	4/8/2010 10:09		PACS2
WG108403-3	MB		MTHG-SED	SOLIDBLANK		4/7/2010 7:20	4/8/2010 10:10		METHOD BLANK
WG108403-4	SB		MTHG-SED	SOLIDBLANK		4/7/2010 7:20	4/8/2010 10:12		WG108403-3 HG-SOL
WG108403-5	MS		MTHG-SED	SALTWTRSED		4/7/2010 7:20	4/8/2010 10:15		L50380-1 HG-SOL
WG108403-6	MSD		MTHG-SED	SALTWTRSED		4/7/2010 7:20	4/8/2010 10:16		WG108403-5 L50380-1 HG-SOL-MSD
WG108403-7	LD		MTHG-SED	SALTWTRSED		4/7/2010 7:20	4/8/2010 10:18		L50380-1 RPD-SOL

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

WG108387 Total Metals

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	MTICP-SED	SALTWTRSED	3/29/2010 12:35	4/6/2010 12:00	4/7/2010 13:13	WG108387-1, -2, -3, -4, -5, -6, -7	
L50380-2	423062-200-4		MTICP-SED	SALTWTRSED	3/29/2010 12:50	4/6/2010 12:00	4/7/2010 13:30		
L50380-3	423062-200-4		MTICP-SED	SALTWTRSED	3/29/2010 13:10	4/6/2010 12:00	4/7/2010 13:35		
L50380-4	423062-200-4		MTICP-SED	SALTWTRSED	3/29/2010 14:28	4/6/2010 12:00	4/7/2010 13:52		FREP @ L50380-6
L50380-5	423062-200-4		MTICP-SED	SALTWTRSED	3/29/2010 13:38	4/6/2010 12:00	4/7/2010 13:57		
L50380-6	423062-200-4		MTICP-SED	SALTWTRSED	3/29/2010 14:03	4/6/2010 12:00	4/7/2010 14:03		
L50380-7	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 9:10	4/6/2010 12:00	4/7/2010 14:08		
L50380-8	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 9:35	4/6/2010 12:00	4/7/2010 14:14		
L50380-9	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 9:55	4/6/2010 12:00	4/7/2010 14:19		
L50381-1	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 10:15	4/6/2010 12:00	4/7/2010 14:25		
L50381-2	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 10:27	4/6/2010 12:00	4/7/2010 14:30		
L50381-3	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 11:32	4/6/2010 12:00	4/7/2010 14:36		FREP @ L50381-5
L50381-4	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 10:40	4/6/2010 12:00	4/7/2010 14:41		
L50381-5	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 11:20	4/6/2010 12:00	4/7/2010 14:58		
L50381-6	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 11:40	4/6/2010 12:00	4/7/2010 15:04		
L50381-7	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 10:55	4/6/2010 12:00	4/7/2010 15:09		
L50381-8	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 11:04	4/6/2010 12:00	4/7/2010 15:15		
WG108387-1	SB		MTICP-SED	SOLIDBLANK		4/6/2010 12:00	4/7/2010 12:46		WG108387-2 ICPMARINE
WG108387-2	MB		MTICP-SED	SOLIDBLANK		4/6/2010 12:00	4/7/2010 12:51		METHOD BLANK
WG108387-3	LD		MTICP-SED	SALTWTRSED		4/6/2010 12:00	4/7/2010 13:19		L50380-1 RPD-SOL
WG108387-4	MS		MTICP-SED	SALTWTRSED		4/6/2010 12:00	4/7/2010 13:24		L50380-1 ICPMARINE
WG108387-5	LCS		MTICP-SED	SOIL		4/6/2010 12:00	4/7/2010 12:57		ERASOIL
WG108387-6	LCS		MTICP-SED	SOIL		4/6/2010 12:00	4/7/2010 13:02		ERASOIL
WG108387-7	SRM		MTICP-SED	SALTWTRSED		4/6/2010 12:00	4/7/2010 13:08		PACS2

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

Workgroup: WG108403 Total Mercury

SRM:WG108403-1 Matrix: SALTWTRSED Listtype: MTHG-SED Method: SW846 7471B Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.1	1.02	mg/Kg	3.04	3.44	113		80--120

SRM:WG108403-2 Matrix: SALTWTRSED Listtype: MTHG-SED Method: SW846 7471B Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.1	1.02	mg/Kg	3.04	3.23	106		80--120

MB:WG108403-3 Matrix: SOLIDBLANK Listtype: MTHG-SED Method: SW846 7471B Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Mercury, Total, CVAA	0.019	0.19	mg/Kg	<MDL	

SB:WG108403-4 MB:WG108403-3 Matrix: SOLIDBLANK Listtype: MTHG-SED Method: SW846 7471B Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.019	0.19	mg/Kg	<MDL	0.476	0.489	103		85--115

MSD:WG108403-6 MS:WG108403-5 L50380-1 Matrix: SALTWTRSED Listtype: MTHG-SED Method: SW846 7471B Project: 423062-200-4
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	Samp Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Mercury, Total, CVAA	0.019	0.194	mg/Kg	0.075	0.479	0.557	101		75--125	0.484	0.565	101		0		20

LD:WG108403-7 L50380-1 Matrix: SALTWTRSED Listtype: MTHG-SED Method: SW846 7471B Project: 423062-200-4
(Lab Duplicate)

Parameter	MDL	RDL	Units	Samp Value	LD Value	RPD^	Qual	Lab Limit
Mercury, Total, CVAA	0.019	0.191	mg/Kg	0.075	0.077			20

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

Workgroup: WG108387 Total Metals

SB:WG108387-1 MB:WG108387-2 Matrix: SOLIDBLANK Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	4.8	23.8	mg/Kg	<MDL	9570	9650	101		85--115
Antimony, Total, ICP	0.71	3.57	mg/Kg	<MDL	47.6	48.7	102		85--115
Arsenic, Total, ICP	1.2	5.95	mg/Kg	<MDL	47.6	47.9	101		85--115
Beryllium, Total, ICP	0.048	0.238	mg/Kg	<MDL	47.6	48.2	101		85--115
Cadmium, Total, ICP	0.095	0.476	mg/Kg	<MDL	47.6	46.7	98		85--115
Chromium, Total, ICP	0.14	0.714	mg/Kg	<MDL	47.6	48.2	101		85--115
Copper, Total, ICP	0.19	0.952	mg/Kg	<MDL	47.6	48.3	101		85--115
Iron, Total, ICP	2.4	11.9	mg/Kg	<MDL	4810	4880	101		85--115
Lead, Total, ICP	0.95	4.76	mg/Kg	<MDL	47.6	46.6	98		85--115
Manganese, Total, ICP	0.095	0.476	mg/Kg	<MDL	238	238	100		85--115
Nickel, Total, ICP	0.24	1.19	mg/Kg	<MDL	47.6	46.7	98		85--115
Selenium, Total, ICP	1.2	5.95	mg/Kg	<MDL	47.6	44.6	94		85--115
Silver, Total, ICP	0.19	0.952	mg/Kg	<MDL	47.6	48.4	102		85--115
Thallium, Total, ICP	1.9	9.52	mg/Kg	<MDL	47.6	46.6	98		85--115
Zinc, Total, ICP	0.24	1.19	mg/Kg	<MDL	238	226	95		85--115

MB:WG108387-2 Matrix: SOLIDBLANK Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Aluminum, Total, ICP	4.8	23.8	mg/Kg	<MDL	
Antimony, Total, ICP	0.71	3.57	mg/Kg	<MDL	
Arsenic, Total, ICP	1.2	5.95	mg/Kg	<MDL	
Beryllium, Total, ICP	0.048	0.238	mg/Kg	<MDL	
Cadmium, Total, ICP	0.095	0.476	mg/Kg	<MDL	
Chromium, Total, ICP	0.14	0.714	mg/Kg	<MDL	
Copper, Total, ICP	0.19	0.952	mg/Kg	<MDL	
Iron, Total, ICP	2.4	11.9	mg/Kg	<MDL	
Lead, Total, ICP	0.95	4.76	mg/Kg	<MDL	
Manganese, Total, ICP	0.095	0.476	mg/Kg	<MDL	
Nickel, Total, ICP	0.24	1.19	mg/Kg	<MDL	
Selenium, Total, ICP	1.2	5.95	mg/Kg	<MDL	
Silver, Total, ICP	0.19	0.952	mg/Kg	<MDL	
Thallium, Total, ICP	1.9	9.52	mg/Kg	<MDL	
Zinc, Total, ICP	0.24	1.19	mg/Kg	<MDL	

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

LD:WG108387-3 L50380-1 Matrix: SALTWTRSED Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: 423062-200-4
(Lab Duplicate)

Parameter	MDL	RDL	Units	Samp Value	LD Value	RPD^	Qual	Lab Limit
Aluminum, Total, ICP	4.9	24.5	mg/Kg	11800	12400	5		20
Antimony, Total, ICP	0.74	3.68	mg/Kg	0.76	<MDL			20
Arsenic, Total, ICP	1.2	6.13	mg/Kg	5.7	6.2	9		20
Beryllium, Total, ICP	0.049	0.245	mg/Kg	0.376	0.391	4		20
Cadmium, Total, ICP	0.098	0.49	mg/Kg	0.16	0.21			20
Chromium, Total, ICP	0.15	0.735	mg/Kg	14.1	14.7	4		20
Copper, Total, ICP	0.2	0.98	mg/Kg	32.6	34.5	6		20
Iron, Total, ICP	2.5	12.3	mg/Kg	15800	16500	5		20
Lead, Total, ICP	0.98	4.9	mg/Kg	14.1	14.8	5		20
Manganese, Total, ICP	0.098	0.49	mg/Kg	162	170	5		20
Nickel, Total, ICP	0.25	1.23	mg/Kg	11.6	12.1	4		20
Selenium, Total, ICP	1.2	6.13	mg/Kg	<MDL	<MDL			20
Silver, Total, ICP	0.2	0.98	mg/Kg	<MDL	<MDL			20
Thallium, Total, ICP	2	9.8	mg/Kg	<MDL	<MDL			20
Zinc, Total, ICP	0.25	1.23	mg/Kg	62.2	66.9	7		20

MS:WG108387-4 L50380-1 Matrix: SALTWTRSED Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: 423062-200-4
(Matrix Spike)

Parameter	MDL	RDL	Units	Samp Value	True Value	MS Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	5	25.2	mg/Kg	11800	10100	23700	117		75--125
Antimony, Total, ICP	0.76	3.78	mg/Kg	0.76	50.4	10.7	20	*	75--125
Arsenic, Total, ICP	1.3	6.3	mg/Kg	5.7	50.4	54.3	96		75--125
Beryllium, Total, ICP	0.05	0.252	mg/Kg	0.376	50.4	48.4	95		75--125
Cadmium, Total, ICP	0.1	0.504	mg/Kg	0.16	50.4	47.7	94		75--125
Chromium, Total, ICP	0.15	0.756	mg/Kg	14.1	50.4	63.1	97		75--125
Copper, Total, ICP	0.2	1.01	mg/Kg	32.6	50.4	83.1	100		75--125
Iron, Total, ICP	2.5	12.6	mg/Kg	15800	5090	21200	107		75--125
Lead, Total, ICP	1	5.04	mg/Kg	14.1	50.4	60.6	92		75--125
Manganese, Total, ICP	0.1	0.504	mg/Kg	162	252	401	95		75--125
Nickel, Total, ICP	0.25	1.26	mg/Kg	11.6	50.4	58.6	93		75--125
Selenium, Total, ICP	1.3	6.3	mg/Kg	<MDL	50.4	44.7	89		75--125
Silver, Total, ICP	0.2	1.01	mg/Kg	<MDL	50.4	49.7	99		75--125
Thallium, Total, ICP	2	10.1	mg/Kg	<MDL	50.4	47.5	94		75--125
Zinc, Total, ICP	0.25	1.26	mg/Kg	62.2	252	288	90		75--125

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

LCS:WG108387-5 Matrix: SOIL Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: NONE
(Lab Control Sample)

Parameter	MDL	RDL	Units	True Value	LCS Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	22	109	mg/Kg	8260	7340	89		61--139
Antimony, Total, ICP	3.3	16.3	mg/Kg	90.2	68.9	76		10--211
Arsenic, Total, ICP	5.4	27.2	mg/Kg	132	134	102		80--120
Beryllium, Total, ICP	0.22	1.09	mg/Kg	89.5	90.9	102		80--120
Cadmium, Total, ICP	0.43	2.17	mg/Kg	66.5	68.9	104		80--120
Chromium, Total, ICP	0.65	3.26	mg/Kg	72.9	69.3	95		79--121
Copper, Total, ICP	0.87	4.35	mg/Kg	68.5	66.5	97		80--120
Iron, Total, ICP	11	54.3	mg/Kg	13400	10900	81		50--149
Lead, Total, ICP	4.3	21.7	mg/Kg	130	132	102		80--120
Manganese, Total, ICP	0.43	2.17	mg/Kg	453	451	99		80--120
Nickel, Total, ICP	1.1	5.43	mg/Kg	55.6	55.1	99		80--120
Selenium, Total, ICP	5.4	27.2	mg/Kg	161	164	102		78--122
Silver, Total, ICP	0.87	4.35	mg/Kg	101	106	105		66--134
Thallium, Total, ICP	8.7	43.5	mg/Kg	133	141	106		77--123
Zinc, Total, ICP	1.1	5.43	mg/Kg	177	174	98		79--121

LCS:WG108387-6 Matrix: SOIL Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: NONE
(Lab Control Sample)

Parameter	MDL	RDL	Units	True Value	LCS Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	21	105	mg/Kg	8260	7380	89		61--139
Antimony, Total, ICP	3.2	15.8	mg/Kg	90.2	70.7	78		10--211
Arsenic, Total, ICP	5.3	26.4	mg/Kg	132	132	100		80--120
Beryllium, Total, ICP	0.21	1.05	mg/Kg	89.5	90.5	101		80--120
Cadmium, Total, ICP	0.42	2.11	mg/Kg	66.5	70.8	106		80--120
Chromium, Total, ICP	0.63	3.16	mg/Kg	72.9	70.4	97		79--121
Copper, Total, ICP	0.84	4.22	mg/Kg	68.5	67.1	98		80--120
Iron, Total, ICP	11	52.7	mg/Kg	13400	10700	80		50--149
Lead, Total, ICP	4.2	21.1	mg/Kg	130	129	99		80--120
Manganese, Total, ICP	0.42	2.11	mg/Kg	453	446	98		80--120
Nickel, Total, ICP	1.1	5.27	mg/Kg	55.6	55.7	100		80--120
Selenium, Total, ICP	5.3	26.4	mg/Kg	161	161	100		78--122
Silver, Total, ICP	0.84	4.22	mg/Kg	101	105	104		66--134
Thallium, Total, ICP	8.4	42.2	mg/Kg	133	146	110		77--123
Zinc, Total, ICP	1.1	5.27	mg/Kg	177	172	97		79--121

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

SRM:WG108387-7 Matrix: SALTWTRSED Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	21	107	mg/Kg	66200	15300	23		10--43
Chromium, Total, ICP	0.64	3.2	mg/Kg	90.7	45.6	50		30--70
Copper, Total, ICP	0.85	4.26	mg/Kg	310	300	97		78--118
Iron, Total, ICP	11	53.3	mg/Kg	40900	30500	75		55--95
Lead, Total, ICP	4.3	21.3	mg/Kg	183	172	94		74--114
Manganese, Total, ICP	0.43	2.13	mg/Kg	440	239	54		35--75
Nickel, Total, ICP	1.1	5.33	mg/Kg	39.5	29.4	74		51--91
Zinc, Total, ICP	1.1	5.33	mg/Kg	364	331	91		73--113

ORGANIC CHEMISTRY QC DATA

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

WG108497 Semi Volatile Organics

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	ORBNASMS	SALTWTRSED	3/29/2010 12:35	4/13/2010 6:00	5/10/2010 9:30	WG108497-2, -5, -4, -3, -1, -6	
L50380-2	423062-200-4		ORBNASMS	SALTWTRSED	3/29/2010 12:50	4/13/2010 6:00	5/10/2010 10:08		
L50380-3	423062-200-4		ORBNASMS	SALTWTRSED	3/29/2010 13:10	4/13/2010 6:00	5/10/2010 10:47		
L50380-4	423062-200-4		ORBNASMS	SALTWTRSED	3/29/2010 14:28	4/13/2010 6:00	5/10/2010 11:25		FREP @ L50380-6
L50380-5	423062-200-4		ORBNASMS	SALTWTRSED	3/29/2010 13:38	4/13/2010 6:00	5/10/2010 12:04		
L50380-6	423062-200-4		ORBNASMS	SALTWTRSED	3/29/2010 14:03	4/13/2010 6:00	5/6/2010 13:09	WG108497-5	
L50380-7	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 9:10	4/13/2010 6:00	5/10/2010 12:42	WG108497-2, -5, -4, -3, -1, -6	
L50380-8	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 9:35	4/13/2010 6:00	5/10/2010 13:21		
L50380-9	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 9:55	4/13/2010 6:00	5/10/2010 13:59		
L50381-1	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 10:15	4/13/2010 6:00	5/10/2010 14:38		
L50381-2	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 10:27	4/13/2010 6:00	5/10/2010 15:16		
L50381-3	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 11:32	4/13/2010 6:00	5/10/2010 15:55		FREP @ L50381-5
L50381-4	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 10:40	4/13/2010 6:00	5/10/2010 16:33		
L50381-5	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 11:20	4/13/2010 6:00	5/10/2010 17:12		
L50381-6	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 11:40	4/13/2010 6:00	5/10/2010 17:50		
L50381-7	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 10:55	4/13/2010 6:00	5/10/2010 18:28		
L50381-8	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 11:04	4/13/2010 6:00	5/10/2010 19:07		
WG108497-1	MB		ORBNASMS	OTHR SOLID		4/13/2010 6:00	5/4/2010 12:08		MB100413
WG108497-2	SB		ORBNASMS	OTHR SOLID		4/13/2010 6:00	5/4/2010 12:46		WG108497-1
WG108497-3	MS		ORBNASMS	SALTWTRSED		4/13/2010 6:00	5/6/2010 11:14		L50380-5
WG108497-4	MSD		ORBNASMS	SALTWTRSED		4/13/2010 6:00	5/6/2010 11:52		WG108497-3 L50380-5
WG108497-5	LD		ORBNASMS	SALTWTRSED		4/13/2010 6:00	5/6/2010 12:31		L50380-6
WG108497-6	SRM		ORBNASMS	SALTWTRSED		4/13/2010 6:00	5/4/2010 13:25		1944

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

WG108469 PCB

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	ORPCBLL	SALTWTRSED	3/29/2010 12:35	4/9/2010 9:00	5/4/2010 16:37	WG108469-1, -2, -3, -4, -8, -9	
L50380-2	423062-200-4		ORPCBLL	SALTWTRSED	3/29/2010 12:50	4/9/2010 9:00	5/4/2010 23:25		
L50380-3	423062-200-4		ORPCBLL	SALTWTRSED	3/29/2010 13:10	4/9/2010 9:00	5/5/2010 11:10		
L50380-4	423062-200-4		ORPCBLL	SALTWTRSED	3/29/2010 14:28	4/9/2010 9:00	5/4/2010 22:11		FREP @ L50380-6
L50380-5	423062-200-4		ORPCBLL	SALTWTRSED	3/29/2010 13:38	4/9/2010 9:00	5/5/2010 0:02		
L50380-6	423062-200-4		ORPCBLL	SALTWTRSED	3/29/2010 14:03	4/9/2010 9:00	5/5/2010 0:39		
L50380-7	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 9:10	4/9/2010 9:00	5/5/2010 1:17		
L50380-8	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 9:35	4/9/2010 9:00	5/5/2010 1:54		
L50380-9	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 9:55	4/9/2010 9:00	5/5/2010 2:31		
L50381-1	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 10:15	4/9/2010 9:00	5/5/2010 3:08		
L50381-2	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 10:27	4/9/2010 9:00	5/5/2010 5:36		
L50381-3	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 11:32	4/9/2010 9:00	5/5/2010 6:14		FREP @ L50381-5
L50381-4	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 10:40	4/9/2010 9:00	5/5/2010 6:51		
L50381-5	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 11:20	4/9/2010 9:00	5/5/2010 7:28		
L50381-6	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 11:40	4/9/2010 9:00	5/5/2010 8:05		
L50381-7	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 10:55	4/9/2010 9:00	5/5/2010 8:42		
L50381-8	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 11:04	4/9/2010 9:00	5/5/2010 9:19		
WG108469-1	MB		ORPCBLL	OTHR SOLID		4/9/2010 9:00	5/4/2010 14:08		MB100409
WG108469-2	SB		ORPCBLL	OTHR SOLID		4/9/2010 9:00	5/4/2010 14:46		WG108469-1
WG108469-3	MS		ORPCBLL	SALTWTRSED		4/9/2010 9:00	5/4/2010 15:23		L50380-1
WG108469-4	MSD		ORPCBLL	SALTWTRSED		4/9/2010 9:00	5/4/2010 16:00		WG108469-3 L50380-1
WG108469-8	LD		ORPCBLL	SALTWTRSED		4/9/2010 9:00	5/4/2010 21:34		L50380-4
WG108469-9	SRM		ORPCBLL	OTHR SOLID		4/9/2010 9:00	5/4/2010 22:48		HS-2

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

WG108461 Pesticides

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	ORPESTLL	SALTWTRSED	3/29/2010 12:35	4/11/2010 6:00	4/28/2010 18:03	WG108461-1, -2, -3, -4, -5, -6	
L50380-2	423062-200-4		ORPESTLL	SALTWTRSED	3/29/2010 12:50	4/11/2010 6:00	4/28/2010 18:40		
L50380-3	423062-200-4		ORPESTLL	SALTWTRSED	3/29/2010 13:10	4/11/2010 6:00	4/28/2010 21:08		
L50380-4	423062-200-4		ORPESTLL	SALTWTRSED	3/29/2010 14:28	4/11/2010 6:00	4/28/2010 21:46		FREP @ L50380-6
L50380-5	423062-200-4		ORPESTLL	SALTWTRSED	3/29/2010 13:38	4/11/2010 6:00	4/28/2010 22:23		
L50380-6	423062-200-4		ORPESTLL	SALTWTRSED	3/29/2010 14:03	4/11/2010 6:00	4/28/2010 23:00		
L50380-7	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 9:10	4/11/2010 6:00	4/28/2010 23:37		
L50380-8	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 9:35	4/11/2010 6:00	4/29/2010 0:14		
L50380-9	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 9:55	4/11/2010 6:00	4/29/2010 0:51		
L50381-1	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 10:15	4/11/2010 6:00	4/28/2010 15:34		
L50381-2	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 10:27	4/11/2010 6:00	4/29/2010 1:28		
L50381-3	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 11:32	4/11/2010 6:00	4/28/2010 16:48		FREP @ L50381-5
L50381-4	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 10:40	4/11/2010 6:00	4/29/2010 2:05		
L50381-5	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 11:20	4/11/2010 6:00	4/29/2010 2:42		
L50381-6	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 11:40	4/11/2010 6:00	4/29/2010 5:11		
L50381-7	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 10:55	4/11/2010 6:00	4/29/2010 5:48		
L50381-8	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 11:04	4/11/2010 6:00	4/29/2010 6:25		
WG108461-1	MB		ORPESTLL	OTHR SOLID		4/11/2010 6:00	4/28/2010 13:05		MB100411
WG108461-2	SB		ORPESTLL	OTHR SOLID		4/11/2010 6:00	4/28/2010 13:43		WG108461-1
WG108461-3	MS		ORPESTLL	SALTWTRSED		4/11/2010 6:00	4/28/2010 14:20		L50381-1
WG108461-4	MSD		ORPESTLL	SALTWTRSED		4/11/2010 6:00	4/28/2010 14:57		WG108461-3 L50381-1
WG108461-5	LD		ORPESTLL	SALTWTRSED		4/11/2010 6:00	4/28/2010 16:11		L50381-3
WG108461-6	SRM		ORPESTLL	OTHR SOLID		4/11/2010 6:00	4/28/2010 17:25		1944

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

Workgroup: WG108497 Semi Volatile Organics

MB:WG108497-1 Matrix: OTHR SOLID Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: NONE
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
1,2,4-Trichlorobenzene	0.1	0.2	ug/Kg	<MDL	
1,2-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	
1,3-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	
1,4-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	
2,4-Dimethylphenol	1	2	ug/Kg	<MDL	
2-Methylnaphthalene	2	4	ug/Kg	<MDL	
2-Methylphenol	2	4	ug/Kg	<MDL	
4-Methylphenol	4	8	ug/Kg	<MDL	
Acenaphthene	2	4	ug/Kg	<MDL	
Acenaphthylene	2	4	ug/Kg	<MDL	
Anthracene	2	4	ug/Kg	<MDL	
Benzo(a)anthracene	2	4	ug/Kg	<MDL	
Benzo(a)pyrene	2	4	ug/Kg	<MDL	
Benzo(b)fluoranthene	2	4	ug/Kg	<MDL	
Benzo(g,h,i)perylene	2	4	ug/Kg	<MDL	
Benzo(k)fluoranthene	2	4	ug/Kg	<MDL	
Benzoic Acid	10	20	ug/Kg	<MDL	
Benzyl Alcohol	2	4	ug/Kg	<MDL	
Benzyl Butyl Phthalate	1	2	ug/Kg	<MDL	
Bis(2-Ethylhexyl)Phthalate	4	8	ug/Kg	11.6	B
Caffeine	4	8	ug/Kg	<MDL	
Carbazole	2	4	ug/Kg	<MDL	
Chrysene	2	4	ug/Kg	<MDL	
Coprostanol	40	80	ug/Kg	<MDL	
Di-N-Butyl Phthalate	4	8	ug/Kg	12.6	B
Di-N-Octyl Phthalate	4	8	ug/Kg	<MDL	
Dibenzo(a,h)anthracene	2	4	ug/Kg	<MDL	
Dibenzofuran	2	4	ug/Kg	<MDL	
Diethyl Phthalate	4	8	ug/Kg	<MDL	
Dimethyl Phthalate	4	8	ug/Kg	<MDL	
Fluoranthene	2	4	ug/Kg	<MDL	
Fluorene	2	4	ug/Kg	<MDL	
Hexachlorobenzene	0.1	0.2	ug/Kg	<MDL	
Hexachlorobutadiene	0.5	1	ug/Kg	<MDL	
Hexachloroethane	1	2	ug/Kg	<MDL	
Indeno(1,2,3-Cd)Pyrene	2	4	ug/Kg	<MDL	
N-Nitrosodiphenylamine	4	8	ug/Kg	<MDL	
Naphthalene	2	4	ug/Kg	<MDL	
Pentachlorophenol	10	20	ug/Kg	<MDL	
Phenanthrene	2	4	ug/Kg	<MDL	

Phenol	4	8	ug/Kg	<MDL
Pyrene	2	4	ug/Kg	<MDL
Total HPAHS	2	4	ug/Kg	<MDL
Total LPAHs	2	4	ug/Kg	<MDL

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

SB:WG108497-2 MB:WG108497-1 Matrix: OTHR SOLID Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
1,2,4-Trichlorobenzene	0.1	0.2	ug/Kg	<MDL	375	175	47		30--110
1,2-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	216	57		10--116
1,3-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	228	61		18--95
1,4-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	201	54		21--99
2,4-Dimethylphenol	1	2	ug/Kg	<MDL	375	66.5	18		10--81
2-Methylnaphthalene	2	4	ug/Kg	<MDL	375	172	46		22--99
2-Methylphenol	2	4	ug/Kg	<MDL	375	147	39		16--91
4-Methylphenol	4	8	ug/Kg	<MDL	375	170	45		10--125
Acenaphthene	2	4	ug/Kg	<MDL	375	247	66		29--102
Acenaphthylene	2	4	ug/Kg	<MDL	375	253	67		31--101
Anthracene	2	4	ug/Kg	<MDL	375	238	63		45--114
Benzo(a)anthracene	2	4	ug/Kg	<MDL	375	301	80		69--117
Benzo(a)pyrene	2	4	ug/Kg	<MDL	375	281	75		15--137
Benzo(b)fluoranthene	2	4	ug/Kg	<MDL	375	299	80		50--121
Benzo(g,h,i)perylene	2	4	ug/Kg	<MDL	375	301	80		46--126
Benzo(k)fluoranthene	2	4	ug/Kg	<MDL	375	332	89		58--128
Benzoic Acid	10	20	ug/Kg	<MDL	375	161	43		10--170
Benzyl Alcohol	2	4	ug/Kg	<MDL	375	173	46		10--119
Benzyl Butyl Phthalate	1	2	ug/Kg	<MDL	375	312	83		15--183
Bis(2-Ethylhexyl)Phthalate	4	8	ug/Kg	11.6	375	293	75		10--182
Caffeine	4	8	ug/Kg	<MDL	375	270	72		45--159
Carbazole	2	4	ug/Kg	<MDL	375	260	69		44--179
Chrysene	2	4	ug/Kg	<MDL	375	272	72		69--111
Coprostanol	40	80	ug/Kg	<MDL	3750	614	16		10--159
Di-N-Butyl Phthalate	4	8	ug/Kg	12.6	375	259	66		17--180
Di-N-Octyl Phthalate	4	8	ug/Kg	<MDL	375	321	86		10--200
Dibenzo(a,h)anthracene	2	4	ug/Kg	<MDL	375	325	87		53--129
Dibenzofuran	2	4	ug/Kg	<MDL	375	242	65		37--97
Diethyl Phthalate	4	8	ug/Kg	<MDL	375	284	76		51--118
Dimethyl Phthalate	4	8	ug/Kg	<MDL	375	287	77		38--114
Fluoranthene	2	4	ug/Kg	<MDL	375	281	75		55--132
Fluorene	2	4	ug/Kg	<MDL	375	266	71		39--106
Hexachlorobenzene	0.1	0.2	ug/Kg	<MDL	375	245	65		40--111
Hexachlorobutadiene	0.5	1	ug/Kg	<MDL	375	179	48		10--97
Hexachloroethane	1	2	ug/Kg	<MDL	375	229	61		17--92
Indeno(1,2,3-Cd)Pyrene	2	4	ug/Kg	<MDL	375	321	86		51--132
N-Nitrosodiphenylamine	4	8	ug/Kg	<MDL	375	225	60		11--148
Naphthalene	2	4	ug/Kg	<MDL	375	180	48		17--94
Pentachlorophenol	10	20	ug/Kg	<MDL	375	159	42		38--124
Phenanthrene	2	4	ug/Kg	<MDL	375	249	66		57--104
Phenol	4	8	ug/Kg	<MDL	375	181	48		10--107
Pyrene	2	4	ug/Kg	<MDL	375	279	74		48--132

Total HPAHS	2	4	ug/Kg	<MDL	3750	2990	80	50--150
Total LPAHs	2	4	ug/Kg	<MDL	2630	1600	61	50--150

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

MSD:WG108497-4 MS:WG108497-3 L50380-5 Matrix: SALTWTRSED Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: NONE
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
1,2,4-Trichlorobenzene	0.1	0.2	ug/Kg	<MDL	375	158	42		10--115	375	182	48		13		100
1,2-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	184	49		10--105	375	222	59		19		100
1,3-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	180	48		10--103	375	234	62		25		100
1,4-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	161	43		10--104	375	199	53		21		100
2,4-Dimethylphenol	1	2	ug/Kg	<MDL	375	142	38		10--150	375	176	47		21		100
2-Methylnaphthalene	2	4	ug/Kg	2.3	375	201	53		22--112	375	210	56		6		100
2-Methylphenol	2	4	ug/Kg	<MDL	375	202	54		10--142	375	277	74		31		100
4-Methylphenol	4	8	ug/Kg	<MDL	375	242	65		10--163	375	287	76		16		100
Acenaphthene	2	4	ug/Kg	6.71	375	313	82		25--130	375	323	84		2		100
Acenaphthylene	2	4	ug/Kg	<MDL	375	316	84		27--132	375	339	90		7		100
Anthracene	2	4	ug/Kg	30.1	375	343	83		10--181	375	386	95		13		100
Benzo(a)anthracene	2	4	ug/Kg	49.2	375	451	107		32--168	375	471	112		5		100
Benzo(a)pyrene	2	4	ug/Kg	47.5	375	389	91		10--200	375	423	100		9		100
Benzo(b)fluoranthene	2	4	ug/Kg	61.2	375	477	111		10--199	375	450	104		7		100
Benzo(g,h,i)perylene	2	4	ug/Kg	29.6	375	322	78		10--173	375	332	81		4		100
Benzo(k)fluoranthene	2	4	ug/Kg	49.5	375	381	88		10--192	375	421	99		12		100
Benzoic Acid	10	20	ug/Kg	79.9	375	282	54		10--158	375	261	48		12		100
Benzyl Alcohol	2	4	ug/Kg	<MDL	375	280	75		10--138	375	290	77		3		100
Benzyl Butyl Phthalate	1	2	ug/Kg	14	375	519	135		41--145	375	487	126		7		100
Bis(2-Ethylhexyl)Phthalate	4	8	ug/Kg	151	375	599	119		10--189	375	590	117		2		100
Caffeine	4	8	ug/Kg	<MDL	375	380	101		17--195	375	407	109		8		100
Carbazole	2	4	ug/Kg	12.4	375	361	93		16--200	375	391	101		8		100
Chrysene	2	4	ug/Kg	62.4	375	399	90		14--184	375	417	95		5		100
Coprostanol	40	80	ug/Kg	<MDL	3750	1490	40		10--183	3750	1580	42		5		100
Di-N-Butyl Phthalate	4	8	ug/Kg	14.8	375	374	96		10--194	375	397	102		6		100
Di-N-Octyl Phthalate	4	8	ug/Kg	<MDL	375	485	129		52--151	375	487	130		1		100
Dibenzo(a,h)anthracene	2	4	ug/Kg	11.3	375	333	86		10--166	375	353	91		6		100
Dibenzofuran	2	4	ug/Kg	4.6	375	313	82		21--134	375	325	86		5		100
Diethyl Phthalate	4	8	ug/Kg	<MDL	375	396	106		31--150	375	418	111		5		100
Dimethyl Phthalate	4	8	ug/Kg	<MDL	375	376	100		13--162	375	397	106		6		100
Fluoranthene	2	4	ug/Kg	122	375	543	112		12--188	375	505	102		9		100
Fluorene	2	4	ug/Kg	8.65	375	356	93		22--147	375	365	95		2		100
Hexachlorobenzene	0.1	0.2	ug/Kg	<MDL	375	328	88		18--151	375	356	95		8		100
Hexachlorobutadiene	0.5	1	ug/Kg	<MDL	375	165	44		10--97	375	189	50		13		100
Hexachloroethane	1	2	ug/Kg	<MDL	375	193	51		10--89	375	236	63		21		100
Indeno(1,2,3-Cd)Pyrene	2	4	ug/Kg	27	375	347	85		10--177	375	363	90		6		100
N-Nitrosodiphenylamine	4	8	ug/Kg	<MDL	375	318	85		10--169	375	418	112		27		100
Naphthalene	2	4	ug/Kg	5.02	375	179	46		12--97	375	202	53		14		100
Pentachlorophenol	10	20	ug/Kg	<MDL	375	379	101		17--170	375	419	112		10		100
Phenanthrene	2	4	ug/Kg	62.6	375	439	100		10--200	375	402	91		9		100
Phenol	4	8	ug/Kg	106	375	350	65		10--127	375	384	74		13		100
Pyrene	2	4	ug/Kg	97.7	375	481	102		20--174	375	448	93		9		100

Total HPAHS	2	4	ug/Kg	557	3750	4120	95	50--150	3750	4180	97	2	100
Total LPAHs	2	4	ug/Kg	117	2630	2150	77	50--150	2630	2230	80	4	100

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

LD:WG108497-5 L50380-6 Matrix: SALTWTRSED Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: 423062-200-4
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD^	Qual	Lab Limit
1,2,4-Trichlorobenzene	0.1	0.2	ug/Kg	<MDL	<MDL			35
1,2-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	<MDL			35
1,3-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	<MDL			35
1,4-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	<MDL			35
2,4-Dimethylphenol	1	2	ug/Kg	<MDL	<MDL			35
2-Methylnaphthalene	2	4	ug/Kg	<MDL	2			35
2-Methylphenol	2	4	ug/Kg	<MDL	<MDL			35
4-Methylphenol	4	8	ug/Kg	<MDL	<MDL			35
Acenaphthene	2	4	ug/Kg	5.27	4.48	16		35
Acenaphthylene	2	4	ug/Kg	<MDL	2.2			35
Anthracene	2	4	ug/Kg	19.2	18.4	4		35
Benzo(a)anthracene	2	4	ug/Kg	65.1	60.5	7		35
Benzo(a)pyrene	2	4	ug/Kg	41.3	33.2	22		35
Benzo(b)fluoranthene	2	4	ug/Kg	62.5	46.6	29		35
Benzo(g,h,i)perylene	2	4	ug/Kg	22.1	24.4	10		35
Benzo(k)fluoranthene	2	4	ug/Kg	51.4	40.5	24		35
Benzoic Acid	10	20	ug/Kg	66	67.5	2		35
Benzyl Alcohol	2	4	ug/Kg	<MDL	<MDL			35
Benzyl Butyl Phthalate	1	2	ug/Kg	13.7	15.9	15		35
Bis(2-Ethylhexyl)Phthalate	4	8	ug/Kg	84.7	88.5	4		35
Caffeine	4	8	ug/Kg	<MDL	<MDL			35
Carbazole	2	4	ug/Kg	7.18	7.84	9		35
Chrysene	2	4	ug/Kg	73.4	65.9	11		35
Coprostanol	40	80	ug/Kg	<MDL	<MDL			35
Di-N-Butyl Phthalate	4	8	ug/Kg	13.6	13.8	1		35
Di-N-Octyl Phthalate	4	8	ug/Kg	<MDL	<MDL			35
Dibenzo(a,h)anthracene	2	4	ug/Kg	10.7	11.7	9		35
Dibenzofuran	2	4	ug/Kg	4.18	4.08	2		35
Diethyl Phthalate	4	8	ug/Kg	<MDL	<MDL			35
Dimethyl Phthalate	4	8	ug/Kg	<MDL	<MDL			35
Fluoranthene	2	4	ug/Kg	173	145	18		35
Fluorene	2	4	ug/Kg	9.35	7.26	25		35
Hexachlorobenzene	0.1	0.2	ug/Kg	<MDL	<MDL			35
Hexachlorobutadiene	0.5	1	ug/Kg	<MDL	<MDL			35
Hexachloroethane	1	2	ug/Kg	<MDL	<MDL			35
Indeno(1,2,3-Cd)Pyrene	2	4	ug/Kg	21.8	19.7	10		35
N-Nitrosodiphenylamine	4	8	ug/Kg	<MDL	<MDL			35
Naphthalene	2	4	ug/Kg	2.2	3.2			35
Pentachlorophenol	10	20	ug/Kg	<MDL	<MDL			35
Phenanthrene	2	4	ug/Kg	57.8	53.2	8		35
Phenol	4	8	ug/Kg	381	396	4		35
Pyrene	2	4	ug/Kg	86.2	89.2	3		35

Total HPAHS	2	4	ug/Kg	608	453	29	35
Total LPAHs	2	4	ug/Kg	97.5	90.7	7	35

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

SRM:WG108497-6 Matrix: SALTWTRSED Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Anthracene	270	533	ug/Kg	1750	663	38		28--98
Benzo(a)anthracene	270	533	ug/Kg	4660	3900	84		66--124
Benzo(a)pyrene	270	533	ug/Kg	4240	2690	63		60--116
Benzo(b)fluoranthene	270	533	ug/Kg	3820	2970	78		52--190
Benzo(g,h,i)perylene	270	533	ug/Kg	2800	2210	79		15--120
Benzo(k)fluoranthene	270	533	ug/Kg	2270	2950	130		60--146
Chrysene	270	533	ug/Kg	4800	4530	94		77--136
Dibenzo(a,h)anthracene	270	533	ug/Kg	419	767	183		10--200
Fluoranthene	270	533	ug/Kg	8800	8590	98		45--126
Indeno(1,2,3-Cd)Pyrene	270	533	ug/Kg	2740	1950	71		33--121
Naphthalene	130	533	ug/Kg	1630	240	15		10--29
Phenanthrene	270	533	ug/Kg	5200	4130	79		51--106
Pyrene	270	533	ug/Kg	9570	7590	79		36--135

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

Surrogate: (Lab Limits)	2,4,6-Tribromo phenol 29--112	2-Fluoro biphenyl 31--101	2-Fluoro phenol 10--112	d14-Ter phenyl 51--130	d4-1,2-Dichloro benzene 24--91	d4-2-Chloro phenol 11--105	d5-Nitro benzene 28--94	d5-Phenol 10--106
L50380-1	109	78	52	91	50	59	64	69
L50380-2	110	77	56	96	54	64	69	71
L50380-3	81	80	58	97	61	65	74	76
L50380-4	100	77	56	89	53	59	69	73
L50380-5	109	73	58	90	53	59	64	70
L50380-6	105	75	54	74	46	57	64	69
L50380-7	102	79	49	98	46	58	64	68
L50380-8	106	78	63	95	58	65	73	75
L50380-9	99	75	50	94	39	52	63	61
L50381-1	99	77	55	99	51	60	66	66
L50381-2	95	81	49	98	48	57	61	69
L50381-3	99	79	53	98	49	58	62	74
L50381-4	105	83	62	95	58	64	81	68
L50381-5	92	71	51	93	48	50	59	60
L50381-6	94	57	40	83	35	41	49	44
L50381-7	98	71	60	91	47	56	66	69
L50381-8	107	65	47	95	44	52	59	62
WG108497-1	51	73	54	98	68	63	79	75
WG108497-2	67	61	54	72	88	52	51	57
WG108497-3	104	72	56	91	81	59	49	72
WG108497-4	103	76	62	92	87	65	53	76
WG108497-5	108	75	56	76	53	61	70	72
WG108497-6	96	79	63	90	57	71	73	83

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

Workgroup: WG108469 PCB

MB:WG108469-1 Matrix: OTHR SOLID Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: NONE
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Aroclor 1016	1	2	ug/Kg	<MDL	
Aroclor 1221	2	4	ug/Kg	<MDL	
Aroclor 1232	2	4	ug/Kg	<MDL	
Aroclor 1242	1	2	ug/Kg	<MDL	
Aroclor 1248	1	2	ug/Kg	<MDL	
Aroclor 1254	1	2	ug/Kg	<MDL	
Aroclor 1260	1	2	ug/Kg	<MDL	
Total Aroclors	1	2	ug/Kg	<MDL	

SB:WG108469-2 MB:WG108469-1 Matrix: OTHR SOLID Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Aroclor 1016	1	2	ug/Kg	<MDL	7.5	4.68	62		39--121
Aroclor 1260	1	2	ug/Kg	<MDL	7.5	7.76	103		53--140

MSD:WG108469-4 MS:WG108469-3 L50380-1 Matrix: SALTWTRSED Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: 423062-200-4
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Aroclor 1016	1	2	ug/Kg	<MDL	7.5	10.1	134		32--164	7.5	10.7	143		6		35
Aroclor 1260	1	2	ug/Kg	8.27	7.5	13.2	66		28--144	7.5	14.2	79		18		35

LD:WG108469-8 L50380-4 Matrix: SALTWTRSED Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: 423062-200-4
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD^	Qual	Lab Limit
Aroclor 1016	30	60	ug/Kg	<MDL	<MDL			35
Aroclor 1221	6	12	ug/Kg	<MDL	<MDL			35
Aroclor 1232	40	80	ug/Kg	<MDL	<MDL			35
Aroclor 1242	1	2	ug/Kg	41.2	34.1	19		35
Aroclor 1248	48	96	ug/Kg	<MDL	<MDL			35
Aroclor 1254	1	2	ug/Kg	58.5	53.8	8		35
Aroclor 1260	1	2	ug/Kg	24.9	20.7	19		35
Total Aroclors	1	2	ug/Kg	125	109	14		35

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

SRM:WG108469-9 Matrix: OTHR SOLID Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Aroclor 1254	2.7	5.33	ug/Kg	112	115	89		57--139

Surrogate: (Lab Limits)	2,4,5,6-Tetra chloro m-xylene 10--118	Deca chloro biphenyl 12--158
L50380-1	52	79
L50380-2	51	74
L50380-3	63	88
L50380-4	58	89
L50380-5	74	80
L50380-6	55	73
L50380-7	66	69
L50380-8	74	73
L50380-9	59	78
L50381-1	72	77
L50381-2	64	76
L50381-3	54	75
L50381-4	69	79
L50381-5	55	81
L50381-6	70	71
L50381-7	72	71
L50381-8	60	72
WG108469-1	38	97
WG108469-2	23	99
WG108469-3	69	70
WG108469-4	60	71
WG108469-8	54	82
WG108469-9	57	88

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

Workgroup: WG108461 Pesticides

MB:WG108461-1 Matrix: OTHR SOLID Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: NONE
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
4,4'-DDD	1	2	ug/Kg	<MDL	
4,4'-DDE	1	2	ug/Kg	<MDL	
4,4'-DDT	1	2	ug/Kg	<MDL	
Aldrin	1	2	ug/Kg	<MDL	
Alpha-BHC	0.5	1	ug/Kg	<MDL	
Alpha-Chlordane	0.5	1	ug/Kg	<MDL	
Beta-BHC	0.5	1	ug/Kg	<MDL	
Delta-BHC	0.5	1	ug/Kg	<MDL	
Dieldrin	1	2	ug/Kg	<MDL	
Endosulfan I	1	2	ug/Kg	<MDL	
Endosulfan II	1	2	ug/Kg	<MDL	
Endosulfan Sulfate	1	2	ug/Kg	<MDL	
Endrin	1	2	ug/Kg	<MDL	
Endrin Aldehyde	1	2	ug/Kg	<MDL	
Gamma-BHC (Lindane)	0.5	1	ug/Kg	<MDL	
Gamma-Chlordane	0.5	1	ug/Kg	<MDL	
Heptachlor	0.5	1	ug/Kg	<MDL	
Heptachlor Epoxide	0.5	1	ug/Kg	<MDL	
Methoxychlor	5	10	ug/Kg	<MDL	
Toxaphene	10	20	ug/Kg	<MDL	

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

SB:WG108461-2 MB:WG108461-1 Matrix: OTHR SOLID Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
4,4'-DDD	1	2	ug/Kg	<MDL	10	8.48	85		78--121
4,4'-DDE	1	2	ug/Kg	<MDL	10	8.95	90		75--111
4,4'-DDT	1	2	ug/Kg	<MDL	10	8.34	83		57--145
Aldrin	1	2	ug/Kg	<MDL	10	6.88	69		28--113
Alpha-BHC	0.5	1	ug/Kg	<MDL	10	6.91	69		20--99
Beta-BHC	0.5	1	ug/Kg	<MDL	10	8.21	82		66--102
Delta-BHC	0.5	1	ug/Kg	<MDL	10	8.56	86		63--108
Dieldrin	1	2	ug/Kg	<MDL	10	8.66	87		58--139
Endosulfan I	1	2	ug/Kg	<MDL	10	8.12	81		62--104
Endosulfan II	1	2	ug/Kg	<MDL	10	8.57	86		72--109
Endosulfan Sulfate	1	2	ug/Kg	<MDL	10	7.36	74		61--104
Endrin	1	2	ug/Kg	<MDL	10	10.1	101		60--160
Endrin Aldehyde	1	2	ug/Kg	<MDL	10	1.1	11		10--77
Gamma-BHC (Lindane)	0.5	1	ug/Kg	<MDL	10	7.46	75		27--130
Heptachlor	0.5	1	ug/Kg	<MDL	10	9.72	97		20--137
Heptachlor Epoxide	0.5	1	ug/Kg	<MDL	10	8.21	82		59--107
Methoxychlor	5	10	ug/Kg	<MDL	10	9.7	97		72--131

MSD:WG108461-4 MS:WG108461-3 L50381-1 Matrix: SALTWTRSED Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: 423062-200-4
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
4,4'-DDD	1	2	ug/Kg	<MDL	10	7.57	76		41--157	10	8.79	88		15		35
4,4'-DDE	1	2	ug/Kg	<MDL	10	8.07	81		59--125	10	9.17	92		13		35
4,4'-DDT	1	2	ug/Kg	<MDL	10	6.94	69		50--144	10	7.91	79		14		35
Aldrin	1	2	ug/Kg	<MDL	10	6.99	70		61--119	10	8.03	80		13		35
Alpha-BHC	0.5	1	ug/Kg	<MDL	10	7.74	77		59--111	10	9.22	92		18		35
Beta-BHC	0.5	1	ug/Kg	<MDL	10	7.76	78		60--119	10	8.86	89		13		35
Delta-BHC	0.5	1	ug/Kg	<MDL	10	8.01	80		54--126	10	8.72	87		8		35
Dieldrin	1	2	ug/Kg	<MDL	10	7.4	74		60--139	10	8.31	83		11		35
Endosulfan I	1	2	ug/Kg	<MDL	10	7.12	71		64--113	10	8.03	80		12		35
Endosulfan II	1	2	ug/Kg	<MDL	10	6.97	70		36--146	10	7.47	75		7		35
Endosulfan Sulfate	1	2	ug/Kg	<MDL	10	6.04	60		46--113	10	6.61	66		10		35
Endrin	1	2	ug/Kg	<MDL	10	8.65	86		62--166	10	9.96	100		15		35
Endrin Aldehyde	1	2	ug/Kg	<MDL	10	1.1	11		10--66	10	1.4	14		24		35
Gamma-BHC (Lindane)	0.5	1	ug/Kg	<MDL	10	7.7	77		61--135	10	8.98	90		16		35
Heptachlor	0.5	1	ug/Kg	<MDL	10	7.43	74		52--157	10	8.76	88		17		35
Heptachlor Epoxide	0.5	1	ug/Kg	<MDL	10	7.27	73		61--118	10	8.25	82		12		35
Methoxychlor	5	10	ug/Kg	<MDL	10	8.2	82		53--129	10	9.6	96		16		35

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

LD:WG108461-5 L50381-3 Matrix: SALTWTRSED Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: 423062-200-4
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD^	Qual	Lab Limit
4,4'-DDD	1	2	ug/Kg	<MDL	<MDL			35
4,4'-DDE	1	2	ug/Kg	<MDL	<MDL			35
4,4'-DDT	1	2	ug/Kg	<MDL	<MDL			35
Aldrin	1	2	ug/Kg	<MDL	<MDL			35
Alpha-BHC	0.5	1	ug/Kg	<MDL	<MDL			35
Alpha-Chlordane	0.5	1	ug/Kg	<MDL	<MDL			35
Beta-BHC	0.5	1	ug/Kg	<MDL	<MDL			35
Delta-BHC	0.5	1	ug/Kg	<MDL	<MDL			35
Dieldrin	1	2	ug/Kg	<MDL	<MDL			35
Endosulfan I	1	2	ug/Kg	<MDL	<MDL			35
Endosulfan II	1	2	ug/Kg	<MDL	<MDL			35
Endosulfan Sulfate	1	2	ug/Kg	<MDL	<MDL			35
Endrin	1	2	ug/Kg	<MDL	<MDL			35
Endrin Aldehyde	1	2	ug/Kg	<MDL	<MDL			35
Gamma-BHC (Lindane)	0.5	1	ug/Kg	<MDL	<MDL			35
Gamma-Chlordane	0.5	1	ug/Kg	<MDL	<MDL			35
Heptachlor	0.5	1	ug/Kg	<MDL	<MDL			35
Heptachlor Epoxide	0.5	1	ug/Kg	<MDL	<MDL			35
Methoxychlor	5	10	ug/Kg	<MDL	<MDL			35
Toxaphene	10	20	ug/Kg	<MDL	<MDL			35

SRM:WG108461-6 Matrix: OTHR SOLID Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
4,4'-DDT	5.3	10.7	ug/Kg	119	134	113		10--200
Alpha-Chlordane	2.7	5.33	ug/Kg	16.5	20.6	125		48--144

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation
ENR Cap, 2010, L50381

Surrogate: (Lab Limits)	2,4,5,6-Tetra chloro m-xylene 10--118	Deca chloro biphenyl 12--158
L50380-1	69	94
L50380-2	55	79
L50380-3	82	93
L50380-4	82	87
L50380-5	72	76
L50380-6	104	109
L50380-7	81	83
L50380-8	80	90
L50380-9	78	85
L50381-1	75	126
L50381-2	39	44
L50381-3	65	85
L50381-4	70	77
L50381-5	57	79
L50381-6	72	87
L50381-7	75	84
L50381-8	80	82
WG108461-1	43	101
WG108461-2	50	91
WG108461-3	56	72
WG108461-4	69	81
WG108461-5	77	94
WG108461-6	87	109

CHAIN OF CUSTODY FORMS

Login: P50381 | DUDI SEDS, STAS. C, THIN | Personnel: BK, CB, DD, JL

Project: 423062-200-4

CHAIN OF CUSTODY

RELINQUISHED BY	Date 3/30/2010	Time 1345
RECEIVED BY	Date 3-30-10	Time 1345
Sample Number(s) 1 → 8		(All)

SAMPLENUM	P50381-1	P50381-2	P50381-3
QC LINK			
LOCATOR	DUD_3C	DUD_4C	DUD_~~4C~~ 6C
Short Loc. Desc.	DUD_3C	DUD_4C	DUD_~~4C~~ 6C
Locator Desc	CLEANUP AREA PERIMETER ASSESSMENT LOCATI	CLEANUP AREA PERIMETER ASSESSMENT LOCATI	CLEANUP AREA PERIMETER ASSESSMENT LOCATI
SITE	DUWAMISH RIVER	DUWAMISH RIVER	DUWAMISH RIVER
COMMENTS	1 Grab Comp, 0-10 cm	1 Grab Comp, 0-10 cm, AREP	1 Grab Comp, 0-10 cm, FREP
Start Date/Time	3/30/10 / 1015	/ 1027	/ 1132
End Date/Time			
Time Span			
Sample Depth	12	10	8
SAMP FUNC	**********	**********	
PERSONNEL			
SAMP METH			
SED DEPTH			
SED SAMP RANGE			
SED TYPE	23N21	~~23N~~ DD 32N21	43N31
TIDE COND	E	E	S
TIDE HT	2.1	1.6	0
Dept. Matrix Prod	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL

Coord = WG108320

FS = WG108328

SAMPLENUM	P50381-4	P50381-5	P50381-6
QC LINK			
LOCATOR	DUD_5C	DUD_6C	DUD_7C
Short Loc. Desc.	DUD_5C	DUD_6C	DUD_7C
Locator Desc	CLEANUP AREA PERIMETER ASSESSMENT LOCATI	CLEANUP AREA PERIMETER ASSESSMENT LOCATI	CLEANUP AREA PERIMETER ASSESSMENT LOCATI
SITE	DUWAMISH RIVER	DUWAMISH RIVER	DUWAMISH RIVER
COMMENTS	1 Grab Comp, 0-10 cm	1 Grab Comp, 0-10 cm	1 Grab Comp, 0-10 cm
Start Date/Time	3/30/10 / 1040	3/30/10 / 1120	3/30/10 / 1140
End Date/Time			
Time Span			
Sample Depth			
SAMP FUNC	**********	**********	**********
PERSONNEL			
SAMP METH			
SED DEPTH	8	8	11
SED SAMP RANGE			
SED TYPE	34N21	48N81	23N2b
TIDE COND	E	S	S
TIDE HT	1.0	0.1	-0.1
Dept. Matrix Prod			
	3 SF PSD	3 SF PSD	3 SF PSD
	3 SF TOC	3 SF TOC	3 SF TOC
	3 SF TOTS	3 SF TOTS	3 SF TOTS
	6 SF AL-ICP	6 SF AL-ICP	6 SF AL-ICP
	6 SF FE-ICP	6 SF FE-ICP	6 SF FE-ICP
	6 SF HG-CVAA-H	6 SF HG-CVAA-H	6 SF HG-CVAA-H
	6 SF MN-ICP	6 SF MN-ICP	6 SF MN-ICP
	6 SF PP ICP	6 SF PP ICP	6 SF PP ICP
	7 SF BNASMS	7 SF BNASMS	7 SF BNASMS
	7 SF PCBLL	7 SF PCBLL	7 SF PCBLL
	7 SF PESTLL	7 SF PESTLL	7 SF PESTLL

SAMPLENUM	P50381-7	P50381-8	
QC LINK			
LOCATOR	DUD_14C	DUD_15C	
Short Loc. Desc.	DUD_14C	DUD_15C	
Locator Desc	PERIMETER LOCATION 14C	DUDI PERIMETER LOCATION 15C	
SITE	DUWAMISH RIVER	DUWAMISH RIVER	
COMMENTS	1 Grab Comp, 0-10 cm	1 Grab Comp, 0-10 cm	
Start Date/Time	3/30/10 / 1055	1104	
End Date/Time			
Time Span			
Sample Depth			
SAMP FUNC	**********	**********	
PERSONNEL			
SAMP METH			
SED DEPTH	17	13	
SED SAMP RANGE			
SED TYPE	23N21	24N31	
TIDE COND	S	S	
TIDE HT	0.6	0.4	
Dept. Matrix Prod			
	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	

LABORATORY WORK ORDER
Chain of Custody

Project Name: Duwamish/Diagonal Sediments
Project Number: 423062-200-4
Laboratory Project Manager: Fritz Grothkopp/Bob Kruger
Telephone Number: 684 2327/2384

King County Department of Natural Resources
Water and Land Resources Division
Environmental Laboratory
322 West Ewing Street
Seattle, Washington 98119-1507

Sample Number (Note: Use only one Login No. per sheet.)	Client Locator	Collect Date	Collect Time	TOC/TOTS	PSD	Metals-ICP/HG-CVAA-H	BNASMS/PESTLL/PCBLL	Number of Containers	Comments
L50381 - 1	DUD-3C	30-MAR-10	1015	X	X	X	X	4	
L50381 - 2	DUD_4C	↓	1027	X	X	X	X	4	
L50381 - 3	DUD_6C		1132	X	X	X	X	4	E REP
L50381 - 4	DUD_5C		1040	X	X	X	X	4	
L50381 - 5	DUD_6C		1120	X	X	X	X	4	
L50381 - 6	DUP_7C		1140	X	X	X	X	4	
L50381 - 7	DUD_14C		1055	X	X	X	X	4	
L50381 - 8	DUD_15C	↓	1104	X	X	X	X	4	
L -									
L -									
L -									

Analyses

Additional Comments:

Total Number of Containers 32

Sampled By: BK, CB, JDP, JC

Relinquished By:		Received By:	
Signature	Date 3/30/2010	Signature	Date 3-30-10
Printed Name Christopher Barnes	Time 1345	Printed Name Jason Kinnard	Time 1345
Organization King County Environmental Laboratory		Organization King County Environmental Laboratory	

Appendix A3 – Perimeter Station 2010

KING COUNTY ENVIRONMENTAL LABORATORY
QUALITY ASSURANCE REVIEW

for

ESTUARINE SEDIMENT ANALYTICAL DATA

DUWAMISH/DIAGONAL SEDIMENT REMEDIATION PROJECT
PERIMETER SEDIMENT CHARACTERIZATION
MARCH 2010 SAMPLING EVENT

Prepared by:

Fritz Grothkopp

Fritz Grothkopp
Laboratory Project Manager

Date: 7-28-10

Reviewed by:

Colin Elliott

Colin Elliott
Quality Assurance Officer

Date: 7-28-2010

King County Environmental Laboratory
322 West Ewing Street
Seattle, Washington 98119-1507
(206) 684-2300

INTRODUCTION

This quality assurance (QA) narrative is intended to document the QA review conducted on the chemistry analyses performed for the Duwamish Diagonal Sediment Remediation Project, Perimeter Sediment Characterization. The QA narrative is organized into the five sections listed below.

- General Comments
- Sample Collection
- Conventional Analyses
- Metal Chemistry
- Organic Chemistry

An overview of the approach used for the QA review is detailed in the *General Comments* section. Additional information specific to each analysis is included in the appropriate analytical section.

This QA review and narrative (specifically defined as QA1) have been conducted in accordance with guidelines established through the Puget Sound Dredged Disposal Analysis (PSDDA) program, Sediment Management Standards (WAC 173-204-610) and the Sediment Sampling and Analysis Appendix (SAPA), WDOE 2008. Other approaches incorporated in the QA review have been established through collaboration between the King County Environmental Laboratory (KC Laboratory) and the Washington State Department of Ecology (Ecology) Sediment Management Unit.

GENERAL COMMENTS

Scope of Samples Submitted

This QA review is associated with marine sediment samples collected on March 29 & 30, 2010 as part of the Duwamish Diagonal Sediment Remediation Project, Perimeter Sediment Characterization. The Sampling and Analysis Plan (SAP) in effect for this sampling event is titled: Duwamish/Diagonal Sediment Remediation Dredging and Capping Operations Sediment Monitoring Sampling and Analysis Plan. March 2010. (KCEL document # 943)

Except where noted in the subcontracting sections of this QA review, all analyses have been conducted by the King County Environmental Laboratory (KCEL). Sediment analytical data are reported with associated data qualifiers and have undergone QA1 review, as summarized in this narrative report.

Completeness

Completeness has been evaluated for this data submission and QA review by considering the following criteria:

- Comparing reported data to the planned project analyses summarized in Table 1.
- Compliance with storage conditions and holding times.
- Frequency of analysis of the complete set of quality control (QC) samples outlined in Table 2.

Subcontracted Analyses

Analyses that have been subcontracted and the issues associated with these subcontracted analyses are noted in this narrative.

Methods

Analytical methods are noted in the applicable analytical sections of this QA review.

Target Lists

The reported target lists have been compared to the target analytes listed in *Table 1 - Marine Sediment Quality Standards Chemical Criteria* and *Table 3 - Puget Sound Marine Sediment Cleanup Screening Levels Chemical Criteria* contained in Chapter 173-204 WAC.

Detection Limits

As part of the QA1 review, the detection limits reported for each parameter have been reviewed against the detection limit requirements defined in the SAP. When sample results have been reported as less than the Method Detection Limit (<MDL) and the associated detection limits are higher than those defined in the SAP, the particular samples and parameters have been identified and the circumstances explained. These summaries are included with each analytical section of this QA review.

The KC Laboratory reports include both the reporting detection limit (RDL) and the method detection limit (MDL) for each sample and parameter, where applicable. The RDL is defined as *the minimum concentration of a chemical constituent that can be reliably quantified while t*he MDL is defined as *the minimum concentration of a chemical constituent that can be detected.* Some subcontracted laboratory data are available with an MDL only, in accordance with the subcontracting laboratory policies. For some methods the detection limits reported may vary from sample to sample depending on the amount of sample analyzed and any additional dilutions required.

Storage Conditions and Holding Times

Storage conditions and holding times have been evaluated using guidelines defined in the 2008 SAPA. Preparation and analysis holding times for each method are summarized in each analytical section.

Method Blanks

Method blank results have been used to evaluate the possible laboratory contamination of samples. Method blank results have been reviewed for the presence of analytes detected at or greater than the MDL. For analytes where the method blank response was at or above the MDL all associated sample results have been qualified with a B flag based on the rules below.

1. Add a "B" flag to all parameters if the associated blank is ≥ the MDL and the sample result is ≥ MDL but ≤ 5 times the blank.
2. Add a "B2" flag to common organic lab contaminants (Acetone, 2-Butanone, Methylene Chloride, Bis (2-ethylhexyl) Phthalate, Butyl Benzyl Phthalate and Di-n-butyl Phthalate) if the method blank is ≥ the MDL and the sample result is > 5 and ≤ 10 times the blank.
3. Add a "B3" flag to all other parameters if the associated blank is ≥ the MDL and the sample result is > 5 and ≤ 10 times the blank.

Standard Reference Materials

Standard reference material (SRM) recoveries have been used to evaluate possible low or high analytical bias on a batch-specific basis. SRM analysis is included with metals and selected organic and conventional parameters (see Table 2). SRMs are purchased from outside agencies (NIST or NRCC) and must have a certified analyte value in order for a particular parameter to be evaluated. All associated sample results for the certified analytes are flagged if the SRM recoveries are unacceptable. Associated sample results may be flagged with a JL whenever recoveries are measured above the acceptance limits and may be flagged with a JG when recoveries are measured below the acceptance limits.

Matrix Spikes

Matrix spike recoveries have been used to evaluate possible low or high analytical bias on a matrix and batch-specific basis. Matrix spikes are analyzed with metals, organics and selected conventionals parameters (see Table 2). Associated sample results may be flagged with a JL whenever recoveries are measured above the acceptance limits and may be flagged with a JG when recoveries are measured below the acceptance limits. Flags are applied to specific sample results based on matrix spike recoveries only if the unacceptable recovery is indicative of a consistent bias for all associated samples.

For Metals only, matrix spike recovery results are used to qualify sample data only when the sample levels in the spiked sample are less than 4 times the spiked concentration. High sample levels relative to the spiked concentration can compromise the measurement of accurate spike recoveries.

Laboratory Replicate Samples

Replicate analysis (laboratory duplicates or triplicates) is used as an indicator of method precision and is used to qualify data on an analyte and batch-specific basis. Not all replicate data are used, however, as an indicator for data qualification. Only sets of replicate results which include at least one result greater than the RDL are considered for data qualification. These guidelines have been used to account for the fact that precision obtained near the detection limit is not representative of precision obtained throughout the entire analytical range. The original sample results are flagged with a J or JK whenever the measured precision is unacceptable (greater than the acceptance limit). Associated sample data will also be flagged if the unacceptable precision is expected in samples of the same matrix and composition.

Surrogates

Surrogate recoveries have been used to evaluate possible low or high analytical bias on a sample-specific basis. Surrogates are only analyzed for organic parameters. Individual sample results may be flagged with a JL whenever recoveries are measured above the acceptance limits and may be flagged with a JG when recoveries are measured below the acceptance limits. Flags are applied to reported results based on surrogate recoveries only if the unacceptable recovery is indicative of a bias for the associated parameters.

Data Qualifiers

The data qualification guidelines described above has been summarized in Table 3. This table conforms to the guidelines in the 2008 SAPA and also shows the data qualifiers used for the Washington Dept of Ecology EIM electronic data format.

Units and Significant Figures

Units and the reporting basis vary, depending on the parameter and are explained in the analytical sections below. Data generally have been reported to three significant figures if above the RDL and two significant figures if equal to or below the RDL.

SAMPLE COLLECTION

This section describes sampling activities associated with the collection of nine perimeter saltwater sediment samples on March 29 & 30, 2010. These samples were collected for the Duwamish/Diagonal Sediment Remediation Program. All sampling activities were conducted following guidance suggested in the Puget Sound Protocols (PSEP, 1996 and 1998).

Sampling Locations and Station Positioning

Sampling locations (stations) were selected and the prescribed coordinates determined prior to field activities. As required by the SAP, each sample at every location was composed of sediment aliquots of equal amounts from three individual Van Veen grabs. Both the prescribed station coordinates and the actual coordinates recorded during sampling activities are presented in the following table (see below). The coordinate system, as shown, is in U.S. State Plane, Washington North 4601, NAD83.

Duwamish/Diagonal Sediment Sampling, Perimeter Stations
Actual and Prescribed Sample Coordinates, March 2010

Lab Number	Locator	Cast	# Grabs	Prescribed Northing	Actual Northing	Prescribed Easting	Actual Easting	Offset > 3 m
L50380-1	DUD_1C	1	2	208754	208756	1267168	1267169	
L50380-1	DUD_1C	2	1	208754	208754	1267168	1267166	
L50380-2	DUD_2C	1	2	208651	208657	1267175	1267171	
L50380-2	DUD_2C	2	1	208651	208654	1267175	1267175	
L50380-3	DUD_8C	1	1	208920	208916	1266864	1266856	
L50380-3	DUD_8C	2	2	208920	208919	1266864	1266860	
L50380-4	DUD_10C, Frep	2	1	209517	209518	1266663	1266659	
L50380-4	DUD_10C, Frep	3	2	209517	209517	1266663	1266666	
L50380-5	DUD_9C	1	1	209157	209155	1266784	1266783	
L50380-5	DUD_9C	2	2	209157	209156	1266784	1266790	
L50380-6	DUD_10C	1	2	209517	209514	1266663	1266664	
L50380-6	DUD_10C	2	1	209517	209518	1266663	1266659	
L50380-7	DUD_11C	1	2	209535	209534	1266844	1266844	
L50380-7	DUD_11C	2	1	209535	209538	1266844	1266841	
L50380-8	DUD_12C	1	1	209630	209632	1266813	1266815	
L50380-8	DUD_12C	2	2	209630	209634	1266813	1266818	
L50380-9	DUD_13C	1	2	207858	207857	1267240	1267244	
L50380-9	DUD_13C	2	1	207858	207855	1267240	1267231	

Sediment grab samples were collected from the King County research vessel *Liberty*, which is equipped with a differential global positioning system (DGPS). Using DGPS, field coordinates were recorded for each cast of the two grab samplers, deployed in tandem, as they contacted the sediment. All field coordinates for each cast listed in the above table are within the +/- 3 meter accuracy limits.

Sample Description Table

Lab Sample #	Station	Sample Collection	Average Sediment Depth (cm)	Sample Usage
L50380-1	DUD_1C	Surface Grabs	15	Chemistry
L50380-2	DUD_2C	Surface Grabs	15	Chemistry
L50380-3	DUD_8C	Surface Grabs	13	Chemistry
L50380-4	DUD_10C	Surface Grabs (field replicate)	11	Chemistry

L50380-5	DUD_9C	Surface Grabs	8	Chemistry
L50380-6	DUD_10C	Surface Grabs	11	Chemistry
L50380-7	DUD_11C	Surface Grabs	10	Chemistry
L50380-8	DUD_12C	Surface Grabs	10	Chemistry
L50380-9	DUD_13C	Surface Grabs	14	Chemistry

Sample Collection

Sediment was collected at each station using two stainless steel, modified, 0.1 m^2 Van Veen grab samplers deployed in tandem via hydrowire. For each acceptable deployment, average depths ranging between 8-15 cm of sediment, were collected within each grab, allowing for sub-sampling within the upper 8-10 cm of material. As required by the SAP, each sample at every location was composed of sediment aliquots of equal amounts from ten individual Van Veen grabs.

Water depth at the eight subtidal cap sample stations ranged between 6-12.6 meters (not corrected for tide).

Sample Handling

Close to equal amounts of sediment were sub-sampled from the ten separate grabs used for chemistry analysis. For chemistry testing, 7 to 10 cm deep aliquots, as measured from the sediment surface, were collected using a stainless steel spoon. Sediment that had touched the sides or bottom of the grab sampler was excluded. Less than the top 10 cm of sediment was sub-sampled in those instances where it was not possible to collect material down to the target sediment penetration depth. All aliquots were placed in a covered stainless-steel compositing bowl, specific for that station. After collecting all aliquots from each of ten grabs, the sediment was thoroughly homogenized, then split out into pre-labeled containers. All sample containers were supplied by the King County Environmental Laboratory, first having been pre-cleaned according to analytical specifications.

Decontamination

Individual sets of the sub-sampling and mixing equipment were dedicated to each station, precluding the need for decontamination of said equipment. The Van Veen grab samplers were decontaminated between stations by scrubbing with a brush using ambient water and Detergent 8, followed by a thorough *in situ* rinsing.

Sample Storage and Preservation

Samples were stored in ice-filled coolers from the time of collection until delivery to the King County Environmental Laboratory. They were delivered under chain-of-custody and were maintained as such throughout the analytical process. Samples were stored frozen (-18°C) by the laboratory until analysis with the exception of samples for particle size distribution (PSD) analysis. PSD samples were stored refrigerated at approximately 4°C. A more complete description of sample handling and storage can be found in each analytical chemistry section of this narrative.

Copies of chain-of-custody forms and field notes are included as an appendix to this QA review narrative. The collect time is defined as that time that sampling commences at each station.

CONVENTIONAL ANALYSES

Completeness
Conventional data are reported for all samples and parameters summarized in Table 1. These samples were analyzed in association with the complete set of QC samples outlined in Table 2.

Subcontracted Analyses
All analyses were performed at the King County Environmental Lab.

Methods
PSD analysis was performed in accordance with ASTM D422 and Puget Sound Protocols methodologies (*Recommended Protocols for Measuring Conventional Sediment Variables in Puget Sound* - page 9 - PSEP, 1986). TOC analysis was performed in accordance with with EPA 9060 and PSEP 1996. Total solids analyses were performed in accordance with SM2540-G.

Detection Limits
The detection limits (MDLs) reported for Conventionals parameters are all within the requirements defined in the SAP (after appropriate dry weight adjustment), except for the following (refer to attached table SAP MDL Comparison):

Parameter	Sample ID#	SAP MDL	Reported MDL	Reason for higher MDL Value
TOC	L50380-1 to -4, 6 to 9	1000	1900 to 2100	Reduced sample size analyzed due to High Organic Background and TS < 50%
PSD Parameters in the % gravel and sand range	L50380-all	0.1%	0.12 - 0.23%	MDL is adjusted for weight of sample analyzed and less than the expected amount was tested.
PSD Parameters in the % silt and clay range	L50380-all	0.5%	0.61 - 1.1%	MDL is adjusted for weight of sample analyzed and less than the expected amount was tested.

For all samples where the MDL did not meet the SAP MDL, the TOC levels along with PSD values were generally above the detection limit, thus the project objectives were met.

Reporting Requirements (significant figures, units, basis and qualifiers)
For analyses performed at the KC Laboratory, data are reported in accordance with laboratory policy at the time the data were generated. Data are reported to three significant figures for results greater than the RDL and two significant figures for results equal to or less than the RDL. For results reported with less than two or three significant figures, significant zeroes are implied. This may not apply to subcontracted data.

In the Comprehensive Report attached, Conventionals parameters are reported in mg/Kg, dry weight basis, for TOC. Particle Size Distribution (PSD) and Total Solids are reported in percent, wet weight basis. For all parameters, the MDL and RDL values for each individual sample are reported in the same units and basis as the sample result. Any result measured at less than the MDL or less than the RDL, a <MDL or <RDL qualifier is added, respectively. Other qualifiers added are based on QA/QC failures and are individually explained in this narrative.

Storage Conditions and Holding Times
Sample storage conditions and holding times have been evaluated using guidelines established in the SAPA (WDOE, 2008). The dates and holding time criteria for the actual storage conditions used for conventional analyses are listed in the table below.

Parameter	Lab ID#	Date Collected	Prep Date	Date Analyzed	Sample Holding Time	Extract Holding Time
Particle Size Distribution	L50380-1,3,4,5,6	29-Mar-2010	13-Apr-2010	14-Apr-2010	6 Months at 4°C	NA
	L50380-7,8,9	30-Mar-2010	13-Apr-2010	14-Apr-2010		
	L50380-2	29-Mar-2010	28-Apr-2010	29-Apr-2010		
Total Organic Carbon	L50380-1,2,3,4	29-Mar-2010	28-Apr-2010	7-May-2010	6 months at -18°C	6 months at -18°C
	L50380-5,6	29-Mar-2010	5-May-2010	11-May-2010		
	L50380-7,8,9	30-Mar-2010	5-May-2010	11-May-2010		
Total Solids	L50380-1,2,3,4	29-Mar-2010	29-Apr-2010	3-May-2010	6 months at -18°C	NA
	L50380-5,6	29-Mar-2010	4-May-2010	5-May-2010		
	L50380-7,8,9	30-Mar-2010	4-May-2010	5-May-2010		

Sample storage conditions and holding times were met for all samples in this data submission.

Method Blanks

Method blanks were analyzed in connection with solids and total organic carbon analyses. All method blanks results were less than the MDL.

Standard Reference Materials

An SRM (Buffalo River Sediment) was analyzed in connection with TOC analysis. The percent recovery for the SRM analysis was within the 80 to 120% QC limits.

Matrix Spikes

The matrix spike recovery for TOC was within the 75 to 125% acceptance limits.

Laboratory Replicate Samples

A set of laboratory triplicates was analyzed for each of the conventional parameters. The percent relative standard deviation (%RSD) for each triplicate set was less than or equal to the 20% acceptance limit.

METALS CHEMISTRY

Completeness
Metal chemistry data are reported for all samples and parameters summarized in Table 1. These samples were analyzed for mercury and other metals in association with the complete set of QC samples outlined in Table 2.

Subcontracted Analyses
Metals analysis was not subcontracted for these sets of samples.

Methods
Mercury analysis was performed in accordance with EPA Method SW846, 7471B. Analysis for other metals was performed in accordance with EPA method SW846, 3050B/6010C.

Target List
The reported target list includes all metals specified in Table 1.

Detection Limits
The detection limits (MDLs) reported for Metals parameters are all within the requirements defined by the SAP (after dry weight adjustment), with the exception of all elements in samples L50380-1,2 and chromium, copper, iron, mercury, nickel, silver, thallium and zinc in sample L50380-9. These samples had less than 50% solids. The element concentrations were detectable with the exception of antimony (L50380-2), selenium (L50380-1,-2), silver (L50380-1,-2,-9) and thallium (L50380-1,-2,-9) where the MDL did not meet the SAP MDL. This is not expected to have compromised the project goals since the MDLs reported for those elements were only slightly above the SAP MDLs.

Reporting Requirements (significant figures, units, basis and qualifiers)
For analyses performed at the KC Laboratory, data are reported in accordance with laboratory policy at the time the data were generated. Data are reported to three significant figures for results greater than the RDL and two significant figures for results equal to or less than the RDL. For results reported with less than two or three significant figures, significant zeroes are implied.

In the Comprehensive Report attached, Metals parameters are reported in mg/Kg, dry weight basis, for all elements. The MDL and RDL values for each individual sample are reported in the same units and basis as the sample result. Any result measured at less than the MDL or less than the RDL, a <MDL or <RDL qualifier is added, respectively. Other qualifiers added are based on QA/QC failures and are individually explained in this narrative.

Storage Conditions and Holding Times
Sample storage conditions and holding times have been evaluated using guidelines established during the Third Annual PSDDA Review Meeting. The dates and holding time criteria for the actual storage conditions used for metals analyses are listed in the table below.

Parameter	Lab ID#	Date Collected	Date Digested/ Extracted	Date Analyzed	Sample Holding Time	Digestate/Extract Holding Time
Total Metals	L50380-1 - 9	3/29/2010 3/30/2010	4/6/2010	4/7/2010	2 Years at -18°C	6 months
Total Mercury	L50380-1 - 9	3/29/2010 3/30/2010	4/7/2010	4/8/2010	28 days at -18°C	NA

Sample storage conditions and holding times were met for all samples in this data submission.

Method Blanks
All metals method blanks results were less than the MDL.

Standard Reference Materials

The SRM analyzed in association with samples included in this data submission is National Research Council of Canada PACS-2. This SRM is not certified for Silver, Arsenic or Cadmium. Acceptance limits for the certified elements have been developed using historical lab data since the certified SRM values and limits were determined with different analysis techniques. SRM recoveries outside these lab-defined limits indicate the method has not performed as expected and the sample data have been qualified to indicate the expected bias.

All metals SRM recoveries were within the lab defined limits indicated in the SAP.

A laboratory control sample (LCS) ERA Soil was also analyzed with the total metals digestion. All recoveries were within the certified limits of the sample. The LCS is used as a secondary check for the total metals digestion procedure because the certified values for the elements are determined using the same methodology. No results from the LCS are used to qualify data.

Matrix Spikes

All matrix spike recoveries were within the 75% to 125% QC limits with the following exceptions:
The reported matrix spike recovery of 20% for Antimony in WG108387 for sample numbers L50380-1 - 9 failed to meet the 75% to 125% QC acceptance criteria. Antimony results for all samples in WG108387 have been qualified with a “JG”.

Laboratory Replicate Samples

The relative percent differences (RPDs) for laboratory duplicate results for all metals were less than or equal to the QC limit of 20%.

ORGANIC CHEMISTRY

Completeness

Organics data are reported for all samples and parameters summarized in Table 1. These samples were analyzed in association with the complete set of QC samples outlined in Table 2.

Methods

BNA analysis was performed in accordance with EPA method 8270D. PCB and chlorinated pesticides analysis was performed in accordance with EPA methods 8082A and 8081B.

Target List

The reported BNA target list includes all compounds specified in *Table 1 - Marine Sediment Quality Standards Chemical Criteria* and *Table 3 - Puget Sound Marine Sediment Cleanup Screening Levels Chemical Criteria* contained in Chapter 173-204 WAC with the exception of benzo(j)fluoranthene. The KC Laboratory has verified that analytical conditions are sufficient to calculate a total benzofluoranthene result using the reported *b* and *k* isomers.

Reported PCB data include Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260.

Detection Limits, Units and Significant Figures

The detection limits (MDLs) reported for Organics parameters are all within the requirements defined in the SAP (after dry weight adjustment), except for the following:

BNAs

The MDLs for all compounds with the exception of 2-methylphenol, benzyl alcohol, pyrene and Hexachlorobutadiene (sample L50380-9 only) were higher than the SAP MDLs for samples L50380-2, 3, 9 due to the total solids being less than 50%. This is not expected to have compromised the project goals since the MDLs reported for those parameters were only slightly above the SAP MDLs.

PCBs

The reported MDL for Aroclors 1016, 1221, 1232 and 1248 in selected samples were greater than the MDL values listed in the SAP. The reported MDLs for these Aroclors were elevated to compensate for overlap of PCB congeners from other Aroclors detected in the samples. See Additional QA Issues at the end of this section for further details. All Aroclor MDLs were higher than SAP MDLs for samples L50379-2, 3, 9 due to the total solids being less than 50%. For Sample L50380-3, the MDLs for all Aroclors were also elevated due to required dilutions.

Chlorinated Pesticides

The reported MDLs for all pesticides compounds except Endrin Aldehyde were greater than the MDL values listed in the SAP for samples L50379-2, 3 due to total solids being less than 50%. The reported MDLs for all pesticides compounds except Alpha-BHC, Alpha Chlordane, Beta-BHC, Delta-BHC, Endrin Aldehyde, Gamma-Chlordane, Heptachlor, Heptachlor Epoxide and Methoxychlor were greater than the MDL values listed in the SAP for samples L50379-9 due to total solids being slightly less than 50%. This is not expected to have compromised the project goals since the MDLs reported for those parameters were only slightly above the SAP MDLs.

The attached SMS OC and Dry Weight Normalization MDL Check tables compare the reported MDL value to the SMS requirement. All the compounds in the reported MDL met the SMS limits with the exception of Total PCBs for sample L50380-3 due to required dilutions. The reported levels of Total PCBs based on Aroclors detected should be used for comparison to SMS limits rather the MDL values. Since Aroclors were detected in all samples, the elevated MDLs for Total PCBs are not significant.

Reporting Requirements (significant figures, units, basis and qualifiers)
For analyses performed at the KC Laboratory, data are reported in accordance with laboratory policy at the time the data were generated. Data are reported to three significant figures for results greater than the RDL and two significant figures for results equal to or less than the RDL. For results reported with less than two or three significant figures, significant zeroes are implied. This may not apply to subcontracted data.

In the Comprehensive Report attached, Organics parameters are reported in ug/Kg, dry weight basis. In this report format, non-ionizable organic parameters have not been converted to mg/Kg TOC. For all parameters, the MDL and RDL values for each individual sample are reported in the same units and basis as the sample result. Any result measured at less than the MDL or less than the RDL, a <MDL or <RDL qualifier is added, respectively. Other qualifiers added are based on QA/QC failures and are individually explained in this narrative.

Storage Conditions and Holding Times
Sample storage conditions and holding times have been evaluated using guidelines established in the SAPA (WDOE, 2008). The dates and holding time criteria for the actual storage conditions used for organics analyses are listed in the table below.

Parameter	Lab ID	Date Collected	Date Extracted	Date Analyzed	Sample Holding Time	Extract Holding Time
BNAs	L50380-1 to 9	29, 30-Mar-10	13-Apr-10	6, 10-May-10	1 year at -18°C	40 days at 4°C
Chlorinated Pesticides	L50380-1 to 9	29, 30-Mar-10	11-Apr-10	28, 29-Apr-10	1 year at -18°C	40 days at 4°C
PCB	L50380-1 to 9	29, 30-Mar-10	09-Apr-10	04, 05-May-10	1 year at -18°C	40 days at 4°C

Sample storage conditions and holding times were met for all samples in this data submission.

Method Blanks
Method blanks were analyzed for all Organics parameters and all method blank results were less than the MDL, except as noted below:

BNA
The method blank analyzed with BNA (WG108497) for L50380-1 to 9 had a result above the MDL for Bis (2-ethylhexyl) Phthalate (11.6 ug/Kg) and Butyl Benzyl Phthalate (12.6 ug/Kg). Sample results for Bis (2-ethylhexyl) Phthalate and Butyl Benzyl Phthalate for those samples where the measured levels were above the MDL have been qualified with the appropriate B flag based on Table 3 below. Those Bis (2-ethylhexyl) Phthalate and Butyl Benzyl Phthalate results that are flagged with either a B or B2 qualifier must be treated as estimated values.

Surrogate Recoveries
Surrogate recovery acceptance limits for sediment samples have been developed based on historical lab performance using the current analytical methods. Recoveries measured above the acceptance limits may be flagged with a JL. Recoveries measured below the acceptance limits (but at or above 10%) may be flagged with a JG. Surrogate recovery summaries for each method are shown below.

1. BNAs
For BNA sample data, surrogate recoveries are evaluated separately for the acid and base/neutral fractions. Within each fraction, 2 or more surrogates must be outside the acceptance limits in order to qualify the associated sample data. None of the BNA samples had multiple surrogate recovery failures.

2. PCBs
Sample data are qualified when individual surrogate recoveries are outside lab-specific acceptance limits. For each set of analyses, all surrogate recoveries were within the lab-specific acceptance limits for all samples in this data submission.

3. Chlorinated Pesticides
Sample data are qualified when individual surrogate recoveries are outside lab-specific acceptance limits. For each set of analyses, all surrogate recoveries were within the lab-specific acceptance limits for all samples in this data submission.

Standard Reference Materials (SRMs)
The SRM results associated with these samples are summarized below, according to the analysis method. Acceptance limits for the certified parameters reported in this data set have been developed using historical lab data. SRM recoveries outside these lab-defined limits indicate the method has not performed as expected and the associated sample data have been flagged.

1. BNAs
The sediment SRM analyzed in association with the reported BNA results is 1944, certified by the National Institute of Standards and Technology (NIST). The certified organics parameters in SRM 1944 are only a partial list of all the BNA compounds reported in this analysis. All measured recoveries for this SRM were within acceptance limits.

2. Chlorinated Pesticides
The sediment SRM analyzed in association with the reported Chlorinated Pesticides results is 1944, certified by the NIST. SRM 1944 contains certified levels of DDT and alpha Chlordane. All measured recoveries for this SRM were within acceptance limits.

2. PCBs
The sediment SRM analyzed in association with the reported PCB results is HS-2, certified by the National Research Council of Canada. SRM HS-2 contains Aroclor 1254. All measured recoveries for this SRM were within acceptance limits.

Matrix Spikes
Matrix Spikes have been analyzed for each method. Recovery acceptance limits for each parameter in sediment have been developed based on historical lab performance using the current analytical methods. The acceptance limits are not applicable when the unspiked sample level was 4 times or greater than the spiked concentration. When applicable, matrix spike recoveries outside these lab-defined limits indicate the method has not performed as expected and the associated sample data have been flagged.

1. BNAs
For the BNA compounds that were included in the matrix spike, the measured recoveries for each were within their acceptance limits.

2. PCBs and Chlorinated Pesticides
Each of the reported Pesticide compounds, except Toxaphene, alpha and gamma Chlordane, was included in the Chlorinated Pesticide matrix spike. Aroclor 1260 and 1016 only are used as the spiking parameters for PCB matrix spike. The measured recovery for each spiked parameter was within their acceptance limits.

Laboratory Replicate Samples
A laboratory duplicate sample(s) was analyzed for each Organics parameter. The relative percent differences (RPDs) for laboratory duplicate for all Organic parameters at or above the RDL were less than or equal to the acceptance limit of 35%.

Additional QA Issues:

PCB Analysis:
PCB data reported for this set of samples include numeric values for only those Aroclors that could be positively identified in each sample and were measured above the detection limit. Identification of Aroclors 1016, 1221, 1232 and 1248 was not always possible due to the overlap of the components from Aroclors 1242, 1254 and 1260. For those Aroclors where this overlap has occurred, the result is reported as <MDL with elevated MDL and RDL values. The elevated MDL represents the maximum amount that would have been reported for that Aroclor had it been positively identified. The RDL value has also been elevated by the same proportion.

The table below lists the samples and affected Aroclors.

Lab Sample Number	PCB 1016	PCB-1221	PCB 1232	PCB 1248
L50380-1	x		x	x
L50380-2	x		x	x
L50380-3	x	x	x	x
L50380-4	x	x	x	x
L50380-5	x	x	x	x
L50380-6	x	x	x	x
L50380-7	x		x	x
L50380-8	x	x	x	x
L50380-9	x	x	x	x

Aroclor 1242 was positively identified this year instead of Aroclor 1248. Both of there Aroclor mixtures have similar patterns, due to the small difference in the percent chlorine (42% vs. 48%), making unequivocal identification difficult when the concentrations are also similar. The same Aroclor identification procedure was used in all years for this project.

TABLE 1
SEDIMENT SAMPLE INVENTORY

Sample	Locator / Description	PSD	Solids	TOC	Metals[1]	BNAs[2]	Pest/ PCBs	Comments
L50380-1	DUD_1C	X	X	X	X	X	X	
L50380-2	DUD_2C	X	X	X	X	X	X	
L50380-3	DUD_8C	X	X	X	X	X	X	
L50380-4	DUD_10C	X	X	X	X	X	X	field replicate
L50380-5	DUD_9C	X	X	X	X	X	X	
L50380-6	DUD_10C	X	X	X	X	X	X	
L50380-7	DUD_11C	X	X	X	X	X	X	
L50380-8	DUD_12C	X	X	X	X	X	X	
L50380-9	DUD_13C	X	X	X	X	X	X	

1 Metals = Hg, Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Se, Ag, Tl, Zn
2 BNAs = includes Chlorobenzenes

TABLE 2
QC SAMPLE FREQUENCY FOR SEDIMENT CHEMICAL AND PHYSICAL PARAMETERS

Parameter	Method Blank	Duplicate	Triplicate	Matrix Spike	SRM	Surrogates
PSD	No	See Triplicate	5% minimum, 1 per QC batch	No	No	No
Total Solids	1 per QC batch	See Triplicate	5% minimum, 1 per QC batch	No	No	No
TOC	1 per QC batch	See Triplicate	5% minimum, 1 per QC batch	5% minimum, 1 per QC batch	1 per QC batch	No
Metals	1 per QC batch	5% minimum, 1 per QC batch	No	5% minimum, 1 per QC batch	1 per QC batch	No
BNAs	1 per QC batch	5% minimum, 1 per QC batch	No	5% minimum, 1 per QC batch	1 per QC batch	Yes
PCBs/Chlorinated Pesticides	1 per QC batch	5% minimum, 1 per QC batch	No	5% minimum, 1 per QC batch	1 per QC batch	Yes

TABLE 3 - SUMMARY OF SEDIMENT DATA QUALIFIERS

Condition to Qualify	King County Data Qualifier	Possible EIM Data Qualifier	Organic QC Limits	Metal QC Limits	Conventional QC Limits	Comment
low matrix spike recovery	JG	JG	Compound specific	< 75%	< 75%	
high matrix spike recovery	JL	JL	Compound specific	>125%	>125%	
low standard reference material recovery	JG	JG	Compound and SRM specific	Element and SRM specific	< 80%	
high standard reference material recovery	JL	JL	Compound and SRM specific	Element and SRM specific	>120%	
high duplicate relative percent difference	JK or J	JK	>35 %	>20%	NA	for organics and metals
high triplicate relative standard deviation	JK or J	JK	NA	NA	> 20%	for conventionals
less than the reporting detection limit	<RDL**	JT	NA	NA	NA	
less than the method detection limit	<MDL	U	NA	NA	NA	
contamination detected in method blank	B	B	MB >/=MDL & Result </= 5x Blank	MB >/=MDL & Result </= 5x Blank	MB >/=MDL & Result </= 5x Blank	
contamination detected in method blank	B2	B	MB >/=MDL & Result > 5x but >/= 10x Blank	MB >/=MDL & Result > 5x but >/= 10x Blank	MB >/=MDL & Result > 5x but >/= 10x Blank	Common Lab Contaminants*
contamination detected in method blank	B3	B	MB >/=MDL & Result > 5x but >/= 10x Blank	MB >/=MDL & Result > 5x but >/= 10x Blank	MB >/=MDL & Result > 5x but >/= 10x Blank	All other parameters
biased data based on low surrogate recoveries	JG	JG	Surrogate specific	NA	NA	At least 2 surrogates < limit for BNAs
biased data based on high surrogate recoveries	JL	JL	Surrogate specific	NA	NA	At least 2 surrogates > limit for BNAs
rejected - unusable for all purposes	R	J or Q	NA	NA	NA	
a sample handling criteria has not been met	SH	JK or J	NA	NA	NA	container, preservation
Holding time not met	H	JK or J				

*COMMON LAB CONTAMINANTS: ACETONE, 2-BUTANONE, METHYLENE CHLORIDE, BIS(2-ETHYLHEXYL) PHTHALATE, BUTYL BENZYL PHTHALATE AND DI-N-BUTYL PHTHALATE

Sample Results Tables

King County Environmental Lab Analytical Report

	Project:	423062-200-4					Project:	423062-200-4					Project:	423062-200-4							
	Locator:	DUD_1C					Locator:	DUD_2C					Locator:	DUD_8C							
	Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM							
	Sample:	L50380-1					Sample:	L50380-2					Sample:	L50380-3							
	Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED							
	ColDate:	3/29/10 12:35					ColDate:	3/29/10 12:50					ColDate:	3/29/10 13:10							
	TimeSpan:						TimeSpan:						TimeSpan:								
	TotalSolid:	44.8					TotalSolid:	44.6					TotalSolid:	66.5							
	ClientLoc:						ClientLoc:						ClientLoc:								
	SampDepth:	6					SampDepth:	6					SampDepth:	10.2							
	DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**								
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**				
CV ASTM D422																					
Clay*	16.7		1	2.09	%		23.7		1.1	2.25	%		4.9		0.82	1.64	%				
Fines*	76.1		1	2.09	%		89.1		1.1	2.25	%		39.3		0.82	1.64	%				
Gravel*	1.2	<RDL	0.21	2.09	%		0.6	<RDL	0.23	2.25	%		6.5		0.16	1.64	%				
p+0.00*	0.4	<RDL	0.21	2.09	%			<MDL	0.23	2.25	%		3		0.16	1.64	%				
p+1.00*	1.4	<RDL	0.21	2.09	%		6.8		0.23	2.25	%		7.9		0.16	1.64	%				
p+10.0(equal/more than)*	10.4		1	2.09	%		18		1.1	2.25	%		3.3		0.82	1.64	%				
p+2.00*	4.1		0.21	2.09	%		5.9		0.23	2.25	%		29.8		0.16	1.64	%				
p+3.00*	22.9		0.21	2.09	%		1.2	<RDL	0.23	2.25	%		15.1		0.16	1.64	%				
p+4.00*	3.4		0.21	2.09	%		1.8	<RDL	0.23	2.25	%		6.9		0.16	1.64	%				
p+5.00*	5.2		1	2.09	%		5.6		1.1	2.25	%		2.5		0.82	1.64	%				
p+6.00*	35.5		1	2.09	%		31.6		1.1	2.25	%		23.7		0.82	1.64	%				
p+7.00*	12.5		1	2.09	%		18		1.1	2.25	%		5.7		0.82	1.64	%				
p+8.00*	6.3		1	2.09	%		10.1		1.1	2.25	%		2.5		0.82	1.64	%				
p+9.00*	6.3		1	2.09	%		5.6		1.1	2.25	%		1.6	RDL	0.82	1.64	%				
p-1.00*	0.5	<RDL	0.21	2.09	%			<MDL	0.23	2.25	%		2.2		0.16	1.64	%				
p-2.00(less than)*	0.3	<RDL	0.21	2.09	%		0.2	<RDL	0.23	2.25	%		2.7		0.16	1.64	%				
p-2.00*	0.4	<RDL	0.21	2.09	%		0.3	<RDL	0.23	2.25	%		1.6	<RDL	0.16	1.64	%				
Sand*	32.2		0.21	2.09	%		15.7		0.23	2.25	%		62.7		0.16	1.64	%				
Silt*	59.4		1	2.09	%		65.4		1.1	2.25	%		34.4		0.82	1.64	%				
CV SM2540-G																					
Total Solids*	44.8		0.005	0.01	%		44.6		0.005	0.01	%		66.5		0.005	0.01	%				
CV SW846 9060-PSEP96																					
Total Organic Carbon	24300		2000	3970	mg/Kg		23100		2000	3970	mg/Kg		12600		2000	3910	mg/Kg				
MT SW846 3050B*SW846 6010C																					
Aluminum, Total, ICP	26300		11	54.9	mg/Kg		28700		11	54.5	mg/Kg		15800		7.4	36.8	mg/Kg				
Antimony, Total, ICP	1.7	<RDL,JG	1.7	8.24	mg/Kg			<MDL,JG	1.6	8.18	mg/Kg		1.5	<RDL,JG	1.1	5.53	mg/Kg				
Arsenic, Total, ICP	13	<RDL	2.7	13.7	mg/Kg		13	<RDL	2.7	13.6	mg/Kg		11.5		1.8	9.23	mg/Kg				
Beryllium, Total, ICP	0.839		0.11	0.549	mg/Kg		0.899		0.11	0.545	mg/Kg		0.532		0.074	0.368	mg/Kg				
Cadmium, Total, ICP	0.36	<RDL	0.22	1.1	mg/Kg		0.4	<RDL	0.22	1.09	mg/Kg		1.53		0.15	0.738	mg/Kg				
Chromium, Total, ICP	31.5		0.33	1.65	mg/Kg		32.1		0.34	1.64	mg/Kg		46.5		0.23	1.11	mg/Kg				
Copper, Total, ICP	72.8		0.45	2.2	mg/Kg		74.4		0.43	2.18	mg/Kg		61.5		0.3	1.48	mg/Kg				
Iron, Total, ICP	35300		5.6	27.5	mg/Kg		37700		5.4	27.4	mg/Kg		24100		3.8	18.5	mg/Kg				
Lead, Total, ICP	31.5		2.2	11	mg/Kg		30.5		2.2	10.9	mg/Kg		49.8		1.5	7.38	mg/Kg				
Manganese, Total, ICP	362		0.22	1.1	mg/Kg		388		0.22	1.09	mg/Kg		260		0.15	0.738	mg/Kg				
Nickel, Total, ICP	25.9		0.56	2.75	mg/Kg		27.1		0.54	2.74	mg/Kg		21.4		0.38	1.85	mg/Kg				
Selenium, Total, ICP		<MDL	2.7	13.7	mg/Kg			<MDL	2.7	13.6	mg/Kg			<MDL	1.8	9.23	mg/Kg				
Silver, Total, ICP		<MDL	0.45	2.2	mg/Kg			<MDL	0.43	2.18	mg/Kg		1.56		0.3	1.48	mg/Kg				
Thallium, Total, ICP		<MDL	4.5	22	mg/Kg			<MDL	4.3	21.8	mg/Kg			<MDL	3	14.8	mg/Kg				
Zinc, Total, ICP	139		0.56	2.75	mg/Kg		135		0.54	2.74	mg/Kg		124		0.38	1.85	mg/Kg				

King County Environmental Lab Analytical Report

Project:	423062-200-4	423062-200-4	423062-200-4
Locator:	DUD_1C	DUD_2C	DUD_8C
Descrip:	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM
Sample:	L50380-1	L50380-2	L50380-3
Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
ColDate:	3/29/10 12:35	3/29/10 12:50	3/29/10 13:10
TimeSpan:			
TotalSolid:	44.8	44.6	66.5
ClientLoc:			
SampDepth:	6	6	10.2
	DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
MT SW846 7471B															
Mercury, Total, CVAA	0.17	<RDL	0.042	0.426	mg/Kg	0.18	<RDL	0.043	0.433	mg/Kg	0.29	<RDL	0.03	0.302	mg/Kg
OR SW846 3550B*SW846 8081B															
4,4'-DDD		<MDL	2.2	4.46	ug/Kg		<MDL	2.2	4.48	ug/Kg	10.7		1.5	3.01	ug/Kg
4,4'-DDE		<MDL	2.2	4.46	ug/Kg		<MDL	2.2	4.48	ug/Kg	5.77		1.5	3.01	ug/Kg
4,4'-DDT		<MDL	2.2	4.46	ug/Kg		<MDL	2.2	4.48	ug/Kg		<MDL	1.5	3.01	ug/Kg
Aldrin		<MDL	2.2	4.46	ug/Kg		<MDL	2.2	4.48	ug/Kg		<MDL	1.5	3.01	ug/Kg
Alpha-BHC		<MDL	1.1	2.23	ug/Kg		<MDL	1.1	2.24	ug/Kg		<MDL	0.75	1.5	ug/Kg
Alpha-Chlordane		<MDL	1.1	2.23	ug/Kg		<MDL	1.1	2.24	ug/Kg	2.65		0.75	1.5	ug/Kg
Beta-BHC		<MDL	1.1	2.23	ug/Kg		<MDL	1.1	2.24	ug/Kg		<MDL	0.75	1.5	ug/Kg
Delta-BHC		<MDL	1.1	2.23	ug/Kg		<MDL	1.1	2.24	ug/Kg		<MDL	0.75	1.5	ug/Kg
Dieldrin		<MDL	2.2	4.46	ug/Kg		<MDL	2.2	4.48	ug/Kg		<MDL	1.5	3.01	ug/Kg
Endosulfan I		<MDL	2.2	4.46	ug/Kg		<MDL	2.2	4.48	ug/Kg		<MDL	1.5	3.01	ug/Kg
Endosulfan II		<MDL	2.2	4.46	ug/Kg		<MDL	2.2	4.48	ug/Kg		<MDL	1.5	3.01	ug/Kg
Endosulfan Sulfate		<MDL	2.2	4.46	ug/Kg		<MDL	2.2	4.48	ug/Kg		<MDL	1.5	3.01	ug/Kg
Endrin		<MDL	2.2	4.46	ug/Kg		<MDL	2.2	4.48	ug/Kg		<MDL	1.5	3.01	ug/Kg
Endrin Aldehyde		<MDL	2.2	4.46	ug/Kg		<MDL	2.2	4.48	ug/Kg		<MDL	1.5	3.01	ug/Kg
Gamma-BHC (Lindane)		<MDL	1.1	2.23	ug/Kg		<MDL	1.1	2.24	ug/Kg		<MDL	0.75	1.5	ug/Kg
Gamma-Chlordane		<MDL	1.1	2.23	ug/Kg		<MDL	1.1	2.24	ug/Kg		<MDL	0.75	1.5	ug/Kg
Heptachlor		<MDL	1.1	2.23	ug/Kg		<MDL	1.1	2.24	ug/Kg		<MDL	0.75	1.5	ug/Kg
Heptachlor Epoxide		<MDL	1.1	2.23	ug/Kg		<MDL	1.1	2.24	ug/Kg		<MDL	0.75	1.5	ug/Kg
Methoxychlor		<MDL	11	22.3	ug/Kg		<MDL	11	22.4	ug/Kg		<MDL	7.5	15	ug/Kg
Toxaphene		<MDL	22	44.6	ug/Kg		<MDL	22	44.8	ug/Kg		<MDL	15	30.1	ug/Kg
OR SW846 3550B*SW846 8082A															
Aroclor 1016		<MDL,TA	8.9	17.9	ug/Kg		<MDL,TA	11	22.4	ug/Kg		<MDL,TA	230	451	ug/Kg
Aroclor 1221		<MDL	4.5	8.93	ug/Kg		<MDL	4.5	8.97	ug/Kg		<MDL,TA	45	90.2	ug/Kg
Aroclor 1232		<MDL,TA	13	26.8	ug/Kg		<MDL,TA	11	22.4	ug/Kg		<MDL,TA	330	662	ug/Kg
Aroclor 1242	12.8		2.2	4.46	ug/Kg	14.6		2.2	4.48	ug/Kg	31.7		7.5	15	ug/Kg
Aroclor 1248		<MDL,TA	18	35.7	ug/Kg		<MDL,TA	22	44.8	ug/Kg		<MDL,TA	330	662	ug/Kg
Aroclor 1254	31.5		2.2	4.46	ug/Kg	36.5		2.2	4.48	ug/Kg	504		7.5	15	ug/Kg
Aroclor 1260	18.5		2.2	4.46	ug/Kg	21.5		2.2	4.48	ug/Kg	156		7.5	15	ug/Kg
Total Aroclors	62.7		2.2	4.46	ug/Kg	72.6		2.2	4.48	ug/Kg	976		7.5	15	ug/Kg
OR SW846 3550B*SW846 8270D															
1,2,4-Trichlorobenzene		<MDL	0.22	0.446	ug/Kg		<MDL	0.22	0.448	ug/Kg		<MDL	0.15	0.301	ug/Kg
1,2-Dichlorobenzene		<MDL	0.45	0.893	ug/Kg		<MDL	0.45	0.897	ug/Kg		<MDL	0.3	0.602	ug/Kg
1,3-Dichlorobenzene		<MDL	0.45	0.893	ug/Kg		<MDL	0.45	0.897	ug/Kg		<MDL	0.3	0.602	ug/Kg
1,4-Dichlorobenzene		<MDL	0.45	0.893	ug/Kg		<MDL	0.45	0.897	ug/Kg		<MDL	0.3	0.602	ug/Kg
2,4-Dimethylphenol		<MDL	2.2	4.46	ug/Kg		<MDL	2.2	4.48	ug/Kg		<MDL	1.5	3.01	ug/Kg
2-Methylnaphthalene	5.6	<RDL	4.5	8.93	ug/Kg	6.3	<RDL	4.5	8.97	ug/Kg	3.5	<RDL	3	6.02	ug/Kg
2-Methylphenol		<MDL	4.5	8.93	ug/Kg		<MDL	4.5	8.97	ug/Kg		<MDL	3	6.02	ug/Kg
4-Methylphenol		<MDL	8.9	17.9	ug/Kg		<MDL	9	17.9	ug/Kg		<MDL	6	12	ug/Kg

King County Environmental Lab Analytical Report

Project:	423062-200-4					Project:	423062-200-4					Project:	423062-200-4			
Locator:	DUD_1C					Locator:	DUD_2C					Locator:	DUD_8C			
Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM			
Sample:	L50380-1					Sample:	L50380-2					Sample:	L50380-3			
Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED			
ColDate:	3/29/10 12:35					ColDate:	3/29/10 12:50					ColDate:	3/29/10 13:10			
TimeSpan:						TimeSpan:						TimeSpan:				
TotalSolid:	44.8					TotalSolid:	44.6					TotalSolid:	66.5			
ClientLoc:						ClientLoc:						ClientLoc:				
SampDepth:	6					SampDepth:	6					SampDepth:	10.2			
DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**				
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**
Acenaphthene	8.3	<RDL	4.5	8.93	ug/Kg	21.4		4.5	8.97	ug/Kg		<MDL	3	6.02	ug/Kg
Acenaphthylene	6.3	<RDL	4.5	8.93	ug/Kg	10.6		4.5	8.97	ug/Kg		<MDL	3	6.02	ug/Kg
Anthracene	30.8		4.5	8.93	ug/Kg	63		4.5	8.97	ug/Kg	15.3		3	6.02	ug/Kg
Benzo(a)anthracene	135		4.5	8.93	ug/Kg	341		4.5	8.97	ug/Kg	44.7		3	6.02	ug/Kg
Benzo(a)pyrene	104		4.5	8.93	ug/Kg	159		4.5	8.97	ug/Kg	47.5		3	6.02	ug/Kg
Benzo(b)fluoranthene	178		4.5	8.93	ug/Kg	269		4.5	8.97	ug/Kg	62.1		3	6.02	ug/Kg
Benzo(g,h,i)perylene	78.3		4.5	8.93	ug/Kg	84.8		4.5	8.97	ug/Kg	27.2		3	6.02	ug/Kg
Benzo(k)fluoranthene	132		4.5	8.93	ug/Kg	210		4.5	8.97	ug/Kg	52.8		3	6.02	ug/Kg
Benzoic Acid	469		22	44.6	ug/Kg	276		22	44.8	ug/Kg	134		15	30.1	ug/Kg
Benzyl Alcohol		<MDL	4.5	8.93	ug/Kg		<MDL	4.5	8.97	ug/Kg		<MDL	3	6.02	ug/Kg
Benzyl Butyl Phthalate	63.4		2.2	4.46	ug/Kg	42.8		2.2	4.48	ug/Kg	22.9		1.5	3.01	ug/Kg
Bis(2-Ethylhexyl)Phthalate	714		8.9	17.9	ug/Kg	513		9	17.9	ug/Kg	459		6	12	ug/Kg
Caffeine		<MDL	8.9	17.9	ug/Kg		<MDL	9	17.9	ug/Kg		<MDL	6	12	ug/Kg
Carbazole	10.4		4.5	8.93	ug/Kg	16.2		4.5	8.97	ug/Kg	4.4	<RDL	3	6.02	ug/Kg
Chrysene	191		4.5	8.93	ug/Kg	352		4.5	8.97	ug/Kg	56.4		3	6.02	ug/Kg
Coprostanol		<MDL	89	179	ug/Kg		<MDL	90	179	ug/Kg		<MDL	60	120	ug/Kg
Dibenzo(a,h)anthracene	26.8		4.5	8.93	ug/Kg	32.7		4.5	8.97	ug/Kg	10.4		3	6.02	ug/Kg
Dibenzofuran	7.8	<RDL	4.5	8.93	ug/Kg	16.3		4.5	8.97	ug/Kg		<MDL	3	6.02	ug/Kg
Diethyl Phthalate		<MDL	8.9	17.9	ug/Kg		<MDL	9	17.9	ug/Kg		<MDL	6	12	ug/Kg
Dimethyl Phthalate	8.9	<RDL	8.9	17.9	ug/Kg		<MDL	9	17.9	ug/Kg		<MDL	6	12	ug/Kg
Di-N-Butyl Phthalate	37.9	B	8.9	17.9	ug/Kg	36.8	B	9	17.9	ug/Kg	28.3	B	6	12	ug/Kg
Di-N-Octyl Phthalate		<MDL	8.9	17.9	ug/Kg		<MDL	9	17.9	ug/Kg		<MDL	6	12	ug/Kg
Fluoranthene	326		4.5	8.93	ug/Kg	1130		4.5	8.97	ug/Kg	94.6		3	6.02	ug/Kg
Fluorene	12.7		4.5	8.93	ug/Kg	25.1		4.5	8.97	ug/Kg	4.4	<RDL	3	6.02	ug/Kg
Hexachlorobenzene		<MDL	0.22	0.446	ug/Kg		<MDL	0.22	0.448	ug/Kg		<MDL	0.15	0.301	ug/Kg
Hexachlorobutadiene		<MDL	1.1	2.23	ug/Kg		<MDL	1.1	2.24	ug/Kg		<MDL	0.75	1.5	ug/Kg
Hexachloroethane		<MDL	2.2	4.46	ug/Kg		<MDL	2.2	4.48	ug/Kg		<MDL	1.5	3.01	ug/Kg
Indeno(1,2,3-Cd)Pyrene	70.1		4.5	8.93	ug/Kg	88.1		4.5	8.97	ug/Kg	24.7		3	6.02	ug/Kg
Naphthalene	9.22		4.5	8.93	ug/Kg	9.57		4.5	8.97	ug/Kg	4.2	<RDL	3	6.02	ug/Kg
N-Nitrosodiphenylamine		<MDL	8.9	17.9	ug/Kg		<MDL	9	17.9	ug/Kg		<MDL	6	12	ug/Kg
Pentachlorophenol		<MDL	22	44.6	ug/Kg		<MDL	22	44.8	ug/Kg		<MDL	15	30.1	ug/Kg
Phenanthrene	98.7		4.5	8.93	ug/Kg	219		4.5	8.97	ug/Kg	25.7		3	6.02	ug/Kg
Phenol	1070		8.9	17.9	ug/Kg	1410		9	17.9	ug/Kg	268		6	12	ug/Kg
Pyrene	243		4.5	8.93	ug/Kg	650		4.5	8.97	ug/Kg	127		3	6.02	ug/Kg
Total HPAHS	1480		4.5	8.93	ug/Kg	3320		4.5	8.97	ug/Kg	547		3	6.02	ug/Kg
Total LPAHs	171		4.5	8.93	ug/Kg	354		4.5	8.97	ug/Kg	58.9		3	6.02	ug/Kg

King County Environmental Lab Analytical Report

	Project:	423062-200-4					Project:	423062-200-4					Project:	423062-200-4							
	Locator:	DUD_10C					Locator:	DUD_9C					Locator:	DUD_10C							
	Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM							
	Sample:	L50380-4					Sample:	L50380-5					Sample:	L50380-6							
	Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED							
	ColDate:	3/29/10 14:28					ColDate:	3/29/10 13:38					ColDate:	3/29/10 14:03							
	TimeSpan:						TimeSpan:						TimeSpan:								
	TotalSolid:	61.9					TotalSolid:	75					TotalSolid:	62.1							
	ClientLoc:						ClientLoc:						ClientLoc:								
	SampDepth:	12.6					SampDepth:	11					SampDepth:	12.6							
	DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**								
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**				
CV ASTM D422																					
Clay*	10.3		0.86	1.72	%		1.8		0.61	1.22	%		10.5		0.75	1.49	%				
Fines*	44.7		0.86	1.72	%		7.3		0.61	1.22	%		38.8		0.75	1.49	%				
Gravel*	5.9		0.17	1.72	%		32.7		0.12	1.22	%		10		0.15	1.49	%				
p+0.00*	3.4		0.17	1.72	%		3		0.12	1.22	%		3.8		0.15	1.49	%				
p+1.00*	22.7		0.17	1.72	%		15.9		0.12	1.22	%		10.8		0.15	1.49	%				
p+10.0(equal/more than)*	7.7		0.86	1.72	%		1.2	RDL	0.61	1.22	%		8.2		0.75	1.49	%				
p+2.00*	20.6		0.17	1.72	%		24.5		0.12	1.22	%		19.5		0.15	1.49	%				
p+3.00*	5.7		0.17	1.72	%		10.1		0.12	1.22	%		17		0.15	1.49	%				
p+4.00*		<MDL	0.17	1.72	%		3.1		0.12	1.22	%		2.9		0.15	1.49	%				
p+5.00*	8.6		0.86	1.72	%		1.8		0.61	1.22	%		4.5		0.75	1.49	%				
p+6.00*	11.2		0.86	1.72	%		0.6	<RDL	0.61	1.22	%		12		0.75	1.49	%				
p+7.00*	7.7		0.86	1.72	%		1.2	RDL	0.61	1.22	%		6.7		0.75	1.49	%				
p+8.00*	6.9		0.86	1.72	%		1.8		0.61	1.22	%		5.2		0.75	1.49	%				
p+9.00*	2.6		0.86	1.72	%		0.6	<RDL	0.61	1.22	%		2.2		0.75	1.49	%				
p-1.00*	1.2	<RDL	0.17	1.72	%		2.2		0.12	1.22	%		2.8		0.15	1.49	%				
p-2.00(less than)*	4.3		0.17	1.72	%		29.9		0.12	1.22	%		6.5		0.15	1.49	%				
p-2.00*	0.4	<RDL	0.17	1.72	%		0.6	<RDL	0.12	1.22	%		0.7	<RDL	0.15	1.49	%				
Sand*	52.4		0.17	1.72	%		56.6		0.12	1.22	%		54		0.15	1.49	%				
Silt*	34.4		0.86	1.72	%		5.5		0.61	1.22	%		28.4		0.75	1.49	%				
CV SM2540-G																					
Total Solids*	61.9		0.005	0.01	%		75		0.005	0.01	%		62.1		0.005	0.01	%				
CV SW846 9060-PSEP96																					
Total Organic Carbon	10800		1900	3930	mg/Kg		4840		960	1920	mg/Kg		11300		1900	3830	mg/Kg				
MT SW846 3050B*SW846 6010C																					
Aluminum, Total, ICP	15200		8.4	41.8	mg/Kg		11000		6.7	33.5	mg/Kg		14800		8.1	40.3	mg/Kg				
Antimony, Total, ICP		<MDL,JG	1.3	6.27	mg/Kg			<MDL,JG	1	5.01	mg/Kg			<MDL,JG	1.2	6.04	mg/Kg				
Arsenic, Total, ICP	9.2	<RDL	2.1	10.5	mg/Kg		5.7	<RDL	1.7	8.36	mg/Kg		10	<RDL	2.1	10.1	mg/Kg				
Beryllium, Total, ICP	0.525		0.084	0.418	mg/Kg		0.357		0.067	0.335	mg/Kg		0.502		0.081	0.403	mg/Kg				
Cadmium, Total, ICP	0.32	<RDL	0.16	0.835	mg/Kg			<MDL	0.13	0.668	mg/Kg		0.26	<RDL	0.16	0.805	mg/Kg				
Chromium, Total, ICP	30.7		0.26	1.25	mg/Kg		18		0.2	1	mg/Kg		24.8		0.24	1.21	mg/Kg				
Copper, Total, ICP	53.6		0.34	1.66	mg/Kg		44.8		0.27	1.33	mg/Kg		53.5		0.32	1.61	mg/Kg				
Iron, Total, ICP	24900		4.2	20.8	mg/Kg		19200		3.3	16.7	mg/Kg		24000		4	20.1	mg/Kg				
Lead, Total, ICP	31		1.6	8.35	mg/Kg		12		1.3	6.68	mg/Kg		32.4		1.6	8.05	mg/Kg				
Manganese, Total, ICP	291		0.16	0.835	mg/Kg		231		0.13	0.668	mg/Kg		275		0.16	0.805	mg/Kg				
Nickel, Total, ICP	25		0.42	2.08	mg/Kg		17.5		0.33	1.67	mg/Kg		21.4		0.4	2.01	mg/Kg				
Selenium, Total, ICP		<MDL	2.1	10.5	mg/Kg			<MDL	1.7	8.36	mg/Kg			<MDL	2.1	10.1	mg/Kg				
Silver, Total, ICP		<MDL	0.34	1.66	mg/Kg			<MDL	0.27	1.33	mg/Kg			<MDL	0.32	1.61	mg/Kg				
Thallium, Total, ICP		<MDL	3.4	16.6	mg/Kg			<MDL	2.7	13.3	mg/Kg			<MDL	3.2	16.1	mg/Kg				
Zinc, Total, ICP	92.7		0.42	2.08	mg/Kg		52.3		0.33	1.67	mg/Kg		95.2		0.4	2.01	mg/Kg				

King County Environmental Lab Analytical Report

Project:	423062-200-4	423062-200-4	423062-200-4
Locator:	DUD_10C	DUD_9C	DUD_10C
Descrip:	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM
Sample:	L50380-4	L50380-5	L50380-6
Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
ColDate:	3/29/10 14:28	3/29/10 13:38	3/29/10 14:03
TimeSpan:			
TotalSolid:	61.9	75	62.1
ClientLoc:			
SampDepth:	12.6	11	12.6
	DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
MT SW846 7471B															
Mercury, Total, CVAA	0.14	<RDL	0.032	0.323	mg/Kg	0.059	<RDL	0.027	0.267	mg/Kg	0.14	<RDL	0.031	0.311	mg/Kg
OR SW846 3550B*SW846 8081B															
4,4'-DDD		<MDL	1.6	3.23	ug/Kg		<MDL	1.3	2.67	ug/Kg		<MDL	1.6	3.22	ug/Kg
4,4'-DDE		<MDL	1.6	3.23	ug/Kg		<MDL	1.3	2.67	ug/Kg		<MDL	1.6	3.22	ug/Kg
4,4'-DDT		<MDL	1.6	3.23	ug/Kg		<MDL	1.3	2.67	ug/Kg		<MDL	1.6	3.22	ug/Kg
Aldrin		<MDL	1.6	3.23	ug/Kg		<MDL	1.3	2.67	ug/Kg		<MDL	1.6	3.22	ug/Kg
Alpha-BHC		<MDL	0.81	1.62	ug/Kg		<MDL	0.67	1.33	ug/Kg		<MDL	0.81	1.61	ug/Kg
Alpha-Chlordane		<MDL	0.81	1.62	ug/Kg		<MDL	0.67	1.33	ug/Kg		<MDL	0.81	1.61	ug/Kg
Beta-BHC		<MDL	0.81	1.62	ug/Kg		<MDL	0.67	1.33	ug/Kg		<MDL	0.81	1.61	ug/Kg
Delta-BHC		<MDL	0.81	1.62	ug/Kg		<MDL	0.67	1.33	ug/Kg		<MDL	0.81	1.61	ug/Kg
Dieldrin		<MDL	1.6	3.23	ug/Kg		<MDL	1.3	2.67	ug/Kg		<MDL	1.6	3.22	ug/Kg
Endosulfan I		<MDL	1.6	3.23	ug/Kg		<MDL	1.3	2.67	ug/Kg		<MDL	1.6	3.22	ug/Kg
Endosulfan II		<MDL	1.6	3.23	ug/Kg		<MDL	1.3	2.67	ug/Kg		<MDL	1.6	3.22	ug/Kg
Endosulfan Sulfate		<MDL	1.6	3.23	ug/Kg		<MDL	1.3	2.67	ug/Kg		<MDL	1.6	3.22	ug/Kg
Endrin		<MDL	1.6	3.23	ug/Kg		<MDL	1.3	2.67	ug/Kg		<MDL	1.6	3.22	ug/Kg
Endrin Aldehyde		<MDL	1.6	3.23	ug/Kg		<MDL	1.3	2.67	ug/Kg		<MDL	1.6	3.22	ug/Kg
Gamma-BHC (Lindane)		<MDL	0.81	1.62	ug/Kg		<MDL	0.67	1.33	ug/Kg		<MDL	0.81	1.61	ug/Kg
Gamma-Chlordane		<MDL	0.81	1.62	ug/Kg		<MDL	0.67	1.33	ug/Kg		<MDL	0.81	1.61	ug/Kg
Heptachlor		<MDL	0.81	1.62	ug/Kg		<MDL	0.67	1.33	ug/Kg		<MDL	0.81	1.61	ug/Kg
Heptachlor Epoxide		<MDL	0.81	1.62	ug/Kg		<MDL	0.67	1.33	ug/Kg		<MDL	0.81	1.61	ug/Kg
Methoxychlor		<MDL	8.1	16.2	ug/Kg		<MDL	6.7	13.3	ug/Kg		<MDL	8.1	16.1	ug/Kg
Toxaphene		<MDL	16	32.3	ug/Kg		<MDL	13	26.7	ug/Kg		<MDL	16	32.2	ug/Kg
OR SW846 3550B*SW846 8082A															
Aroclor 1016		<MDL,TA	48	96.9	ug/Kg		<MDL,TA	16	32	ug/Kg		<MDL,TA	26	51.5	ug/Kg
Aroclor 1221		<MDL,TA	9.7	19.4	ug/Kg		<MDL,TA	5.3	10.7	ug/Kg		<MDL,TA	9.7	19.3	ug/Kg
Aroclor 1232		<MDL,TA	65	129	ug/Kg		<MDL,TA	16	32	ug/Kg		<MDL,TA	26	51.5	ug/Kg
Aroclor 1242	66.6		1.6	3.23	ug/Kg	21.7		1.3	2.67	ug/Kg	34.1		1.6	3.22	ug/Kg
Aroclor 1248		<MDL,TA	78	155	ug/Kg		<MDL,TA	21	42.7	ug/Kg		<MDL,TA	45	90.2	ug/Kg
Aroclor 1254	94.5		1.6	3.23	ug/Kg	29.2		1.3	2.67	ug/Kg	84.2		1.6	3.22	ug/Kg
Aroclor 1260	40.2		1.6	3.23	ug/Kg	13.2		1.3	2.67	ug/Kg	28.2		1.6	3.22	ug/Kg
Total Aroclors	202		1.6	3.23	ug/Kg	64.1		1.3	2.67	ug/Kg	129		1.6	3.22	ug/Kg
OR SW846 3550B*SW846 8270D															
1,2,4-Trichlorobenzene		<MDL	0.16	0.323	ug/Kg		<MDL	0.13	0.267	ug/Kg		<MDL	0.16	0.322	ug/Kg
1,2-Dichlorobenzene		<MDL	0.32	0.646	ug/Kg		<MDL	0.27	0.533	ug/Kg		<MDL	0.32	0.644	ug/Kg
1,3-Dichlorobenzene		<MDL	0.32	0.646	ug/Kg		<MDL	0.27	0.533	ug/Kg		<MDL	0.32	0.644	ug/Kg
1,4-Dichlorobenzene		<MDL	0.32	0.646	ug/Kg		<MDL	0.27	0.533	ug/Kg		<MDL	0.32	0.644	ug/Kg
2,4-Dimethylphenol		<MDL	1.6	3.23	ug/Kg		<MDL	1.3	2.67	ug/Kg		<MDL	1.6	3.22	ug/Kg
2-Methylnaphthalene		<MDL	3.2	6.46	ug/Kg	3.1	<RDL	2.7	5.33	ug/Kg		<MDL	3.2	6.44	ug/Kg
2-Methylphenol		<MDL	3.2	6.46	ug/Kg		<MDL	2.7	5.33	ug/Kg		<MDL	3.2	6.44	ug/Kg
4-Methylphenol		<MDL	6.5	12.9	ug/Kg		<MDL	5.3	10.7	ug/Kg		<MDL	6.4	12.9	ug/Kg

King County Environmental Lab Analytical Report

Project:	423062-200-4					Project:	423062-200-4					Project:	423062-200-4				
Locator:	DUD_10C					Locator:	DUD_9C					Locator:	DUD_10C				
Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM				
Sample:	L50380-4					Sample:	L50380-5					Sample:	L50380-6				
Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED				
ColDate:	3/29/10 14:28					ColDate:	3/29/10 13:38					ColDate:	3/29/10 14:03				
TimeSpan:						TimeSpan:						TimeSpan:					
TotalSolid:	61.9					TotalSolid:	75					TotalSolid:	62.1				
ClientLoc:						ClientLoc:						ClientLoc:					
SampDepth:	12.6					SampDepth:	11					SampDepth:	12.6				
DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**					
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**
Acenaphthene	4.5	<RDL	3.2	6.46	ug/Kg	8.95		2.7	5.33	ug/Kg	8.49		3.2	6.44	ug/Kg
Acenaphthylene		<MDL	3.2	6.46	ug/Kg		<MDL	2.7	5.33	ug/Kg		<MDL	3.2	6.44	ug/Kg
Anthracene	17.1		3.2	6.46	ug/Kg	40.1		2.7	5.33	ug/Kg	30.9		3.2	6.44	ug/Kg
Benzo(a)anthracene	58.6		3.2	6.46	ug/Kg	65.6		2.7	5.33	ug/Kg	105		3.2	6.44	ug/Kg
Benzo(a)pyrene	48.9		3.2	6.46	ug/Kg	63.3		2.7	5.33	ug/Kg	66.5		3.2	6.44	ug/Kg
Benzo(b)fluoranthene	80.3		3.2	6.46	ug/Kg	81.6		2.7	5.33	ug/Kg	101		3.2	6.44	ug/Kg
Benzo(g,h,i)perylene	33.9		3.2	6.46	ug/Kg	39.5		2.7	5.33	ug/Kg	35.6		3.2	6.44	ug/Kg
Benzo(k)fluoranthene	64.1		3.2	6.46	ug/Kg	66		2.7	5.33	ug/Kg	82.8		3.2	6.44	ug/Kg
Benzoic Acid	138		16	32.3	ug/Kg	107		13	26.7	ug/Kg	106		16	32.2	ug/Kg
Benzyl Alcohol		<MDL	3.2	6.46	ug/Kg		<MDL	2.7	5.33	ug/Kg		<MDL	3.2	6.44	ug/Kg
Benzyl Butyl Phthalate	62.7		1.6	3.23	ug/Kg	18.7		1.3	2.67	ug/Kg	22.1		1.6	3.22	ug/Kg
Bis(2-Ethylhexyl)Phthalate	365		6.5	12.9	ug/Kg	201		5.3	10.7	ug/Kg	136	B2	6.4	12.9	ug/Kg
Caffeine		<MDL	6.5	12.9	ug/Kg		<MDL	5.3	10.7	ug/Kg		<MDL	6.4	12.9	ug/Kg
Carbazole	4	<RDL	3.2	6.46	ug/Kg	16.5		2.7	5.33	ug/Kg	11.6		3.2	6.44	ug/Kg
Chrysene	80.6		3.2	6.46	ug/Kg	83.2		2.7	5.33	ug/Kg	118		3.2	6.44	ug/Kg
Coprostanol		<MDL	65	129	ug/Kg		<MDL	53	107	ug/Kg		<MDL	64	129	ug/Kg
Dibenzo(a,h)anthracene	12.1		3.2	6.46	ug/Kg	15.1		2.7	5.33	ug/Kg	17.2		3.2	6.44	ug/Kg
Dibenzofuran		<MDL	3.2	6.46	ug/Kg	6.13		2.7	5.33	ug/Kg	6.73		3.2	6.44	ug/Kg
Diethyl Phthalate		<MDL	6.5	12.9	ug/Kg		<MDL	5.3	10.7	ug/Kg		<MDL	6.4	12.9	ug/Kg
Dimethyl Phthalate		<MDL	6.5	12.9	ug/Kg		<MDL	5.3	10.7	ug/Kg		<MDL	6.4	12.9	ug/Kg
Di-N-Butyl Phthalate	26.8	B	6.5	12.9	ug/Kg	19.7	B	5.3	10.7	ug/Kg	21.9	B	6.4	12.9	ug/Kg
Di-N-Octyl Phthalate		<MDL	6.5	12.9	ug/Kg		<MDL	5.3	10.7	ug/Kg		<MDL	6.4	12.9	ug/Kg
Fluoranthene	109		3.2	6.46	ug/Kg	163		2.7	5.33	ug/Kg	279		3.2	6.44	ug/Kg
Fluorene	5.3	<RDL	3.2	6.46	ug/Kg	11.5		2.7	5.33	ug/Kg	15.1		3.2	6.44	ug/Kg
Hexachlorobenzene		<MDL	0.16	0.323	ug/Kg		<MDL	0.13	0.267	ug/Kg		<MDL	0.16	0.322	ug/Kg
Hexachlorobutadiene		<MDL	0.81	1.62	ug/Kg		<MDL	0.67	1.33	ug/Kg		<MDL	0.81	1.61	ug/Kg
Hexachloroethane		<MDL	1.6	3.23	ug/Kg		<MDL	1.3	2.67	ug/Kg		<MDL	1.6	3.22	ug/Kg
Indeno(1,2,3-Cd)Pyrene	32		3.2	6.46	ug/Kg	36		2.7	5.33	ug/Kg	35.1		3.2	6.44	ug/Kg
Naphthalene		<MDL	3.2	6.46	ug/Kg	6.69		2.7	5.33	ug/Kg	3.5	<RDL	3.2	6.44	ug/Kg
N-Nitrosodiphenylamine		<MDL	6.5	12.9	ug/Kg		<MDL	5.3	10.7	ug/Kg		<MDL	6.4	12.9	ug/Kg
Pentachlorophenol		<MDL	16	32.3	ug/Kg		<MDL	13	26.7	ug/Kg		<MDL	16	32.2	ug/Kg
Phenanthrene	35.1		3.2	6.46	ug/Kg	83.5		2.7	5.33	ug/Kg	93.1		3.2	6.44	ug/Kg
Phenol		<MDL	6.5	12.9	ug/Kg	141		5.3	10.7	ug/Kg	614		6.4	12.9	ug/Kg
Pyrene	96		3.2	6.46	ug/Kg	130		2.7	5.33	ug/Kg	139		3.2	6.44	ug/Kg
Total HPAHS	616		3.2	6.46	ug/Kg	743		2.7	5.33	ug/Kg	979		3.2	6.44	ug/Kg
Total LPAHs	69.6		3.2	6.46	ug/Kg	156		2.7	5.33	ug/Kg	157		3.2	6.44	ug/Kg

King County Environmental Lab Analytical Report

Project:	423062-200-4	423062-200-4	423062-200-4
Locator:	DUD_11C	DUD_12C	DUD_13C
Descrip:	CLEANUP AREA PERIM	CLEANUP AREA PERIM	PERIMETER LOCATION
Sample:	L50380-7	L50380-8	L50380-9
Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
ColDate:	3/30/10 9:10	3/30/10 9:35	3/30/10 9:55
TimeSpan:			
TotalSolid:	69.2	63.4	48.7
ClientLoc:			
SampDepth:	10	10	11
	DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
CV ASTM D422															
Clay*	10.2		0.64	1.27	%	12		0.8	1.6	%	19.1		0.91	1.82	%
Fines*	25.4		0.64	1.27	%	41.7		0.8	1.6	%	74.6		0.91	1.82	%
Gravel*	7.7		0.13	1.27	%	3		0.16	1.6	%	3.7		0.18	1.82	%
p+0.00*	3.3		0.13	1.27	%	0.9	<RDL	0.16	1.6	%	0.9	<RDL	0.18	1.82	%
p+1.00*	6.9		0.13	1.27	%	2.2		0.16	1.6	%	0.9	<RDL	0.18	1.82	%
p+10.0(equal/more than)*	6.4		0.64	1.27	%	8		0.8	1.6	%	12.7		0.91	1.82	%
p+2.00*	30.3		0.13	1.27	%	18.8		0.16	1.6	%	9.2		0.18	1.82	%
p+3.00*	17.1		0.13	1.27	%	11.9		0.16	1.6	%	17.6		0.18	1.82	%
p+4.00*	5.7		0.13	1.27	%	16		0.16	1.6	%	0.8	<RDL	0.18	1.82	%
p+5.00*	4.4		0.64	1.27	%	8		0.8	1.6	%	8.2		0.91	1.82	%
p+6.00*	3.2		0.64	1.27	%	7.2		0.8	1.6	%	24.6		0.91	1.82	%
p+7.00*	5.1		0.64	1.27	%	9.6		0.8	1.6	%	14.6		0.91	1.82	%
p+8.00*	2.5		0.64	1.27	%	4.8		0.8	1.6	%	8.2		0.91	1.82	%
p+9.00*	3.8		0.64	1.27	%	4		0.8	1.6	%	6.4		0.91	1.82	%
p-1.00*	3.9		0.13	1.27	%	1.4	<RDL	0.16	1.6	%		<MDL	0.18	1.82	%
p-2.00(less than)*	2.6		0.13	1.27	%	0.8	<RDL	0.16	1.6	%	3.3		0.18	1.82	%
p-2.00*	1.2	<RDL	0.13	1.27	%	0.9	<RDL	0.16	1.6	%	0.4	<RDL	0.18	1.82	%
Sand*	63.3		0.13	1.27	%	49.8		0.16	1.6	%	29.3		0.18	1.82	%
Silt*	15.2		0.64	1.27	%	29.7		0.8	1.6	%	55.5		0.91	1.82	%
CV SM2540-G															
Total Solids*	69.2		0.005	0.01	%	63.4		0.005	0.01	%	48.7		0.005	0.01	%
CV SW846 9060-PSEP96															
Total Organic Carbon	9880		1900	3820	mg/Kg	12600		2100	3960	mg/Kg	19800		2000	3960	mg/Kg
MT SW846 3050B*SW846 6010C															
Aluminum, Total, ICP	14400		7.1	35.5	mg/Kg	14300		7.9	39.1	mg/Kg	24200		10	50.5	mg/Kg
Antimony, Total, ICP	1.2	<RDL,JG	1.1	5.33	mg/Kg	1.5	<RDL,JG	1.2	5.87	mg/Kg		<MDL,JG	1.5	7.58	mg/Kg
Arsenic, Total, ICP	6.6	<RDL	1.7	8.87	mg/Kg	9.1	<RDL	1.9	9.76	mg/Kg	11	<RDL	2.5	12.6	mg/Kg
Beryllium, Total, ICP	0.464		0.071	0.355	mg/Kg	0.472		0.079	0.391	mg/Kg	0.819		0.1	0.505	mg/Kg
Cadmium, Total, ICP	0.2	<RDL	0.14	0.71	mg/Kg	0.38	<RDL	0.16	0.781	mg/Kg	0.29	<RDL	0.2	1.01	mg/Kg
Chromium, Total, ICP	25.3		0.22	1.07	mg/Kg	24.9		0.24	1.17	mg/Kg	29.6		0.31	1.51	mg/Kg
Copper, Total, ICP	51.7		0.29	1.42	mg/Kg	59.3		0.32	1.56	mg/Kg	63.9		0.41	2.02	mg/Kg
Iron, Total, ICP	22700		3.6	17.8	mg/Kg	21600		3.9	19.6	mg/Kg	31600		5.1	25.3	mg/Kg
Lead, Total, ICP	23.4		1.4	7.1	mg/Kg	46.2		1.6	7.81	mg/Kg	26.5		2	10.1	mg/Kg
Manganese, Total, ICP	263		0.14	0.71	mg/Kg	229		0.16	0.781	mg/Kg	320		0.2	1.01	mg/Kg
Nickel, Total, ICP	20.7		0.36	1.78	mg/Kg	22.1		0.39	1.96	mg/Kg	25.1		0.51	2.53	mg/Kg
Selenium, Total, ICP		<MDL	1.7	8.87	mg/Kg		<MDL	1.9	9.76	mg/Kg		<MDL	2.5	12.6	mg/Kg
Silver, Total, ICP		<MDL	0.29	1.42	mg/Kg		<MDL	0.32	1.56	mg/Kg		<MDL	0.41	2.02	mg/Kg
Thallium, Total, ICP		<MDL	2.9	14.2	mg/Kg		<MDL	3.2	15.6	mg/Kg		<MDL	4.1	20.2	mg/Kg
Zinc, Total, ICP	82.1		0.36	1.78	mg/Kg	106		0.39	1.96	mg/Kg	106		0.51	2.53	mg/Kg

King County Environmental Lab Analytical Report

Project:	423062-200-4	423062-200-4	423062-200-4
Locator:	DUD_11C	DUD_12C	DUD_13C
Descrip:	CLEANUP AREA PERIM	CLEANUP AREA PERIM	PERIMETER LOCATION
Sample:	L50380-7	L50380-8	L50380-9
Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
ColDate:	3/30/10 9:10	3/30/10 9:35	3/30/10 9:55
TimeSpan:			
TotalSolid:	69.2	63.4	48.7
ClientLoc:			
SampDepth:	10	10	11
	DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
MT SW846 7471B															
Mercury, Total, CVAA	0.1	<RDL	0.029	0.286	mg/Kg	0.16	<RDL	0.032	0.312	mg/Kg	0.17	<RDL	0.041	0.409	mg/Kg
OR SW846 3550B*SW846 8081B															
4,4'-DDD		<MDL	1.4	2.89	ug/Kg		<MDL	1.6	3.15	ug/Kg		<MDL	2.1	4.11	ug/Kg
4,4'-DDE		<MDL	1.4	2.89	ug/Kg		<MDL	1.6	3.15	ug/Kg		<MDL	2.1	4.11	ug/Kg
4,4'-DDT		<MDL	1.4	2.89	ug/Kg		<MDL	1.6	3.15	ug/Kg		<MDL	2.1	4.11	ug/Kg
Aldrin		<MDL	1.4	2.89	ug/Kg		<MDL	1.6	3.15	ug/Kg		<MDL	2.1	4.11	ug/Kg
Alpha-BHC		<MDL	0.72	1.45	ug/Kg		<MDL	0.79	1.58	ug/Kg		<MDL	1	2.05	ug/Kg
Alpha-Chlordane		<MDL	0.72	1.45	ug/Kg		<MDL	0.79	1.58	ug/Kg		<MDL	1	2.05	ug/Kg
Beta-BHC		<MDL	0.72	1.45	ug/Kg		<MDL	0.79	1.58	ug/Kg		<MDL	1	2.05	ug/Kg
Delta-BHC		<MDL	0.72	1.45	ug/Kg		<MDL	0.79	1.58	ug/Kg		<MDL	1	2.05	ug/Kg
Dieldrin		<MDL	1.4	2.89	ug/Kg		<MDL	1.6	3.15	ug/Kg		<MDL	2.1	4.11	ug/Kg
Endosulfan I		<MDL	1.4	2.89	ug/Kg		<MDL	1.6	3.15	ug/Kg		<MDL	2.1	4.11	ug/Kg
Endosulfan II		<MDL	1.4	2.89	ug/Kg		<MDL	1.6	3.15	ug/Kg		<MDL	2.1	4.11	ug/Kg
Endosulfan Sulfate		<MDL	1.4	2.89	ug/Kg		<MDL	1.6	3.15	ug/Kg		<MDL	2.1	4.11	ug/Kg
Endrin		<MDL	1.4	2.89	ug/Kg		<MDL	1.6	3.15	ug/Kg		<MDL	2.1	4.11	ug/Kg
Endrin Aldehyde		<MDL	1.4	2.89	ug/Kg		<MDL	1.6	3.15	ug/Kg		<MDL	2.1	4.11	ug/Kg
Gamma-BHC (Lindane)		<MDL	0.72	1.45	ug/Kg		<MDL	0.79	1.58	ug/Kg		<MDL	1	2.05	ug/Kg
Gamma-Chlordane		<MDL	0.72	1.45	ug/Kg		<MDL	0.79	1.58	ug/Kg		<MDL	1	2.05	ug/Kg
Heptachlor		<MDL	0.72	1.45	ug/Kg		<MDL	0.79	1.58	ug/Kg		<MDL	1	2.05	ug/Kg
Heptachlor Epoxide		<MDL	0.72	1.45	ug/Kg		<MDL	0.79	1.58	ug/Kg		<MDL	1	2.05	ug/Kg
Methoxychlor		<MDL	7.2	14.5	ug/Kg		<MDL	7.9	15.8	ug/Kg		<MDL	10	20.5	ug/Kg
Toxaphene		<MDL	14	28.9	ug/Kg		<MDL	16	31.5	ug/Kg		<MDL	21	41.1	ug/Kg
OR SW846 3550B*SW846 8082A															
Aroclor 1016		<MDL,TA	7.2	14.5	ug/Kg		<MDL,TA	35	69.4	ug/Kg		<MDL,TA	21	41.1	ug/Kg
Aroclor 1221		<MDL	2.9	5.78	ug/Kg		<MDL,TA	9.5	18.9	ug/Kg		<MDL,TA	8.2	16.4	ug/Kg
Aroclor 1232		<MDL,TA	7.2	14.5	ug/Kg		<MDL,TA	35	69.4	ug/Kg		<MDL,TA	21	41.1	ug/Kg
Aroclor 1242	11		1.4	2.89	ug/Kg	52.5		1.6	3.15	ug/Kg	32		2.1	4.11	ug/Kg
Aroclor 1248		<MDL,TA	14	28.9	ug/Kg		<MDL,TA	57	114	ug/Kg		<MDL,TA	45	90.3	ug/Kg
Aroclor 1254	27.6		1.4	2.89	ug/Kg	89.1		1.6	3.15	ug/Kg	72.9		2.1	4.11	ug/Kg
Aroclor 1260	15.9		1.4	2.89	ug/Kg	40.2		1.6	3.15	ug/Kg	29.6		2.1	4.11	ug/Kg
Total Aroclors	57.5		1.4	2.89	ug/Kg	181		1.6	3.15	ug/Kg	134		2.1	4.11	ug/Kg
OR SW846 3550B*SW846 8270D															
1,2,4-Trichlorobenzene		<MDL	0.14	0.289	ug/Kg		<MDL	0.16	0.315	ug/Kg		<MDL	0.21	0.411	ug/Kg
1,2-Dichlorobenzene		<MDL	0.29	0.578	ug/Kg		<MDL	0.32	0.631	ug/Kg		<MDL	0.41	0.821	ug/Kg
1,3-Dichlorobenzene		<MDL	0.29	0.578	ug/Kg		<MDL	0.32	0.631	ug/Kg		<MDL	0.41	0.821	ug/Kg
1,4-Dichlorobenzene		<MDL	0.29	0.578	ug/Kg		<MDL	0.32	0.631	ug/Kg		<MDL	0.41	0.821	ug/Kg
2,4-Dimethylphenol		<MDL	1.4	2.89	ug/Kg		<MDL	1.6	3.15	ug/Kg		<MDL	2.1	4.11	ug/Kg
2-Methylnaphthalene		<MDL	2.9	5.78	ug/Kg	9.48		3.2	6.31	ug/Kg		<MDL	4.1	8.21	ug/Kg
2-Methylphenol		<MDL	2.9	5.78	ug/Kg		<MDL	3.2	6.31	ug/Kg		<MDL	4.1	8.21	ug/Kg
4-Methylphenol		<MDL	5.8	11.6	ug/Kg		<MDL	6.3	12.6	ug/Kg		<MDL	8.2	16.4	ug/Kg

King County Environmental Lab Analytical Report

Project:	423062-200-4					Project:	423062-200-4					Project:	423062-200-4			
Locator:	DUD_11C					Locator:	DUD_12C					Locator:	DUD_13C			
Descrip:	CLEANUP AREA PERIM					Descrip:	CLEANUP AREA PERIM					Descrip:	PERIMETER LOCATION			
Sample:	L50380-7					Sample:	L50380-8					Sample:	L50380-9			
Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED			
ColDate:	3/30/10 9:10					ColDate:	3/30/10 9:35					ColDate:	3/30/10 9:55			
TimeSpan:						TimeSpan:						TimeSpan:				
TotalSolid:	69.2					TotalSolid:	63.4					TotalSolid:	48.7			
ClientLoc:						ClientLoc:						ClientLoc:				
SampDepth:	10					SampDepth:	10					SampDepth:	11			
DRY Weight Basis						**DRY Weight Basis**						**DRY Weight Basis**				
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**	**Value**	**Qual**	**MDL**	**RDL**	**Units**
Acenaphthene	5.1	<RDL	2.9	5.78	ug/Kg	6.85		3.2	6.31	ug/Kg	4.5	<RDL	4.1	8.21	ug/Kg
Acenaphthylene	3.3	<RDL	2.9	5.78	ug/Kg	3.9	<RDL	3.2	6.31	ug/Kg		<MDL	4.1	8.21	ug/Kg
Anthracene	26.4		2.9	5.78	ug/Kg	46.1		3.2	6.31	ug/Kg	24		4.1	8.21	ug/Kg
Benzo(a)anthracene	81.2		2.9	5.78	ug/Kg	93.8		3.2	6.31	ug/Kg	71.7		4.1	8.21	ug/Kg
Benzo(a)pyrene	76.9		2.9	5.78	ug/Kg	102		3.2	6.31	ug/Kg	70.4		4.1	8.21	ug/Kg
Benzo(b)fluoranthene	106		2.9	5.78	ug/Kg	149		3.2	6.31	ug/Kg	121		4.1	8.21	ug/Kg
Benzo(g,h,i)perylene	50.4		2.9	5.78	ug/Kg	64.8		3.2	6.31	ug/Kg	46		4.1	8.21	ug/Kg
Benzo(k)fluoranthene	96.4		2.9	5.78	ug/Kg	97.5		3.2	6.31	ug/Kg	76.2		4.1	8.21	ug/Kg
Benzoic Acid	109		14	28.9	ug/Kg	127		16	31.5	ug/Kg	97.3		21	41.1	ug/Kg
Benzyl Alcohol		<MDL	2.9	5.78	ug/Kg		<MDL	3.2	6.31	ug/Kg		<MDL	4.1	8.21	ug/Kg
Benzyl Butyl Phthalate	64.6		1.4	2.89	ug/Kg	41		1.6	3.15	ug/Kg	28.3		2.1	4.11	ug/Kg
Bis(2-Ethylhexyl)Phthalate	344		5.8	11.6	ug/Kg	322		6.3	12.6	ug/Kg	156	B2	8.2	16.4	ug/Kg
Caffeine		<MDL	5.8	11.6	ug/Kg		<MDL	6.3	12.6	ug/Kg		<MDL	8.2	16.4	ug/Kg
Carbazole	17.1		2.9	5.78	ug/Kg	18.9		3.2	6.31	ug/Kg	8	<RDL	4.1	8.21	ug/Kg
Chrysene	117		2.9	5.78	ug/Kg	120		3.2	6.31	ug/Kg	106		4.1	8.21	ug/Kg
Coprostanol		<MDL	58	116	ug/Kg		<MDL	63	126	ug/Kg		<MDL	82	164	ug/Kg
Dibenzo(a,h)anthracene	18.4		2.9	5.78	ug/Kg	24		3.2	6.31	ug/Kg	17.8		4.1	8.21	ug/Kg
Dibenzofuran	5.3	<RDL	2.9	5.78	ug/Kg	5.8	<RDL	3.2	6.31	ug/Kg	4.1	<RDL	4.1	8.21	ug/Kg
Diethyl Phthalate		<MDL	5.8	11.6	ug/Kg		<MDL	6.3	12.6	ug/Kg		<MDL	8.2	16.4	ug/Kg
Dimethyl Phthalate		<MDL	5.8	11.6	ug/Kg		<MDL	6.3	12.6	ug/Kg		<MDL	8.2	16.4	ug/Kg
Di-N-Butyl Phthalate	27.6	B	5.8	11.6	ug/Kg	32.8	B	6.3	12.6	ug/Kg	31	B	8.2	16.4	ug/Kg
Di-N-Octyl Phthalate		<MDL	5.8	11.6	ug/Kg		<MDL	6.3	12.6	ug/Kg		<MDL	8.2	16.4	ug/Kg
Fluoranthene	237		2.9	5.78	ug/Kg	215		3.2	6.31	ug/Kg	137		4.1	8.21	ug/Kg
Fluorene	9.28		2.9	5.78	ug/Kg	15.7		3.2	6.31	ug/Kg	8	<RDL	4.1	8.21	ug/Kg
Hexachlorobenzene		<MDL	0.14	0.289	ug/Kg		<MDL	0.16	0.315	ug/Kg	2.77		0.21	0.411	ug/Kg
Hexachlorobutadiene		<MDL	0.72	1.45	ug/Kg		<MDL	0.79	1.58	ug/Kg		<MDL	1	2.05	ug/Kg
Hexachloroethane		<MDL	1.4	2.89	ug/Kg		<MDL	1.6	3.15	ug/Kg		<MDL	2.1	4.11	ug/Kg
Indeno(1,2,3-Cd)Pyrene	46.7		2.9	5.78	ug/Kg	60.9		3.2	6.31	ug/Kg	42.7		4.1	8.21	ug/Kg
Naphthalene	3.2	<RDL	2.9	5.78	ug/Kg	30		3.2	6.31	ug/Kg		<MDL	4.1	8.21	ug/Kg
N-Nitrosodiphenylamine		<MDL	5.8	11.6	ug/Kg		<MDL	6.3	12.6	ug/Kg		<MDL	8.2	16.4	ug/Kg
Pentachlorophenol		<MDL	14	28.9	ug/Kg		<MDL	16	31.5	ug/Kg		<MDL	21	41.1	ug/Kg
Phenanthrene	91		2.9	5.78	ug/Kg	102		3.2	6.31	ug/Kg	47.8		4.1	8.21	ug/Kg
Phenol	405		5.8	11.6	ug/Kg	549		6.3	12.6	ug/Kg	339		8.2	16.4	ug/Kg
Pyrene	171		2.9	5.78	ug/Kg	194		3.2	6.31	ug/Kg	103		4.1	8.21	ug/Kg
Total HPAHS	999		2.9	5.78	ug/Kg	1120		3.2	6.31	ug/Kg	791		4.1	8.21	ug/Kg
Total LPAHs	141		2.9	5.78	ug/Kg	215		3.2	6.31	ug/Kg	93.2		4.1	8.21	ug/Kg

SAP MDL Comparison Table

King County Environmental Laboratory
SAP MDL Comparison

		Project:	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4
		Locator:	DUD_1C	DUD_2C	DUD_8C	DUD_10C	DUD_9C	DUD_10C	DUD_11C	DUD_12C	DUD_13C
		Descrip:	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	PERIMETER LOCATION
		Sample:	L50380-1	L50380-2	L50380-3	L50380-4	L50380-5	L50380-6	L50380-7	L50380-8	L50380-9
		Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
		ColDate:	3/29/10 12:35	3/29/10 12:50	3/29/10 13:10	3/29/10 14:28	3/29/10 13:38	3/29/10 14:03	3/30/10 9:10	3/30/10 9:35	3/30/10 9:55
		TimeSpan:									
		TotalSolid:	44.8	44.6	66.5	61.9	75	62.1	69.2	63.4	48.7
		ClientLoc:									
		SampDepth:	6	6	10.2	12.6	11	12.6	10	10	11
			DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**
Parameters	Units	SAP MDL (@50% TS)	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**
CV ASTM D422											
Fines*	%	NA	1	1.1	0.82	0.86	0.61	0.75	0.64	0.8	0.91
Clay*	%	NA	1	1.1	0.82	0.86	0.61	0.75	0.64	0.8	0.91
Silt*	%	NA	1	1.1	0.82	0.86	0.61	0.75	0.64	0.8	0.91
Sand*	%	NA	0.21	0.23	0.16	0.17	0.12	0.15	0.13	0.16	0.18
Gravel*	%	NA	0.21	0.23	0.16	0.17	0.12	0.15	0.13	0.16	0.18
p+0.00*	%	0.1	0.21	0.23	0.16	0.17	0.12	0.15	0.13	0.16	0.18
p+1.00*	%	0.1	0.21	0.23	0.16	0.17	0.12	0.15	0.13	0.16	0.18
p+10.0(equal/more than)*	%	0.5	1	1.1	0.82	0.86	0.61	0.75	0.64	0.8	0.91
p+2.00*	%	0.1	0.21	0.23	0.16	0.17	0.12	0.15	0.13	0.16	0.18
p+3.00*	%	0.1	0.21	0.23	0.16	0.17	0.12	0.15	0.13	0.16	0.18
p+4.00*	%	0.1	0.21	0.23	0.16	0.17	0.12	0.15	0.13	0.16	0.18
p+5.00*	%	0.5	1	1.1	0.82	0.86	0.61	0.75	0.64	0.8	0.91
p+6.00*	%	0.5	1	1.1	0.82	0.86	0.61	0.75	0.64	0.8	0.91
p+7.00*	%	0.5	1	1.1	0.82	0.86	0.61	0.75	0.64	0.8	0.91
p+8.00*	%	0.5	1	1.1	0.82	0.86	0.61	0.75	0.64	0.8	0.91
p+9.00*	%	0.5	1	1.1	0.82	0.86	0.61	0.75	0.64	0.8	0.91
p-1.00*	%	0.1	0.21	0.23	0.16	0.17	0.12	0.15	0.13	0.16	0.18
p-2.00(less than)*	%	0.1	0.21	0.23	0.16	0.17	0.12	0.15	0.13	0.16	0.18
p-2.00*	%	0.1	0.21	0.23	0.16	0.17	0.12	0.15	0.13	0.16	0.18
CV SW846 9060-PSEP96											
Total Organic Carbon	mg/Kg	1000	2000	2000	2000	1900	960	1900	1900	2100	2000
CV SM2540-G											
Total Solids*	%	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
MT SW846 7471B											
Mercury, Total, CVAA	mg/Kg	0.04	0.042	0.043	0.03	0.032	0.027	0.031	0.029	0.032	0.041
MT SW846 3050B*SW846 6010C											
Aluminum, Total, ICP	mg/Kg	10	11	11	7.4	8.4	6.7	8.1	7.1	7.9	10
Antimony, Total, ICP	mg/Kg	1.5	1.7	1.6	1.1	1.3	1	1.2	1.1	1.2	1.5
Arsenic, Total, ICP	mg/Kg	2.6	2.7	2.7	1.8	2.1	1.7	2.1	1.7	1.9	2.5
Beryllium, Total, ICP	mg/Kg	0.1	0.11	0.11	0.074	0.084	0.067	0.081	0.071	0.079	0.1
Cadmium, Total, ICP	mg/Kg	0.2	0.22	0.22	0.15	0.16	0.13	0.16	0.14	0.16	0.2
Chromium, Total, ICP	mg/Kg	0.3	0.33	0.34	0.23	0.26	0.2	0.24	0.22	0.24	0.31
Copper, Total, ICP	mg/Kg	0.4	0.45	0.43	0.3	0.34	0.27	0.32	0.29	0.32	0.41
Iron, Total, ICP	mg/Kg	5	5.6	5.4	3.8	4.2	3.3	4	3.6	3.9	5.1
Lead, Total, ICP	mg/Kg	2	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2
Manganese, Total, ICP	mg/Kg	0.2	0.22	0.22	0.15	0.16	0.13	0.16	0.14	0.16	0.2
Nickel, Total, ICP	mg/Kg	0.5	0.56	0.54	0.38	0.42	0.33	0.4	0.36	0.39	0.51
Selenium, Total, ICP	mg/Kg	2.6	2.7	2.7	1.8	2.1	1.7	2.1	1.7	1.9	2.5
Silver, Total, ICP	mg/Kg	0.4	0.45	0.43	0.3	0.34	0.27	0.32	0.29	0.32	0.41
Thallium, Total, ICP	mg/Kg	4	4.5	4.3	3	3.4	2.7	3.2	2.9	3.2	4.1
Zinc, Total, ICP	mg/Kg	0.5	0.56	0.54	0.38	0.42	0.33	0.4	0.36	0.39	0.51
OR SW846 3550B*SW846 8081B											
4,4'-DDD	ug/Kg	2	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2.1
4,4'-DDE	ug/Kg	2	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2.1
4,4'-DDT	ug/Kg	2	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2.1
Aldrin	ug/Kg	2	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2.1
Alpha-BHC	ug/Kg	1	1.1	1.1	0.75	0.81	0.67	0.81	0.72	0.79	1
Alpha-Chlordane	ug/Kg	1	1.1	1.1	0.75	0.81	0.67	0.81	0.72	0.79	1
Beta-BHC	ug/Kg	1	1.1	1.1	0.75	0.81	0.67	0.81	0.72	0.79	1

King County Environmental Laboratory
SAP MDL Comparison

		Project:	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4
		Locator:	DUD_1C	DUD_2C	DUD_8C	DUD_10C	DUD_9C	DUD_10C	DUD_11C	DUD_12C	DUD_13C
		Descrip:	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	PERIMETER LOCATION
		Sample:	L50380-1	L50380-2	L50380-3	L50380-4	L50380-5	L50380-6	L50380-7	L50380-8	L50380-9
		Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
		ColDate:	3/29/10 12:35	3/29/10 12:50	3/29/10 13:10	3/29/10 14:28	3/29/10 13:38	3/29/10 14:03	3/30/10 9:10	3/30/10 9:35	3/30/10 9:55
		TimeSpan:									
		TotalSolid:	44.8	44.6	66.5	61.9	75	62.1	69.2	63.4	48.7
		ClientLoc:									
		SampDepth:	6	6	10.2	12.6	11	12.6	10	10	11
			DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**
Parameters	Units	SAP MDL (@50% TS)	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**
Delta-BHC	ug/Kg	1	1.1	1.1	0.75	0.81	0.67	0.81	0.72	0.79	1
Dieldrin	ug/Kg	2	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2.1
Endosulfan I	ug/Kg	2	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2.1
Endosulfan II	ug/Kg	2	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2.1
Endosulfan Sulfate	ug/Kg	2	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2.1
Endrin	ug/Kg	2	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2.1
Endrin Aldehyde	ug/Kg	4	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2.1
Gamma-BHC (Lindane)	ug/Kg	1	1.1	1.1	0.75	0.81	0.67	0.81	0.72	0.79	1
Gamma-Chlordane	ug/Kg	1	1.1	1.1	0.75	0.81	0.67	0.81	0.72	0.79	1
Heptachlor	ug/Kg	1	1.1	1.1	0.75	0.81	0.67	0.81	0.72	0.79	1
Heptachlor Epoxide	ug/Kg	1	1.1	1.1	0.75	0.81	0.67	0.81	0.72	0.79	1
Methoxychlor	ug/Kg	10	11	11	7.5	8.1	6.7	8.1	7.2	7.9	10
Toxaphene	ug/Kg	20	22	22	15	16	13	16	14	16	21
OR SW846 3550B*SW846 8082A											
Aroclor 1016	ug/Kg	2	8.9	11	230	48	16	26	7.2	35	21
Aroclor 1221	ug/Kg	4	4.5	4.5	45	9.7	5.3	9.7	2.9	9.5	8.2
Aroclor 1232	ug/Kg	4	13	11	330	65	16	26	7.2	35	21
Aroclor 1242	ug/Kg	2	2.2	2.2	7.5	1.6	1.3	1.6	1.4	1.6	2.1
Aroclor 1248	ug/Kg	2	18	22	330	78	21	45	14	57	45
Aroclor 1254	ug/Kg	2	2.2	2.2	7.5	1.6	1.3	1.6	1.4	1.6	2.1
Aroclor 1260	ug/Kg	2	2.2	2.2	7.5	1.6	1.3	1.6	1.4	1.6	2.1
Total Aroclors	ug/Kg	2	2.2	2.2	7.5	1.6	1.3	1.6	1.4	1.6	2.1
OR SW846 3550B*SW846 8270D											
1,2,4-Trichlorobenzene	ug/Kg	0.2	0.22	0.22	0.15	0.16	0.13	0.16	0.14	0.16	0.21
1,2-Dichlorobenzene	ug/Kg	0.4	0.45	0.45	0.3	0.32	0.27	0.32	0.29	0.32	0.41
1,3-Dichlorobenzene	ug/Kg	0.4	0.45	0.45	0.3	0.32	0.27	0.32	0.29	0.32	0.41
1,4-Dichlorobenzene	ug/Kg	0.4	0.45	0.45	0.3	0.32	0.27	0.32	0.29	0.32	0.41
2,4-Dimethylphenol	ug/Kg	2	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2.1
2-Methylnaphthalene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
2-Methylphenol	ug/Kg	8	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
4-Methylphenol	ug/Kg	8	8.9	9	6	6.5	5.3	6.4	5.8	6.3	8.2
Acenaphthene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Acenaphthylene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Anthracene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Benzo(a)anthracene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Benzo(a)pyrene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Benzo(b)fluoranthene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Benzo(g,h,i)perylene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Benzo(k)fluoranthene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Benzoic Acid	ug/Kg	20	22	22	15	16	13	16	14	16	21
Benzyl Alcohol	ug/Kg	8	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Benzyl Butyl Phthalate	ug/Kg	2	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2.1
Bis(2-Ethylhexyl)Phthalate	ug/Kg	8	8.9	9	6	6.5	5.3	6.4	5.8	6.3	8.2
Caffeine	ug/Kg	8	8.9	9	6	6.5	5.3	6.4	5.8	6.3	8.2
Carbazole	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Chrysene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Coprostanol	ug/Kg	80	89	90	60	65	53	64	58	63	82
Dibenzo(a,h)anthracene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Dibenzofuran	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Diethyl Phthalate	ug/Kg	8	8.9	9	6	6.5	5.3	6.4	5.8	6.3	8.2
Dimethyl Phthalate	ug/Kg	8	8.9	9	6	6.5	5.3	6.4	5.8	6.3	8.2

King County Environmental Laboratory
SAP MDL Comparison

		Project:	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4	423062-200-4
		Locator:	DUD_1C	DUD_2C	DUD_8C	DUD_10C	DUD_9C	DUD_10C	DUD_11C	DUD_12C	DUD_13C
		Descrip:	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	CLEANUP AREA PERIM	PERIMETER LOCATION
		Sample:	L50380-1	L50380-2	L50380-3	L50380-4	L50380-5	L50380-6	L50380-7	L50380-8	L50380-9
		Matrix:	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED	SF SALTWTRSED
		ColDate:	3/29/10 12:35	3/29/10 12:50	3/29/10 13:10	3/29/10 14:28	3/29/10 13:38	3/29/10 14:03	3/30/10 9:10	3/30/10 9:35	3/30/10 9:55
		TimeSpan:									
		TotalSolid:	44.8	44.6	66.5	61.9	75	62.1	69.2	63.4	48.7
		ClientLoc:									
		SampDepth:	6	6	10.2	12.6	11	12.6	10	10	11
			DRY Weight Basis	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**	**DRY Weight Basis**
Parameters	Units	SAP MDL (@50% TS)	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**	**MDL**
Di-N-Butyl Phthalate	ug/Kg	8	8.9	9	6	6.5	5.3	6.4	5.8	6.3	8.2
Di-N-Octyl Phthalate	ug/Kg	8	8.9	9	6	6.5	5.3	6.4	5.8	6.3	8.2
Fluoranthene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Fluorene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Hexachlorobenzene	ug/Kg	0.2	0.22	0.22	0.15	0.16	0.13	0.16	0.14	0.16	0.21
Hexachlorobutadiene	ug/Kg	1	1.1	1.1	0.75	0.81	0.67	0.81	0.72	0.79	1
Hexachloroethane	ug/Kg	2	2.2	2.2	1.5	1.6	1.3	1.6	1.4	1.6	2.1
Indeno(1,2,3-Cd)Pyrene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Naphthalene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
N-Nitrosodiphenylamine	ug/Kg	8	8.9	9	6	6.5	5.3	6.4	5.8	6.3	8.2
Pentachlorophenol	ug/Kg	20	22	22	15	16	13	16	14	16	21
Phenanthrene	ug/Kg	4	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Phenol	ug/Kg	8	8.9	9	6	6.5	5.3	6.4	5.8	6.3	8.2
Pyrene	ug/Kg	8	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Total HPAHS	ug/Kg	8	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1
Total LPAHs	ug/Kg	8	4.5	4.5	3	3.2	2.7	3.2	2.9	3.2	4.1

SAP & SMS OC and Dry Weight Normalization MDL Check Tables

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.18	38	38
2,4-Dimethylphenol	1	2.23	29	27
2-Methylphenol	2	4.46	63	59
4-Methylphenol	4	8.93	670	661
Acenaphthene	2	0.18	16	16
Acenaphthylene	2	0.18	66	66
Anthracene	2	0.18	220	220
Benzo(a)anthracene	2	0.18	110	110
Benzo(a)pyrene	2	0.18	99	99
Benzo(b)fluoranthene	2	0.18	115	115
Benzo(g,h,i)perylene	2	0.18	31	31
Benzo(k)fluoranthene	2	0.18	115	115
Benzoic Acid	10	22.32	650	628
Benzyl Alcohol	2	4.46	57	53
Benzyl Butyl Phthalate	1	0.09	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.37	47	47
Chrysene	2	0.18	110	110
Dibenzo(a,h)anthracene	2	0.18	12	12
Dibenzofuran	2	0.18	15	15
Diethyl Phthalate	4	0.37	61	61
Dimethyl Phthalate	4	0.37	53	53
Di-N-Butyl Phthalate	4	0.37	220	220
Di-N-Octyl Phthalate	4	0.37	58	58
Fluorene	2	0.18	23	23
Fluoranthene	2	0.18	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.05	3.9	3.9
Indeno(1,2,3-Cd)Pyrene	2	0.18	34	34
N-Nitrosodiphenylamine	4	0.37	11	11
Naphthalene	2	0.18	99	99
Pentachlorophenol	10	22.32	360	338
Phenanthrene	2	0.18	100	100
Phenol	4	8.93	420	411
Pyrene	2	0.18	1000	1000
Aroclor 1016	4	0.37		
Aroclor 1221	2	0.18		
Aroclor 1232	6	0.55		
Aroclor 1242	1	0.09		
Aroclor 1248	8	0.73		
Aroclor 1254	1	0.09		
Aroclor 1260	1	0.09		
Total Organic Carbon (dry)	24330.35714			
Total Solids	44.8			
HPAH	20	1.83	960	958
LPAH	14	1.28	370	369
Total PCB	8	0.73	12	11.3

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.19	38	38
2,4-Dimethylphenol	1	2.24	29	27
2-Methylphenol	2	4.48	63	59
4-Methylphenol	4	8.97	670	661
Acenaphthene	2	0.19	16	16
Acenaphthylene	2	0.19	66	66
Anthracene	2	0.19	220	220
Benzo(a)anthracene	2	0.19	110	110
Benzo(a)pyrene	2	0.19	99	99
Benzo(b)fluoranthene	2	0.19	115	115
Benzo(g,h,i)perylene	2	0.19	31	31
Benzo(k)fluoranthene	2	0.19	115	115
Benzoic Acid	10	22.42	650	628
Benzyl Alcohol	2	4.48	57	53
Benzyl Butyl Phthalate	1	0.10	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.39	47	47
Chrysene	2	0.19	110	110
Dibenzo(a,h)anthracene	2	0.19	12	12
Dibenzofuran	2	0.19	15	15
Diethyl Phthalate	4	0.39	61	61
Dimethyl Phthalate	4	0.39	53	53
Di-N-Butyl Phthalate	4	0.39	220	220
Di-N-Octyl Phthalate	4	0.39	58	58
Fluorene	2	0.19	23	23
Fluoranthene	2	0.19	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.05	3.9	3.9
Indeno(1,2,3-Cd)Pyrene	2	0.19	34	34
N-Nitrosodiphenylamine	4	0.39	11	11
Naphthalene	2	0.19	99	99
Pentachlorophenol	10	22.42	360	338
Phenanthrene	2	0.19	100	100
Phenol	4	8.97	420	411
Pyrene	2	0.19	1000	1000
Aroclor 1016	5	0.49		
Aroclor 1221	2	0.19		
Aroclor 1232	5	0.49		
Aroclor 1242	1	0.10		
Aroclor 1248	10	0.97		
Aroclor 1254	1	0.10		
Aroclor 1260	1	0.10		
Total Organic Carbon (dry)	23094.1704			
Total Solids	44.6			
HPAH	20	1.94	960	958
LPAH	14	1.36	370	369
Total PCB	10	0.97	12	11.0

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.24	38	38
2,4-Dimethylphenol	1	1.50	29	27
2-Methylphenol	2	3.01	63	60
4-Methylphenol	4	6.02	670	664
Acenaphthene	2	0.24	16	16
Acenaphthylene	2	0.24	66	66
Anthracene	2	0.24	220	220
Benzo(a)anthracene	2	0.24	110	110
Benzo(a)pyrene	2	0.24	99	99
Benzo(b)fluoranthene	2	0.24	115	115
Benzo(g,h,i)perylene	2	0.24	31	31
Benzo(k)fluoranthene	2	0.24	115	115
Benzoic Acid	10	15.04	650	635
Benzyl Alcohol	2	3.01	57	54
Benzyl Butyl Phthalate	1	0.12	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.48	47	47
Chrysene	2	0.24	110	110
Dibenzo(a,h)anthracene	2	0.24	12	12
Dibenzofuran	2	0.24	15	15
Diethyl Phthalate	4	0.48	61	61
Dimethyl Phthalate	4	0.48	53	53
Di-N-Butyl Phthalate	4	0.48	220	220
Di-N-Octyl Phthalate	4	0.48	58	58
Fluorene	2	0.24	23	23
Fluoranthene	2	0.24	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.06	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.24	34	34
N-Nitrosodiphenylamine	4	0.48	11	11
Naphthalene	2	0.24	99	99
Pentachlorophenol	10	15.04	360	345
Phenanthrene	2	0.24	100	100
Phenol	4	6.02	420	414
Pyrene	2	0.24	1000	1000
Aroclor 1016	150	17.88		
Aroclor 1221	30	3.58		
Aroclor 1232	220	26.22		
Aroclor 1242	5	0.60		
Aroclor 1248	220	26.22		
Aroclor 1254	5	0.60		
Aroclor 1260	5	0.60		
Total Organic Carbon (dry)	12616.54135			
Total Solids	66.5			
HPAH	20	2.38	960	958
LPAH	14	1.67	370	368
Total PCB	220	26.22	12	-14.2

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.02	0.81	0.79
1,2-Dichlorobenzene	0.2	0.03	2.3	2.3
1,4-Dichlorobenzene	0.2	0.03	3.1	3.1
2-Methylnaphthalene	2	0.30	38	38
2,4-Dimethylphenol	1	1.62	29	27
2-Methylphenol	2	3.23	63	60
4-Methylphenol	4	6.46	670	664
Acenaphthene	2	0.30	16	16
Acenaphthylene	2	0.30	66	66
Anthracene	2	0.30	220	220
Benzo(a)anthracene	2	0.30	110	110
Benzo(a)pyrene	2	0.30	99	99
Benzo(b)fluoranthene	2	0.30	115	115
Benzo(g,h,i)perylene	2	0.30	31	31
Benzo(k)fluoranthene	2	0.30	115	115
Benzoic Acid	10	16.16	650	634
Benzyl Alcohol	2	3.23	57	54
Benzyl Butyl Phthalate	1	0.15	4.9	4.7
Bis(2-Ethylhexyl)Phthalate	4	0.60	47	46
Chrysene	2	0.30	110	110
Dibenzo(a,h)anthracene	2	0.30	12	12
Dibenzofuran	2	0.30	15	15
Diethyl Phthalate	4	0.60	61	60
Dimethyl Phthalate	4	0.60	53	52
Di-N-Butyl Phthalate	4	0.60	220	219
Di-N-Octyl Phthalate	4	0.60	58	57
Fluorene	2	0.30	23	23
Fluoranthene	2	0.30	160	160
Hexachlorobenzene	0.1	0.02	0.38	0.36
Hexachlorobutadiene	0.5	0.08	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.30	34	34
N-Nitrosodiphenylamine	4	0.60	11	10
Naphthalene	2	0.30	99	99
Pentachlorophenol	10	16.16	360	344
Phenanthrene	2	0.30	100	100
Phenol	4	6.46	420	414
Pyrene	2	0.30	1000	1000
Aroclor 1016	30	4.50		
Aroclor 1221	6	0.90		
Aroclor 1232	40	6.01		
Aroclor 1242	1	0.15		
Aroclor 1248	48	7.21		
Aroclor 1254	1	0.15		
Aroclor 1260	1	0.15		
Total Organic Carbon (dry)	10759.28918			
Total Solids	61.9			
HPAH	20	3.00	960	957
LPAH	14	2.10	370	368
Total PCB	48	7.21	12	4.8

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.03	0.81	0.78
1,2-Dichlorobenzene	0.2	0.06	2.3	2.2
1,4-Dichlorobenzene	0.2	0.06	3.1	3.0
2-Methylnaphthalene	2	0.55	38	37
2,4-Dimethylphenol	1	1.33	29	28
2-Methylphenol	2	2.67	63	60
4-Methylphenol	4	5.33	670	665
Acenaphthene	2	0.55	16	15
Acenaphthylene	2	0.55	66	65
Anthracene	2	0.55	220	219
Benzo(a)anthracene	2	0.55	110	109
Benzo(a)pyrene	2	0.55	99	98
Benzo(b)fluoranthene	2	0.55	115	114
Benzo(g,h,i)perylene	2	0.55	31	30
Benzo(k)fluoranthene	2	0.55	115	114
Benzoic Acid	10	13.33	650	637
Benzyl Alcohol	2	2.67	57	54
Benzyl Butyl Phthalate	1	0.28	4.9	4.6
Bis(2-Ethylhexyl)Phthalate	4	1.10	47	46
Chrysene	2	0.55	110	109
Dibenzo(a,h)anthracene	2	0.55	12	11
Dibenzofuran	2	0.55	15	14
Diethyl Phthalate	4	1.10	61	60
Dimethyl Phthalate	4	1.10	53	52
Di-N-Butyl Phthalate	4	1.10	220	219
Di-N-Octyl Phthalate	4	1.10	58	57
Fluorene	2	0.55	23	22
Fluoranthene	2	0.55	160	159
Hexachlorobenzene	0.1	0.03	0.38	0.35
Hexachlorobutadiene	0.5	0.14	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.55	34	33
N-Nitrosodiphenylamine	4	1.10	11	10
Naphthalene	2	0.55	99	98
Pentachlorophenol	10	13.33	360	347
Phenanthrene	2	0.55	100	99
Phenol	4	5.33	420	415
Pyrene	2	0.55	1000	999
Aroclor 1016	12	3.31		
Aroclor 1221	4	1.10		
Aroclor 1232	12	3.31		
Aroclor 1242	1	0.28		
Aroclor 1248	16	4.41		
Aroclor 1254	1	0.28		
Aroclor 1260	1	0.28		
Total Organic Carbon (dry)	4840			
Total Solids	75			
HPAH	20	5.51	960	954
LPAH	14	3.86	370	366
Total PCB	16	4.41	12	7.6

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.03	2.3	2.3
1,4-Dichlorobenzene	0.2	0.03	3.1	3.1
2-Methylnaphthalene	2	0.28	38	38
2,4-Dimethylphenol	1	1.61	29	27
2-Methylphenol	2	3.22	63	60
4-Methylphenol	4	6.44	670	664
Acenaphthene	2	0.28	16	16
Acenaphthylene	2	0.28	66	66
Anthracene	2	0.28	220	220
Benzo(a)anthracene	2	0.28	110	110
Benzo(a)pyrene	2	0.28	99	99
Benzo(b)fluoranthene	2	0.28	115	115
Benzo(g,h,i)perylene	2	0.28	31	31
Benzo(k)fluoranthene	2	0.28	115	115
Benzoic Acid	10	16.10	650	634
Benzyl Alcohol	2	3.22	57	54
Benzyl Butyl Phthalate	1	0.14	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.57	47	46
Chrysene	2	0.28	110	110
Dibenzo(a,h)anthracene	2	0.28	12	12
Dibenzofuran	2	0.28	15	15
Diethyl Phthalate	4	0.57	61	60
Dimethyl Phthalate	4	0.57	53	52
Di-N-Butyl Phthalate	4	0.57	220	219
Di-N-Octyl Phthalate	4	0.57	58	57
Fluorene	2	0.28	23	23
Fluoranthene	2	0.28	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.07	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.28	34	34
N-Nitrosodiphenylamine	4	0.57	11	10
Naphthalene	2	0.28	99	99
Pentachlorophenol	10	16.10	360	344
Phenanthrene	2	0.28	100	100
Phenol	4	6.44	420	414
Pyrene	2	0.28	1000	1000
Aroclor 1016	16	2.28		
Aroclor 1221	6	0.85		
Aroclor 1232	16	2.28		
Aroclor 1242	1	0.14		
Aroclor 1248	28	3.99		
Aroclor 1254	1	0.14		
Aroclor 1260	1	0.14		
Total Organic Carbon (dry)	11304.34783			
Total Solids	62.1			
HPAH	20	2.85	960	957
LPAH	14	1.99	370	368
Total PCB	28	3.99	12	8.0

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.03	2.3	2.3
1,4-Dichlorobenzene	0.2	0.03	3.1	3.1
2-Methylnaphthalene	2	0.29	38	38
2,4-Dimethylphenol	1	1.45	29	28
2-Methylphenol	2	2.89	63	60
4-Methylphenol	4	5.78	670	664
Acenaphthene	2	0.29	16	16
Acenaphthylene	2	0.29	66	66
Anthracene	2	0.29	220	220
Benzo(a)anthracene	2	0.29	110	110
Benzo(a)pyrene	2	0.29	99	99
Benzo(b)fluoranthene	2	0.29	115	115
Benzo(g,h,i)perylene	2	0.29	31	31
Benzo(k)fluoranthene	2	0.29	115	115
Benzoic Acid	10	14.45	650	636
Benzyl Alcohol	2	2.89	57	54
Benzyl Butyl Phthalate	1	0.15	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.58	47	46
Chrysene	2	0.29	110	110
Dibenzo(a,h)anthracene	2	0.29	12	12
Dibenzofuran	2	0.29	15	15
Diethyl Phthalate	4	0.58	61	60
Dimethyl Phthalate	4	0.58	53	52
Di-N-Butyl Phthalate	4	0.58	220	219
Di-N-Octyl Phthalate	4	0.58	58	57
Fluorene	2	0.29	23	23
Fluoranthene	2	0.29	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.07	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.29	34	34
N-Nitrosodiphenylamine	4	0.58	11	10
Naphthalene	2	0.29	99	99
Pentachlorophenol	10	14.45	360	346
Phenanthrene	2	0.29	100	100
Phenol	4	5.78	420	414
Pyrene	2	0.29	1000	1000
Aroclor 1016	5	0.73		
Aroclor 1221	2	0.29		
Aroclor 1232	5	0.73		
Aroclor 1242	1	0.15		
Aroclor 1248	10	1.46		
Aroclor 1254	1	0.15		
Aroclor 1260	1	0.15		
Total Organic Carbon (dry)	9884.393064			
Total Solids	69.2			
HPAH	20	2.92	960	957
LPAH	14	2.05	370	368
Total PCB	10	1.46	12	10.5

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.25	38	38
2,4-Dimethylphenol	1	1.58	29	27
2-Methylphenol	2	3.15	63	60
4-Methylphenol	4	6.31	670	664
Acenaphthene	2	0.25	16	16
Acenaphthylene	2	0.25	66	66
Anthracene	2	0.25	220	220
Benzo(a)anthracene	2	0.25	110	110
Benzo(a)pyrene	2	0.25	99	99
Benzo(b)fluoranthene	2	0.25	115	115
Benzo(g,h,i)perylene	2	0.25	31	31
Benzo(k)fluoranthene	2	0.25	115	115
Benzoic Acid	10	15.77	650	634
Benzyl Alcohol	2	3.15	57	54
Benzyl Butyl Phthalate	1	0.12	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.50	47	47
Chrysene	2	0.25	110	110
Dibenzo(a,h)anthracene	2	0.25	12	12
Dibenzofuran	2	0.25	15	15
Diethyl Phthalate	4	0.50	61	61
Dimethyl Phthalate	4	0.50	53	53
Di-N-Butyl Phthalate	4	0.50	220	220
Di-N-Octyl Phthalate	4	0.50	58	58
Fluorene	2	0.25	23	23
Fluoranthene	2	0.25	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.06	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.25	34	34
N-Nitrosodiphenylamine	4	0.50	11	11
Naphthalene	2	0.25	99	99
Pentachlorophenol	10	15.77	360	344
Phenanthrene	2	0.25	100	100
Phenol	4	6.31	420	414
Pyrene	2	0.25	1000	1000
Aroclor 1016	22	2.75		
Aroclor 1221	6	0.75		
Aroclor 1232	22	2.75		
Aroclor 1242	1	0.12		
Aroclor 1248	36	4.49		
Aroclor 1254	1	0.12		
Aroclor 1260	1	0.12		
Total Organic Carbon (dry)	12634.0694			
Total Solids	63.4			
HPAH	20	2.50	960	958
LPAH	14	1.75	370	368
Total PCB	36	4.49	12	7.5

SMS OC and Dry Weight Normalization Detection Limit Check

	MDL (ug/Kg, ww)	MDL (mg/Kg, dw, oc)	SMS (mg/Kg, dw,oc)	Delta (SMS-MDL)
1,2,4-Trichlorobenzene	0.1	0.01	0.81	0.80
1,2-Dichlorobenzene	0.2	0.02	2.3	2.3
1,4-Dichlorobenzene	0.2	0.02	3.1	3.1
2-Methylnaphthalene	2	0.21	38	38
2,4-Dimethylphenol	1	2.05	29	27
2-Methylphenol	2	4.11	63	59
4-Methylphenol	4	8.21	670	662
Acenaphthene	2	0.21	16	16
Acenaphthylene	2	0.21	66	66
Anthracene	2	0.21	220	220
Benzo(a)anthracene	2	0.21	110	110
Benzo(a)pyrene	2	0.21	99	99
Benzo(b)fluoranthene	2	0.21	115	115
Benzo(g,h,i)perylene	2	0.21	31	31
Benzo(k)fluoranthene	2	0.21	115	115
Benzoic Acid	10	20.53	650	629
Benzyl Alcohol	2	4.11	57	53
Benzyl Butyl Phthalate	1	0.10	4.9	4.8
Bis(2-Ethylhexyl)Phthalate	4	0.42	47	47
Chrysene	2	0.21	110	110
Dibenzo(a,h)anthracene	2	0.21	12	12
Dibenzofuran	2	0.21	15	15
Diethyl Phthalate	4	0.42	61	61
Dimethyl Phthalate	4	0.42	53	53
Di-N-Butyl Phthalate	4	0.42	220	220
Di-N-Octyl Phthalate	4	0.42	58	58
Fluorene	2	0.21	23	23
Fluoranthene	2	0.21	160	160
Hexachlorobenzene	0.1	0.01	0.38	0.37
Hexachlorobutadiene	0.5	0.05	3.9	3.8
Indeno(1,2,3-Cd)Pyrene	2	0.21	34	34
N-Nitrosodiphenylamine	4	0.42	11	11
Naphthalene	2	0.21	99	99
Pentachlorophenol	10	20.53	360	339
Phenanthrene	2	0.21	100	100
Phenol	4	8.21	420	412
Pyrene	2	0.21	1000	1000
Aroclor 1016	10	1.04		
Aroclor 1221	4	0.42		
Aroclor 1232	10	1.04		
Aroclor 1242	1	0.10		
Aroclor 1248	22	2.29		
Aroclor 1254	1	0.10		
Aroclor 1260	1	0.10		
Total Organic Carbon (dry)	19753.59343			
Total Solids	48.7			
HPAH	20	2.08	960	958
LPAH	14	1.46	370	369
Total PCB	22	2.29	12	9.7

CONVENTIONAL ANALYSES QC DATA

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

WG108448 PSD

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50379-1	423062-100-4	Duwamish Diagonal Cap Monitoring	CVPSD	SALTWTRSED	3/29/2010 9:30	4/5/2010 0:00	4/6/2010 0:00	WG108448-1, -2	
L50379-2	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 9:55	4/5/2010 0:00	4/6/2010 0:00		
L50379-3	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 10:11	4/5/2010 0:00	4/6/2010 0:00		
L50379-4	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 10:28	4/5/2010 0:00	4/6/2010 0:00		
L50379-5	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 10:52	4/5/2010 0:00	4/6/2010 0:00		
L50379-6	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 10:40	4/13/2010 0:00	4/14/2010 0:00		FREP @ L50379-4
L50379-7	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 11:20	4/5/2010 0:00	4/6/2010 0:00		
L50379-8	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 12:05	4/5/2010 0:00	4/6/2010 0:00		
L50379-9	423062-100-4		CVPSD	SALTWTRSED	3/29/2010 12:24	4/13/2010 0:00	4/14/2020 0:00		
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	CVPSD	SALTWTRSED	3/29/2010 12:35	4/13/2010 0:00	4/14/2010 0:00		
L50380-3	423062-200-4		CVPSD	SALTWTRSED	3/29/2010 13:10	4/13/2010 0:00	4/14/2010 0:00		
L50380-4	423062-200-4		CVPSD	SALTWTRSED	3/29/2010 14:28	4/13/2010 0:00	4/14/2010 0:00		FREP @ L50380-6
L50380-5	423062-200-4		CVPSD	SALTWTRSED	3/29/2010 13:38	4/13/2010 0:00	4/14/2010 0:00		
L50380-6	423062-200-4		CVPSD	SALTWTRSED	3/29/2010 14:03	4/13/2010 0:00	4/14/2010 0:00		
L50380-7	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 9:10	4/13/2010 0:00	4/14/2010 0:00		
L50380-8	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 9:35	4/13/2010 0:00	4/14/2010 0:00		
L50380-9	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 9:55	4/13/2010 0:00	4/14/2010 0:00		
WG108448-1	LD		CVPSD	SALTWTRSED		4/13/2010 0:00	4/14/2010 0:00		L50379-6
WG108448-2	LT		CVPSD	SALTWTRSED		4/13/2010 0:00	4/14/2010 0:00		WG108448-1 L50379-6

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

WG108848 PSD

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-2	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	CVPSD	SALTWTRSED	3/29/2010 12:50	4/28/2010 0:00	4/29/2010 0:00	WG108848-1, -2	
L50381-1	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 10:15	4/28/2010 0:00	4/29/2010 0:00		
L50381-2	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 10:27	4/28/2010 0:00	4/29/2010 0:00		
L50381-3	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 11:32	4/28/2010 0:00	4/29/2010 0:00		FREP @ L50381-5
L50381-4	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 10:40	4/28/2010 0:00	4/29/2010 0:00		
L50381-5	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 11:20	4/28/2010 0:00	4/29/2010 0:00		
L50381-6	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 11:40	4/28/2010 0:00	4/29/2010 0:00		
L50381-7	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 10:55	4/28/2010 0:00	4/29/2010 0:00		
L50381-8	423062-200-4		CVPSD	SALTWTRSED	3/30/2010 11:04	4/28/2010 0:00	4/29/2010 0:00		
WG108848-1	LD		CVPSD	SALTWTRSED		4/28/2010 0:00	4/29/2010 0:00		L50380-2
WG108848-2	LT		CVPSD	SALTWTRSED		4/28/2010 0:00	4/29/2010 0:00		WG108848-1 L50380-2

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

WG108840 TOC

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50379-1	423062-100-4	Duwamish Diagonal Cap Monitoring	CVTOC	SALTWTRSED	3/29/2010 9:30	4/28/2010 14:00	5/6/2010 11:38	WG108840-1, -2, -3, -4, -5, -6, -7	
L50379-2	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 9:55	4/28/2010 14:00	5/6/2010 12:00		
L50379-3	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 10:11	4/28/2010 14:00	5/6/2010 13:30		
L50379-4	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 10:28	4/28/2010 14:00	5/6/2010 13:55		
L50379-5	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 10:52	4/28/2010 14:00	5/7/2010 9:51		
L50379-6	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 10:40	4/28/2010 14:00	5/7/2010 10:12		FREP @ L50379-4
L50379-7	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 11:20	4/28/2010 14:00	5/7/2010 10:33		
L50379-8	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 12:05	4/28/2010 14:00	5/7/2010 10:55		
L50379-9	423062-100-4		CVTOC	SALTWTRSED	3/29/2010 12:24	4/28/2010 14:00	5/7/2010 11:17		
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	CVTOC	SALTWTRSED	3/29/2010 12:35	4/28/2010 14:00	5/7/2010 11:39		
L50380-2	423062-200-4		CVTOC	SALTWTRSED	3/29/2010 12:50	4/28/2010 14:00	5/7/2010 12:00		
L50380-3	423062-200-4		CVTOC	SALTWTRSED	3/29/2010 13:10	4/28/2010 14:00	5/7/2010 12:21		
L50380-4	423062-200-4		CVTOC	SALTWTRSED	3/29/2010 14:28	4/28/2010 14:00	5/7/2010 12:42		FREP @ L50380-6
WG108840-1	MB		CVTOC	OTHR SOLID		5/6/2010 10:39	5/6/2010 10:39		MB1 100506
WG108840-2	SB		CVTOC	OTHR SOLID		5/6/2010 10:55	5/6/2010 10:55		WG108840-1
WG108840-3	SRM		CVTOC	OTHR SOLID		5/6/2010 11:14	5/6/2010 11:14		HICONC
WG108840-4	LD		CVTOC	SALTWTRSED		4/28/2010 14:00	5/6/2010 12:22		L50379-2
WG108840-5	LT		CVTOC	SALTWTRSED		4/28/2010 14:00	5/6/2010 12:45		WG108840-4 L50379-2
WG108840-6	MS		CVTOC	SALTWTRSED		4/28/2010 14:00	5/6/2010 13:06		L50379-2
WG108840-7	MB		CVTOC	OTHR SOLID		5/7/2010 9:27	5/7/2010 9:27		MB1 100507

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

WG108993 TOC

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-5	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	CVTOC	SALTWTRSED	3/29/2010 13:38	5/5/2010 14:30	5/11/2010 10:39	WG108993-1, -2, -4, -5, -6, -3, -7	
L50380-6	423062-200-4		CVTOC	SALTWTRSED	3/29/2010 14:03	5/5/2010 14:30	5/11/2010 11:01		
L50380-7	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 9:10	5/5/2010 14:30	5/11/2010 12:37		
L50380-8	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 9:35	5/5/2010 14:30	5/11/2010 12:58		
L50380-9	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 9:55	5/5/2010 14:30	5/11/2010 13:40		
L50381-1	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 10:15	5/5/2010 14:30	5/12/2010 8:53		
L50381-2	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 10:27	5/5/2010 14:30	5/12/2010 9:14		
L50381-3	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 11:32	5/5/2010 14:30	5/12/2010 9:35		FREP @ L50381-5
L50381-4	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 10:40	5/5/2010 14:30	5/12/2010 9:57		
L50381-5	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 11:20	5/5/2010 14:30	5/12/2010 10:26		
L50381-6	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 11:40	5/5/2010 14:30	5/12/2010 10:47		
L50381-7	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 10:55	5/5/2010 14:30	5/12/2010 11:09		
L50381-8	423062-200-4		CVTOC	SALTWTRSED	3/30/2010 11:04	5/5/2010 14:30	5/12/2010 11:30		
WG108993-1	MB		CVTOC	OTHR SOLID		5/11/2010 9:46	5/11/2010 9:46		MB1 100511
WG108993-2	SB		CVTOC	OTHR SOLID		5/11/2010 10:00	5/11/2010 10:00		WG108993-1
WG108993-3	SRM		CVTOC	OTHR SOLID		5/11/2010 14:02	5/11/2010 14:02		HICONC
WG108993-4	LD		CVTOC	SALTWTRSED		5/5/2010 14:30	5/11/2010 11:22		L50380-6
WG108993-5	LT		CVTOC	SALTWTRSED		5/5/2010 14:30	5/11/2010 11:44		WG108993-4 L50380-6
WG108993-6	MS		CVTOC	SALTWTRSED		5/5/2010 14:30	5/11/2010 12:14		L50380-6
WG108993-7	MB		CVTOC	OTHR SOLID		5/12/2010 8:26	5/12/2010 8:26		MB1 100512

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

WG108912 Total Solids

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50379-1	423062-100-4	Duwamish Diagonal Cap Monitoring	CVTOTS	SALTWTRSED	3/29/2010 9:30	4/29/2010 10:45	5/3/2010 8:19	WG108912-1, -2, -3	
L50379-2	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 9:55	4/29/2010 10:45	5/3/2010 8:20		
L50379-3	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 10:11	4/29/2010 10:45	5/3/2010 8:20		
L50379-4	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 10:28	4/29/2010 10:45	5/3/2010 8:20		
L50379-5	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 10:52	4/29/2010 10:45	5/3/2010 8:13		
L50379-6	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 10:40	4/29/2010 10:45	5/3/2010 8:13		FREP @ L50379-4
L50379-7	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 11:20	4/29/2010 10:45	5/3/2010 8:14		
L50379-8	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 12:05	4/29/2010 10:45	5/3/2010 8:15		
L50379-9	423062-100-4		CVTOTS	SALTWTRSED	3/29/2010 12:24	4/29/2010 10:45	5/3/2010 8:15		
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	CVTOTS	SALTWTRSED	3/29/2010 12:35	4/29/2010 10:45	5/3/2010 8:23		
L50380-2	423062-200-4		CVTOTS	SALTWTRSED	3/29/2010 12:50	4/29/2010 10:45	5/3/2010 8:21		
L50380-3	423062-200-4		CVTOTS	SALTWTRSED	3/29/2010 13:10	4/29/2010 10:45	5/3/2010 8:21		
L50380-4	423062-200-4		CVTOTS	SALTWTRSED	3/29/2010 14:28	4/29/2010 10:45	5/3/2010 8:16		FREP @ L50380-6
WG108912-1	MB		CVTOTS	OTHR SOLID		4/29/2010 10:45	5/3/2010 8:23		MB1 4/29/10
WG108912-2	LD		CVTOTS	SALTWTRSED		4/29/2010 10:45	5/3/2010 8:14		L50379-7
WG108912-3	LT		CVTOTS	SALTWTRSED		4/29/2010 10:45	5/3/2010 8:14		WG108912-2 L50379-7

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

WG108974 Total Solids

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-5	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	CVTOTS	SALTWTRSED	3/29/2010 13:38	5/4/2010 14:55	5/5/2010 10:29		
L50380-6	423062-200-4		CVTOTS	SALTWTRSED	3/29/2010 14:03	5/4/2010 14:55	5/5/2010 10:29		
L50380-7	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 9:10	5/4/2010 14:55	5/5/2010 10:30		
L50380-8	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 9:35	5/4/2010 14:55	5/5/2010 10:30		
L50380-9	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 9:55	5/4/2010 14:55	5/5/2010 10:32		
L50381-1	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 10:15	5/4/2010 14:55	5/5/2010 10:33		
L50381-2	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 10:27	5/4/2010 14:55	5/5/2010 10:33		
L50381-3	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 11:32	5/4/2010 14:55	5/5/2010 10:33		FREP @ L50381-5
L50381-4	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 10:40	5/4/2010 14:55	5/5/2010 10:35	WG108974-1, -2, -3	
L50381-5	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 11:20	5/4/2010 14:55	5/5/2010 10:35		
L50381-6	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 11:40	5/4/2010 14:55	5/5/2010 10:36		
L50381-7	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 10:55	5/4/2010 14:55	5/5/2010 10:36		
L50381-8	423062-200-4		CVTOTS	SALTWTRSED	3/30/2010 11:04	5/4/2010 14:55	5/5/2010 10:36		
WG108974-1	MB		CVTOTS	OTHR SOLID		5/4/2010 14:55	5/5/2010 10:29		MB1 5/4/10
WG108974-2	LD		CVTOTS	SALTWTRSED		5/4/2010 14:55	5/5/2010 10:34		L50381-3
WG108974-3	LT		CVTOTS	SALTWTRSED		5/4/2010 14:55	5/5/2010 10:34		WG108974-2 L50381-3

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

Workgroup: WG108448 PSD

LT:WG108448-2 LD:WG108448-1 L50379-6 Matrix: SALTWTRSED Listtype: CVPSD Method: ASTM D422 Project: 423062-100-4 (Lab Triplicate, Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	LT Value	RSD	Qual	Lab Limit
Clay	0.79	1.58	%	6.1	6.8	6.3	6		20
Gravel	0.16	1.58	%	16.3	15.9	16.3	1		20
Sand	0.16	1.58	%	74	70.4	73.8	3		20
Silt	0.79	1.58	%	12.1	11.3	12.6	6		20

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

Workgroup: WG108848 PSD

LT:WG108848-2 LD:WG108848-1 L50380-2 Matrix: SALTWTRSED Listtype: CVPSD Method: ASTM D422 Project: 423062-200-4 (Lab Triplicate, Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	LT Value	RSD	Qual	Lab Limit
Clay	1.1	2.19	%	23.7	25.5	23	5		20
Gravel	0.22	2.19	%	0.6	<MDL	2			20
Sand	0.22	2.19	%	15.7	10.6	13.7	20		20
Silt	1.1	2.19	%	65.4	73.9	61.2	10		20

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

Workgroup: WG108840 TOC

MB:WG108840-1 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Organic Carbon	500	1000	mg/Kg	<MDL	

SB:WG108840-2 MB:WG108840-1 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	500	1000	mg/Kg	<MDL	2500	2560	102		80--120

SRM:WG108840-3 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	2500	4930	mg/Kg	33480	34300	102		80--120

LT:WG108840-5 LD:WG108840-4 L50379-2 Matrix: SALTWTRSED Listtype: CVTOC Method: SW846 9060-PSEP96 Project: 423062-100-4
(Lab Triplicate, Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	LT Value	RSD	Qual	Lab Limit
Total Organic Carbon	1700	3420	mg/Kg	11900	12500	12200	2		20

MS:WG108840-6 L50379-2 Matrix: SALTWTRSED Listtype: CVTOC Method: SW846 9060-PSEP96 Project: 423062-100-4
(Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	1700	3420	mg/Kg	11900	8546	20200	96		75--125

MB:WG108840-7 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Organic Carbon	500	1000	mg/Kg	<MDL	

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

Workgroup: WG108993 TOC

MB:WG108993-1 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Organic Carbon	500	1000	mg/Kg	<MDL	

SB:WG108993-2 MB:WG108993-1 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	500	1000	mg/Kg	<MDL	2500	2600	104		80--120

SRM:WG108993-3 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	2400	4780	mg/Kg	21900	20800	95		80--120

LT:WG108993-5 LD:WG108993-4 L50380-6 Matrix: SALTWTRSED Listtype: CVTOC Method: SW846 9060-PSEP96 Project: 423062-200-4
(Lab Triplicate, Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	LT Value	RSD	Qual	Lab Limit
Total Organic Carbon	1200	2370	mg/Kg	7020	7990	6840	9		20

MS:WG108993-6 L50380-6 Matrix: SALTWTRSED Listtype: CVTOC Method: SW846 9060-PSEP96 Project: 423062-200-4
(Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	1200	2450	mg/Kg	7020	6135	12800	94		75--125

MB:WG108993-7 Matrix: OTHR SOLID Listtype: CVTOC Method: SW846 9060-PSEP96 Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Organic Carbon	500	1000	mg/Kg	<MDL	

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

Workgroup: WG108912 Total Solids

MB:WG108912-1 Matrix: OTHR SOLID Listtype: CVTOTS Method: SM2540-G Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Solids	0.005	0.01	%	<MDL	

LT:WG108912-3 LD:WG108912-2 L50379-7 Matrix: SALTWTRSED Listtype: CVTOTS Method: SM2540-G Project: 423062-100-4
(Lab Triplicate, Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	LT Value	RSD	Qual	Lab Limit
Total Solids	0.005	0.01	%	51.2	51.3	51.3	0		20

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

Workgroup: WG108974 Total Solids

MB:WG108974-1 Matrix: OTHR SOLID Listtype: CVTOTS Method: SM2540-G Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Solids	0.005	0.01	%	<MDL	

LT:WG108974-3 LD:WG108974-2 L50381-3 Matrix: SALTWTRSED Listtype: CVTOTS Method: SM2540-G Project: 423062-200-4
(Lab Triplicate, Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	LT Value	RSD	Qual	Lab Limit
Total Solids	0.005	0.01	%	84.5	83.9	84.2	0		20

METAL CHEMISTRY QC DATA

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

WG108403 Total Mercury

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap/ Perimeter MON.	MTHG-SED	SALTWTRSED	3/29/2010 12:35	4/7/2010 7:20	4/8/2010 10:13	WG108403-1, -2, -3, -4, -5, -6, -7	
L50380-2	423062-200-4		MTHG-SED	SALTWTRSED	3/29/2010 12:50	4/7/2010 7:20	4/8/2010 10:20		
L50380-3	423062-200-4		MTHG-SED	SALTWTRSED	3/29/2010 13:10	4/7/2010 7:20	4/8/2010 10:21		
L50380-4	423062-200-4		MTHG-SED	SALTWTRSED	3/29/2010 14:28	4/7/2010 7:20	4/8/2010 10:26		FREP @ L50380-6
L50380-5	423062-200-4		MTHG-SED	SALTWTRSED	3/29/2010 13:38	4/7/2010 7:20	4/8/2010 10:27		
L50380-6	423062-200-4		MTHG-SED	SALTWTRSED	3/29/2010 14:03	4/7/2010 7:20	4/8/2010 10:29		
L50380-7	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 9:10	4/7/2010 7:20	4/8/2010 10:31		
L50380-8	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 9:35	4/7/2010 7:20	4/8/2010 10:32		
L50380-9	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 9:55	4/7/2010 7:20	4/8/2010 10:34		
L50381-1	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 10:15	4/7/2010 7:20	4/8/2010 10:35		
L50381-2	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 10:27	4/7/2010 7:20	4/8/2010 10:37		
L50381-3	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 11:32	4/7/2010 7:20	4/8/2010 10:38		FREP @ L50381-5
L50381-4	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 10:40	4/7/2010 7:20	4/8/2010 10:40		
L50381-5	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 11:20	4/7/2010 7:20	4/8/2010 10:45		
L50381-6	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 11:40	4/7/2010 7:20	4/8/2010 10:46		
L50381-7	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 10:55	4/7/2010 7:20	4/8/2010 10:48		
L50381-8	423062-200-4		MTHG-SED	SALTWTRSED	3/30/2010 11:04	4/7/2010 7:20	4/8/2010 10:49		
WG108403-1	SRM		MTHG-SED	SALTWTRSED		4/7/2010 7:20	4/8/2010 10:07		PACS2
WG108403-2	SRM		MTHG-SED	SALTWTRSED		4/7/2010 7:20	4/8/2010 10:09		PACS2
WG108403-3	MB		MTHG-SED	SOLIDBLANK		4/7/2010 7:20	4/8/2010 10:10		METHOD BLANK
WG108403-4	SB		MTHG-SED	SOLIDBLANK		4/7/2010 7:20	4/8/2010 10:12		WG108403-3 HG-SOL
WG108403-5	MS		MTHG-SED	SALTWTRSED		4/7/2010 7:20	4/8/2010 10:15		L50380-1 HG-SOL
WG108403-6	MSD		MTHG-SED	SALTWTRSED		4/7/2010 7:20	4/8/2010 10:16		WG108403-5 L50380-1 HG-SOL-MSD
WG108403-7	LD		MTHG-SED	SALTWTRSED		4/7/2010 7:20	4/8/2010 10:18		L50380-1 RPD-SOL

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

WG108387 Total Metals

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap/ Perimeter MON.	MTICP-SED	SALTWTRSED	3/29/2010 12:35	4/6/2010 12:00	4/7/2010 13:13	WG108387-1, -2, -3, -4, -5, -6, -7	
L50380-2	423062-200-4		MTICP-SED	SALTWTRSED	3/29/2010 12:50	4/6/2010 12:00	4/7/2010 13:30		
L50380-3	423062-200-4		MTICP-SED	SALTWTRSED	3/29/2010 13:10	4/6/2010 12:00	4/7/2010 13:35		
L50380-4	423062-200-4		MTICP-SED	SALTWTRSED	3/29/2010 14:28	4/6/2010 12:00	4/7/2010 13:52		FREP @ L50380-6
L50380-5	423062-200-4		MTICP-SED	SALTWTRSED	3/29/2010 13:38	4/6/2010 12:00	4/7/2010 13:57		
L50380-6	423062-200-4		MTICP-SED	SALTWTRSED	3/29/2010 14:03	4/6/2010 12:00	4/7/2010 14:03		
L50380-7	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 9:10	4/6/2010 12:00	4/7/2010 14:08		
L50380-8	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 9:35	4/6/2010 12:00	4/7/2010 14:14		
L50380-9	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 9:55	4/6/2010 12:00	4/7/2010 14:19		
L50381-1	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 10:15	4/6/2010 12:00	4/7/2010 14:25		
L50381-2	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 10:27	4/6/2010 12:00	4/7/2010 14:30		
L50381-3	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 11:32	4/6/2010 12:00	4/7/2010 14:36		FREP @ L50381-5
L50381-4	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 10:40	4/6/2010 12:00	4/7/2010 14:41		
L50381-5	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 11:20	4/6/2010 12:00	4/7/2010 14:58		
L50381-6	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 11:40	4/6/2010 12:00	4/7/2010 15:04		
L50381-7	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 10:55	4/6/2010 12:00	4/7/2010 15:09		
L50381-8	423062-200-4		MTICP-SED	SALTWTRSED	3/30/2010 11:04	4/6/2010 12:00	4/7/2010 15:15		
WG108387-1	SB		MTICP-SED	SOLIDBLANK		4/6/2010 12:00	4/7/2010 12:46		WG108387-2 ICPMARINE
WG108387-2	MB		MTICP-SED	SOLIDBLANK		4/6/2010 12:00	4/7/2010 12:51		METHOD BLANK
WG108387-3	LD		MTICP-SED	SALTWTRSED		4/6/2010 12:00	4/7/2010 13:19		L50380-1 RPD-SOL
WG108387-4	MS		MTICP-SED	SALTWTRSED		4/6/2010 12:00	4/7/2010 13:24		L50380-1 ICPMARINE
WG108387-5	LCS		MTICP-SED	SOIL		4/6/2010 12:00	4/7/2010 12:57		ERASOIL
WG108387-6	LCS		MTICP-SED	SOIL		4/6/2010 12:00	4/7/2010 13:02		ERASOIL
WG108387-7	SRM		MTICP-SED	SALTWTRSED		4/6/2010 12:00	4/7/2010 13:08		PACS2

King County Environmental Lab Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

Workgroup: WG108403 Total Mercury

SRM:WG108403-1 Matrix: SALTWTRSED Listtype: MTHG-SED Method: SW846 7471B Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.1	1.02	mg/Kg	3.04	3.44	113		80--120

SRM:WG108403-2 Matrix: SALTWTRSED Listtype: MTHG-SED Method: SW846 7471B Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.1	1.02	mg/Kg	3.04	3.23	106		80--120

MB:WG108403-3 Matrix: SOLIDBLANK Listtype: MTHG-SED Method: SW846 7471B Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Mercury, Total, CVAA	0.019	0.19	mg/Kg	<MDL	

SB:WG108403-4 MB:WG108403-3 Matrix: SOLIDBLANK Listtype: MTHG-SED Method: SW846 7471B Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.019	0.19	mg/Kg	<MDL	0.476	0.489	103		85--115

MSD:WG108403-6 MS:WG108403-5 L50380-1 Matrix: SALTWTRSED Listtype: MTHG-SED Method: SW846 7471B Project: 423062-200-4
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	Samp Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Mercury, Total, CVAA	0.019	0.194	mg/Kg	0.075	0.479	0.557	101		75--125	0.484	0.565	101		0		20

LD:WG108403-7 L50380-1 Matrix: SALTWTRSED Listtype: MTHG-SED Method: SW846 7471B Project: 423062-200-4
(Lab Duplicate)

Parameter	MDL	RDL	Units	Samp Value	LD Value	RPD^	Qual	Lab Limit
Mercury, Total, CVAA	0.019	0.191	mg/Kg	0.075	0.077			20

King County Environmental Lab Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

Workgroup: WG108387 Total Metals

SB:WG108387-1 MB:WG108387-2 Matrix: SOLIDBLANK Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	4.8	23.8	mg/Kg	<MDL	9570	9650	101		85--115
Antimony, Total, ICP	0.71	3.57	mg/Kg	<MDL	47.6	48.7	102		85--115
Arsenic, Total, ICP	1.2	5.95	mg/Kg	<MDL	47.6	47.9	101		85--115
Beryllium, Total, ICP	0.048	0.238	mg/Kg	<MDL	47.6	48.2	101		85--115
Cadmium, Total, ICP	0.095	0.476	mg/Kg	<MDL	47.6	46.7	98		85--115
Chromium, Total, ICP	0.14	0.714	mg/Kg	<MDL	47.6	48.2	101		85--115
Copper, Total, ICP	0.19	0.952	mg/Kg	<MDL	47.6	48.3	101		85--115
Iron, Total, ICP	2.4	11.9	mg/Kg	<MDL	4810	4880	101		85--115
Lead, Total, ICP	0.95	4.76	mg/Kg	<MDL	47.6	46.6	98		85--115
Manganese, Total, ICP	0.095	0.476	mg/Kg	<MDL	238	238	100		85--115
Nickel, Total, ICP	0.24	1.19	mg/Kg	<MDL	47.6	46.7	98		85--115
Selenium, Total, ICP	1.2	5.95	mg/Kg	<MDL	47.6	44.6	94		85--115
Silver, Total, ICP	0.19	0.952	mg/Kg	<MDL	47.6	48.4	102		85--115
Thallium, Total, ICP	1.9	9.52	mg/Kg	<MDL	47.6	46.6	98		85--115
Zinc, Total, ICP	0.24	1.19	mg/Kg	<MDL	238	226	95		85--115

MB:WG108387-2 Matrix: SOLIDBLANK Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project:
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Aluminum, Total, ICP	4.8	23.8	mg/Kg	<MDL	
Antimony, Total, ICP	0.71	3.57	mg/Kg	<MDL	
Arsenic, Total, ICP	1.2	5.95	mg/Kg	<MDL	
Beryllium, Total, ICP	0.048	0.238	mg/Kg	<MDL	
Cadmium, Total, ICP	0.095	0.476	mg/Kg	<MDL	
Chromium, Total, ICP	0.14	0.714	mg/Kg	<MDL	
Copper, Total, ICP	0.19	0.952	mg/Kg	<MDL	
Iron, Total, ICP	2.4	11.9	mg/Kg	<MDL	
Lead, Total, ICP	0.95	4.76	mg/Kg	<MDL	
Manganese, Total, ICP	0.095	0.476	mg/Kg	<MDL	
Nickel, Total, ICP	0.24	1.19	mg/Kg	<MDL	
Selenium, Total, ICP	1.2	5.95	mg/Kg	<MDL	
Silver, Total, ICP	0.19	0.952	mg/Kg	<MDL	
Thallium, Total, ICP	1.9	9.52	mg/Kg	<MDL	
Zinc, Total, ICP	0.24	1.19	mg/Kg	<MDL	

King County Environmental Lab Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

LD:WG108387-3 L50380-1 Matrix: SALTWTRSED Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: 423062-200-4 (Lab Duplicate)

Parameter	MDL	RDL	Units	Samp Value	LD Value	RPD^	Qual	Lab Limit
Aluminum, Total, ICP	4.9	24.5	mg/Kg	11800	12400	5		20
Antimony, Total, ICP	0.74	3.68	mg/Kg	0.76	<MDL			20
Arsenic, Total, ICP	1.2	6.13	mg/Kg	5.7	6.2	9		20
Beryllium, Total, ICP	0.049	0.245	mg/Kg	0.376	0.391	4		20
Cadmium, Total, ICP	0.098	0.49	mg/Kg	0.16	0.21			20
Chromium, Total, ICP	0.15	0.735	mg/Kg	14.1	14.7	4		20
Copper, Total, ICP	0.2	0.98	mg/Kg	32.6	34.5	6		20
Iron, Total, ICP	2.5	12.3	mg/Kg	15800	16500	5		20
Lead, Total, ICP	0.98	4.9	mg/Kg	14.1	14.8	5		20
Manganese, Total, ICP	0.098	0.49	mg/Kg	162	170	5		20
Nickel, Total, ICP	0.25	1.23	mg/Kg	11.6	12.1	4		20
Selenium, Total, ICP	1.2	6.13	mg/Kg	<MDL	<MDL			20
Silver, Total, ICP	0.2	0.98	mg/Kg	<MDL	<MDL			20
Thallium, Total, ICP	2	9.8	mg/Kg	<MDL	<MDL			20
Zinc, Total, ICP	0.25	1.23	mg/Kg	62.2	66.9	7		20

MS:WG108387-4 L50380-1 Matrix: SALTWTRSED Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: 423062-200-4 (Matrix Spike)

Parameter	MDL	RDL	Units	Samp Value	True Value	MS Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	5	25.2	mg/Kg	11800	10100	23700	117		75--125
Antimony, Total, ICP	0.76	3.78	mg/Kg	0.76	50.4	10.7	20	*	75--125
Arsenic, Total, ICP	1.3	6.3	mg/Kg	5.7	50.4	54.3	96		75--125
Beryllium, Total, ICP	0.05	0.252	mg/Kg	0.376	50.4	48.4	95		75--125
Cadmium, Total, ICP	0.1	0.504	mg/Kg	0.16	50.4	47.7	94		75--125
Chromium, Total, ICP	0.15	0.756	mg/Kg	14.1	50.4	63.1	97		75--125
Copper, Total, ICP	0.2	1.01	mg/Kg	32.6	50.4	83.1	100		75--125
Iron, Total, ICP	2.5	12.6	mg/Kg	15800	5090	21200	107		75--125
Lead, Total, ICP	1	5.04	mg/Kg	14.1	50.4	60.6	92		75--125
Manganese, Total, ICP	0.1	0.504	mg/Kg	162	252	401	95		75--125
Nickel, Total, ICP	0.25	1.26	mg/Kg	11.6	50.4	58.6	93		75--125
Selenium, Total, ICP	1.3	6.3	mg/Kg	<MDL	50.4	44.7	89		75--125
Silver, Total, ICP	0.2	1.01	mg/Kg	<MDL	50.4	49.7	99		75--125
Thallium, Total, ICP	2	10.1	mg/Kg	<MDL	50.4	47.5	94		75--125
Zinc, Total, ICP	0.25	1.26	mg/Kg	62.2	252	288	90		75--125

King County Environmental Lab Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

LCS:WG108387-5 Matrix: SOIL Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: NONE
(Lab Control Sample)

Parameter	MDL	RDL	Units	True Value	LCS Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	22	109	mg/Kg	8260	7340	89		61--139
Antimony, Total, ICP	3.3	16.3	mg/Kg	90.2	68.9	76		10--211
Arsenic, Total, ICP	5.4	27.2	mg/Kg	132	134	102		80--120
Beryllium, Total, ICP	0.22	1.09	mg/Kg	89.5	90.9	102		80--120
Cadmium, Total, ICP	0.43	2.17	mg/Kg	66.5	68.9	104		80--120
Chromium, Total, ICP	0.65	3.26	mg/Kg	72.9	69.3	95		79--121
Copper, Total, ICP	0.87	4.35	mg/Kg	68.5	66.5	97		80--120
Iron, Total, ICP	11	54.3	mg/Kg	13400	10900	81		50--149
Lead, Total, ICP	4.3	21.7	mg/Kg	130	132	102		80--120
Manganese, Total, ICP	0.43	2.17	mg/Kg	453	451	99		80--120
Nickel, Total, ICP	1.1	5.43	mg/Kg	55.6	55.1	99		80--120
Selenium, Total, ICP	5.4	27.2	mg/Kg	161	164	102		78--122
Silver, Total, ICP	0.87	4.35	mg/Kg	101	106	105		66--134
Thallium, Total, ICP	8.7	43.5	mg/Kg	133	141	106		77--123
Zinc, Total, ICP	1.1	5.43	mg/Kg	177	174	98		79--121

LCS:WG108387-6 Matrix: SOIL Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: NONE
(Lab Control Sample)

Parameter	MDL	RDL	Units	True Value	LCS Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	21	105	mg/Kg	8260	7380	89		61--139
Antimony, Total, ICP	3.2	15.8	mg/Kg	90.2	70.7	78		10--211
Arsenic, Total, ICP	5.3	26.4	mg/Kg	132	132	100		80--120
Beryllium, Total, ICP	0.21	1.05	mg/Kg	89.5	90.5	101		80--120
Cadmium, Total, ICP	0.42	2.11	mg/Kg	66.5	70.8	106		80--120
Chromium, Total, ICP	0.63	3.16	mg/Kg	72.9	70.4	97		79--121
Copper, Total, ICP	0.84	4.22	mg/Kg	68.5	67.1	98		80--120
Iron, Total, ICP	11	52.7	mg/Kg	13400	10700	80		50--149
Lead, Total, ICP	4.2	21.1	mg/Kg	130	129	99		80--120
Manganese, Total, ICP	0.42	2.11	mg/Kg	453	446	98		80--120
Nickel, Total, ICP	1.1	5.27	mg/Kg	55.6	55.7	100		80--120
Selenium, Total, ICP	5.3	26.4	mg/Kg	161	161	100		78--122
Silver, Total, ICP	0.84	4.22	mg/Kg	101	105	104		66--134
Thallium, Total, ICP	8.4	42.2	mg/Kg	133	146	110		77--123
Zinc, Total, ICP	1.1	5.27	mg/Kg	177	172	97		79--121

King County Environmental Lab Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

SRM:WG108387-7 Matrix: SALTWTRSED Listtype: MTICP-SED Method: SW846 3050B*SW846 6010C Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Aluminum, Total, ICP	21	107	mg/Kg	66200	15300	23		10--43
Chromium, Total, ICP	0.64	3.2	mg/Kg	90.7	45.6	50		30--70
Copper, Total, ICP	0.85	4.26	mg/Kg	310	300	97		78--118
Iron, Total, ICP	11	53.3	mg/Kg	40900	30500	75		55--95
Lead, Total, ICP	4.3	21.3	mg/Kg	183	172	94		74--114
Manganese, Total, ICP	0.43	2.13	mg/Kg	440	239	54		35--75
Nickel, Total, ICP	1.1	5.33	mg/Kg	39.5	29.4	74		51--91
Zinc, Total, ICP	1.1	5.33	mg/Kg	364	331	91		73--113

ORGANIC CHEMISTRY QC DATA

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

WG108497 Semi Volatile Organics

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	ORBNASMS	SALTWTRSED	3/29/2010 12:35	4/13/2010 6:00	5/10/2010 9:30	WG108497-2, -5, -4, -3, -1, -6	
L50380-2	423062-200-4		ORBNASMS	SALTWTRSED	3/29/2010 12:50	4/13/2010 6:00	5/10/2010 10:08		
L50380-3	423062-200-4		ORBNASMS	SALTWTRSED	3/29/2010 13:10	4/13/2010 6:00	5/10/2010 10:47		
L50380-4	423062-200-4		ORBNASMS	SALTWTRSED	3/29/2010 14:28	4/13/2010 6:00	5/10/2010 11:25		FREP @ L50380-6
L50380-5	423062-200-4		ORBNASMS	SALTWTRSED	3/29/2010 13:38	4/13/2010 6:00	5/10/2010 12:04		
L50380-6	423062-200-4		ORBNASMS	SALTWTRSED	3/29/2010 14:03	4/13/2010 6:00	5/6/2010 13:09	WG108497-5	
L50380-7	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 9:10	4/13/2010 6:00	5/10/2010 12:42	WG108497-2, -5, -4, -3, -1, -6	
L50380-8	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 9:35	4/13/2010 6:00	5/10/2010 13:21		
L50380-9	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 9:55	4/13/2010 6:00	5/10/2010 13:59		
L50381-1	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 10:15	4/13/2010 6:00	5/10/2010 14:38		
L50381-2	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 10:27	4/13/2010 6:00	5/10/2010 15:16		
L50381-3	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 11:32	4/13/2010 6:00	5/10/2010 15:55		FREP @ L50381-5
L50381-4	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 10:40	4/13/2010 6:00	5/10/2010 16:33		
L50381-5	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 11:20	4/13/2010 6:00	5/10/2010 17:12		
L50381-6	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 11:40	4/13/2010 6:00	5/10/2010 17:50		
L50381-7	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 10:55	4/13/2010 6:00	5/10/2010 18:28		
L50381-8	423062-200-4		ORBNASMS	SALTWTRSED	3/30/2010 11:04	4/13/2010 6:00	5/10/2010 19:07		
WG108497-1	MB		ORBNASMS	OTHR SOLID		4/13/2010 6:00	5/4/2010 12:08		MB100413
WG108497-2	SB		ORBNASMS	OTHR SOLID		4/13/2010 6:00	5/4/2010 12:46		WG108497-1
WG108497-3	MS		ORBNASMS	SALTWTRSED		4/13/2010 6:00	5/6/2010 11:14		L50380-5
WG108497-4	MSD		ORBNASMS	SALTWTRSED		4/13/2010 6:00	5/6/2010 11:52		WG108497-3 L50380-5
WG108497-5	LD		ORBNASMS	SALTWTRSED		4/13/2010 6:00	5/6/2010 12:31		L50380-6
WG108497-6	SRM		ORBNASMS	SALTWTRSED		4/13/2010 6:00	5/4/2010 13:25		1944

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

WG108469 PCB

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	ORPCBLL	SALTWTRSED	3/29/2010 12:35	4/9/2010 9:00	5/4/2010 16:37	WG108469-1, -2, -3, -4, -8, -9	
L50380-2	423062-200-4		ORPCBLL	SALTWTRSED	3/29/2010 12:50	4/9/2010 9:00	5/4/2010 23:25		
L50380-3	423062-200-4		ORPCBLL	SALTWTRSED	3/29/2010 13:10	4/9/2010 9:00	5/5/2010 11:10		
L50380-4	423062-200-4		ORPCBLL	SALTWTRSED	3/29/2010 14:28	4/9/2010 9:00	5/4/2010 22:11		FREP @ L50380-6
L50380-5	423062-200-4		ORPCBLL	SALTWTRSED	3/29/2010 13:38	4/9/2010 9:00	5/5/2010 0:02		
L50380-6	423062-200-4		ORPCBLL	SALTWTRSED	3/29/2010 14:03	4/9/2010 9:00	5/5/2010 0:39		
L50380-7	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 9:10	4/9/2010 9:00	5/5/2010 1:17		
L50380-8	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 9:35	4/9/2010 9:00	5/5/2010 1:54		
L50380-9	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 9:55	4/9/2010 9:00	5/5/2010 2:31		
L50381-1	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 10:15	4/9/2010 9:00	5/5/2010 3:08		
L50381-2	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 10:27	4/9/2010 9:00	5/5/2010 5:36		
L50381-3	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 11:32	4/9/2010 9:00	5/5/2010 6:14		FREP @ L50381-5
L50381-4	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 10:40	4/9/2010 9:00	5/5/2010 6:51		
L50381-5	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 11:20	4/9/2010 9:00	5/5/2010 7:28		
L50381-6	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 11:40	4/9/2010 9:00	5/5/2010 8:05		
L50381-7	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 10:55	4/9/2010 9:00	5/5/2010 8:42		
L50381-8	423062-200-4		ORPCBLL	SALTWTRSED	3/30/2010 11:04	4/9/2010 9:00	5/5/2010 9:19		
WG108469-1	MB		ORPCBLL	OTHR SOLID		4/9/2010 9:00	5/4/2010 14:08		MB100409
WG108469-2	SB		ORPCBLL	OTHR SOLID		4/9/2010 9:00	5/4/2010 14:46		WG108469-1
WG108469-3	MS		ORPCBLL	SALTWTRSED		4/9/2010 9:00	5/4/2010 15:23		L50380-1
WG108469-4	MSD		ORPCBLL	SALTWTRSED		4/9/2010 9:00	5/4/2010 16:00		WG108469-3 L50380-1
WG108469-8	LD		ORPCBLL	SALTWTRSED		4/9/2010 9:00	5/4/2010 21:34		L50380-4
WG108469-9	SRM		ORPCBLL	OTHR SOLID		4/9/2010 9:00	5/4/2010 22:48		HS-2

King County Environmental Laboratory Batch Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

WG108461 Pesticides

Sample	Project	Project Description	List Type	Matrix	Col. Date	Prep Date	Anal Date	QC Association	Comments
L50380-1	423062-200-4	Duwamish Diagonal Thin Layer Cap MON.	ORPESTLL	SALTWTRSED	3/29/2010 12:35	4/11/2010 6:00	4/28/2010 18:03	WG108461-1, -2, -3, -4, -5, -6	
L50380-2	423062-200-4		ORPESTLL	SALTWTRSED	3/29/2010 12:50	4/11/2010 6:00	4/28/2010 18:40		
L50380-3	423062-200-4		ORPESTLL	SALTWTRSED	3/29/2010 13:10	4/11/2010 6:00	4/28/2010 21:08		
L50380-4	423062-200-4		ORPESTLL	SALTWTRSED	3/29/2010 14:28	4/11/2010 6:00	4/28/2010 21:46		FREP @ L50380-6
L50380-5	423062-200-4		ORPESTLL	SALTWTRSED	3/29/2010 13:38	4/11/2010 6:00	4/28/2010 22:23		
L50380-6	423062-200-4		ORPESTLL	SALTWTRSED	3/29/2010 14:03	4/11/2010 6:00	4/28/2010 23:00		
L50380-7	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 9:10	4/11/2010 6:00	4/28/2010 23:37		
L50380-8	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 9:35	4/11/2010 6:00	4/29/2010 0:14		
L50380-9	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 9:55	4/11/2010 6:00	4/29/2010 0:51		
L50381-1	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 10:15	4/11/2010 6:00	4/28/2010 15:34		
L50381-2	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 10:27	4/11/2010 6:00	4/29/2010 1:28		
L50381-3	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 11:32	4/11/2010 6:00	4/28/2010 16:48		FREP @ L50381-5
L50381-4	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 10:40	4/11/2010 6:00	4/29/2010 2:05		
L50381-5	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 11:20	4/11/2010 6:00	4/29/2010 2:42		
L50381-6	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 11:40	4/11/2010 6:00	4/29/2010 5:11		
L50381-7	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 10:55	4/11/2010 6:00	4/29/2010 5:48		
L50381-8	423062-200-4		ORPESTLL	SALTWTRSED	3/30/2010 11:04	4/11/2010 6:00	4/29/2010 6:25		
WG108461-1	MB		ORPESTLL	OTHR SOLID		4/11/2010 6:00	4/28/2010 13:05		MB100411
WG108461-2	SB		ORPESTLL	OTHR SOLID		4/11/2010 6:00	4/28/2010 13:43		WG108461-1
WG108461-3	MS		ORPESTLL	SALTWTRSED		4/11/2010 6:00	4/28/2010 14:20		L50381-1
WG108461-4	MSD		ORPESTLL	SALTWTRSED		4/11/2010 6:00	4/28/2010 14:57		WG108461-3 L50381-1
WG108461-5	LD		ORPESTLL	SALTWTRSED		4/11/2010 6:00	4/28/2010 16:11		L50381-3
WG108461-6	SRM		ORPESTLL	OTHR SOLID		4/11/2010 6:00	4/28/2010 17:25		1944

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

Workgroup: WG108497 Semi Volatile Organics

MB:WG108497-1 Matrix: OTHR SOLID Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: NONE
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
1,2,4-Trichlorobenzene	0.1	0.2	ug/Kg	<MDL	
1,2-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	
1,3-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	
1,4-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	
2,4-Dimethylphenol	1	2	ug/Kg	<MDL	
2-Methylnaphthalene	2	4	ug/Kg	<MDL	
2-Methylphenol	2	4	ug/Kg	<MDL	
4-Methylphenol	4	8	ug/Kg	<MDL	
Acenaphthene	2	4	ug/Kg	<MDL	
Acenaphthylene	2	4	ug/Kg	<MDL	
Anthracene	2	4	ug/Kg	<MDL	
Benzo(a)anthracene	2	4	ug/Kg	<MDL	
Benzo(a)pyrene	2	4	ug/Kg	<MDL	
Benzo(b)fluoranthene	2	4	ug/Kg	<MDL	
Benzo(g,h,i)perylene	2	4	ug/Kg	<MDL	
Benzo(k)fluoranthene	2	4	ug/Kg	<MDL	
Benzoic Acid	10	20	ug/Kg	<MDL	
Benzyl Alcohol	2	4	ug/Kg	<MDL	
Benzyl Butyl Phthalate	1	2	ug/Kg	<MDL	
Bis(2-Ethylhexyl)Phthalate	4	8	ug/Kg	11.6	B
Caffeine	4	8	ug/Kg	<MDL	
Carbazole	2	4	ug/Kg	<MDL	
Chrysene	2	4	ug/Kg	<MDL	
Coprostanol	40	80	ug/Kg	<MDL	
Di-N-Butyl Phthalate	4	8	ug/Kg	12.6	B
Di-N-Octyl Phthalate	4	8	ug/Kg	<MDL	
Dibenzo(a,h)anthracene	2	4	ug/Kg	<MDL	
Dibenzofuran	2	4	ug/Kg	<MDL	
Diethyl Phthalate	4	8	ug/Kg	<MDL	
Dimethyl Phthalate	4	8	ug/Kg	<MDL	
Fluoranthene	2	4	ug/Kg	<MDL	
Fluorene	2	4	ug/Kg	<MDL	
Hexachlorobenzene	0.1	0.2	ug/Kg	<MDL	
Hexachlorobutadiene	0.5	1	ug/Kg	<MDL	
Hexachloroethane	1	2	ug/Kg	<MDL	
Indeno(1,2,3-Cd)Pyrene	2	4	ug/Kg	<MDL	
N-Nitrosodiphenylamine	4	8	ug/Kg	<MDL	
Naphthalene	2	4	ug/Kg	<MDL	
Pentachlorophenol	10	20	ug/Kg	<MDL	
Phenanthrene	2	4	ug/Kg	<MDL	

Phenol	4	8	ug/Kg	<MDL
Pyrene	2	4	ug/Kg	<MDL
Total HPAHS	2	4	ug/Kg	<MDL
Total LPAHs	2	4	ug/Kg	<MDL

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

SB:WG108497-2 MB:WG108497-1 Matrix: OTHR SOLID Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
1,2,4-Trichlorobenzene	0.1	0.2	ug/Kg	<MDL	375	175	47		30--110
1,2-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	216	57		10--116
1,3-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	228	61		18--95
1,4-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	201	54		21--99
2,4-Dimethylphenol	1	2	ug/Kg	<MDL	375	66.5	18		10--81
2-Methylnaphthalene	2	4	ug/Kg	<MDL	375	172	46		22--99
2-Methylphenol	2	4	ug/Kg	<MDL	375	147	39		16--91
4-Methylphenol	4	8	ug/Kg	<MDL	375	170	45		10--125
Acenaphthene	2	4	ug/Kg	<MDL	375	247	66		29--102
Acenaphthylene	2	4	ug/Kg	<MDL	375	253	67		31--101
Anthracene	2	4	ug/Kg	<MDL	375	238	63		45--114
Benzo(a)anthracene	2	4	ug/Kg	<MDL	375	301	80		69--117
Benzo(a)pyrene	2	4	ug/Kg	<MDL	375	281	75		15--137
Benzo(b)fluoranthene	2	4	ug/Kg	<MDL	375	299	80		50--121
Benzo(g,h,i)perylene	2	4	ug/Kg	<MDL	375	301	80		46--126
Benzo(k)fluoranthene	2	4	ug/Kg	<MDL	375	332	89		58--128
Benzoic Acid	10	20	ug/Kg	<MDL	375	161	43		10--170
Benzyl Alcohol	2	4	ug/Kg	<MDL	375	173	46		10--119
Benzyl Butyl Phthalate	1	2	ug/Kg	<MDL	375	312	83		15--183
Bis(2-Ethylhexyl)Phthalate	4	8	ug/Kg	11.6	375	293	75		10--182
Caffeine	4	8	ug/Kg	<MDL	375	270	72		45--159
Carbazole	2	4	ug/Kg	<MDL	375	260	69		44--179
Chrysene	2	4	ug/Kg	<MDL	375	272	72		69--111
Coprostanol	40	80	ug/Kg	<MDL	3750	614	16		10--159
Di-N-Butyl Phthalate	4	8	ug/Kg	12.6	375	259	66		17--180
Di-N-Octyl Phthalate	4	8	ug/Kg	<MDL	375	321	86		10--200
Dibenzo(a,h)anthracene	2	4	ug/Kg	<MDL	375	325	87		53--129
Dibenzofuran	2	4	ug/Kg	<MDL	375	242	65		37--97
Diethyl Phthalate	4	8	ug/Kg	<MDL	375	284	76		51--118
Dimethyl Phthalate	4	8	ug/Kg	<MDL	375	287	77		38--114
Fluoranthene	2	4	ug/Kg	<MDL	375	281	75		55--132
Fluorene	2	4	ug/Kg	<MDL	375	266	71		39--106
Hexachlorobenzene	0.1	0.2	ug/Kg	<MDL	375	245	65		40--111
Hexachlorobutadiene	0.5	1	ug/Kg	<MDL	375	179	48		10--97
Hexachloroethane	1	2	ug/Kg	<MDL	375	229	61		17--92
Indeno(1,2,3-Cd)Pyrene	2	4	ug/Kg	<MDL	375	321	86		51--132
N-Nitrosodiphenylamine	4	8	ug/Kg	<MDL	375	225	60		11--148
Naphthalene	2	4	ug/Kg	<MDL	375	180	48		17--94
Pentachlorophenol	10	20	ug/Kg	<MDL	375	159	42		38--124
Phenanthrene	2	4	ug/Kg	<MDL	375	249	66		57--104
Phenol	4	8	ug/Kg	<MDL	375	181	48		10--107
Pyrene	2	4	ug/Kg	<MDL	375	279	74		48--132

Total HPAHS	2	4	ug/Kg	<MDL	3750	2990	80	50--150
Total LPAHs	2	4	ug/Kg	<MDL	2630	1600	61	50--150

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

MSD:WG108497-4 MS:WG108497-3 L50380-5 Matrix: SALTWTRSED Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: NONE
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
1,2,4-Trichlorobenzene	0.1	0.2	ug/Kg	<MDL	375	158	42		10--115	375	182	48		13		100
1,2-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	184	49		10--105	375	222	59		19		100
1,3-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	180	48		10--103	375	234	62		25		100
1,4-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	375	161	43		10--104	375	199	53		21		100
2,4-Dimethylphenol	1	2	ug/Kg	<MDL	375	142	38		10--150	375	176	47		21		100
2-Methylnaphthalene	2	4	ug/Kg	2.3	375	201	53		22--112	375	210	56		6		100
2-Methylphenol	2	4	ug/Kg	<MDL	375	202	54		10--142	375	277	74		31		100
4-Methylphenol	4	8	ug/Kg	<MDL	375	242	65		10--163	375	287	76		16		100
Acenaphthene	2	4	ug/Kg	6.71	375	313	82		25--130	375	323	84		2		100
Acenaphthylene	2	4	ug/Kg	<MDL	375	316	84		27--132	375	339	90		7		100
Anthracene	2	4	ug/Kg	30.1	375	343	83		10--181	375	386	95		13		100
Benzo(a)anthracene	2	4	ug/Kg	49.2	375	451	107		32--168	375	471	112		5		100
Benzo(a)pyrene	2	4	ug/Kg	47.5	375	389	91		10--200	375	423	100		9		100
Benzo(b)fluoranthene	2	4	ug/Kg	61.2	375	477	111		10--199	375	450	104		7		100
Benzo(g,h,i)perylene	2	4	ug/Kg	29.6	375	322	78		10--173	375	332	81		4		100
Benzo(k)fluoranthene	2	4	ug/Kg	49.5	375	381	88		10--192	375	421	99		12		100
Benzoic Acid	10	20	ug/Kg	79.9	375	282	54		10--158	375	261	48		12		100
Benzyl Alcohol	2	4	ug/Kg	<MDL	375	280	75		10--138	375	290	77		3		100
Benzyl Butyl Phthalate	1	2	ug/Kg	14	375	519	135		41--145	375	487	126		7		100
Bis(2-Ethylhexyl)Phthalate	4	8	ug/Kg	151	375	599	119		10--189	375	590	117		2		100
Caffeine	4	8	ug/Kg	<MDL	375	380	101		17--195	375	407	109		8		100
Carbazole	2	4	ug/Kg	12.4	375	361	93		16--200	375	391	101		8		100
Chrysene	2	4	ug/Kg	62.4	375	399	90		14--184	375	417	95		5		100
Coprostanol	40	80	ug/Kg	<MDL	3750	1490	40		10--183	3750	1580	42		5		100
Di-N-Butyl Phthalate	4	8	ug/Kg	14.8	375	374	96		10--194	375	397	102		6		100
Di-N-Octyl Phthalate	4	8	ug/Kg	<MDL	375	485	129		52--151	375	487	130		1		100
Dibenzo(a,h)anthracene	2	4	ug/Kg	11.3	375	333	86		10--166	375	353	91		6		100
Dibenzofuran	2	4	ug/Kg	4.6	375	313	82		21--134	375	325	86		5		100
Diethyl Phthalate	4	8	ug/Kg	<MDL	375	396	106		31--150	375	418	111		5		100
Dimethyl Phthalate	4	8	ug/Kg	<MDL	375	376	100		13--162	375	397	106		6		100
Fluoranthene	2	4	ug/Kg	122	375	543	112		12--188	375	505	102		9		100
Fluorene	2	4	ug/Kg	8.65	375	356	93		22--147	375	365	95		2		100
Hexachlorobenzene	0.1	0.2	ug/Kg	<MDL	375	328	88		18--151	375	356	95		8		100
Hexachlorobutadiene	0.5	1	ug/Kg	<MDL	375	165	44		10--97	375	189	50		13		100
Hexachloroethane	1	2	ug/Kg	<MDL	375	193	51		10--89	375	236	63		21		100
Indeno(1,2,3-Cd)Pyrene	2	4	ug/Kg	27	375	347	85		10--177	375	363	90		6		100
N-Nitrosodiphenylamine	4	8	ug/Kg	<MDL	375	318	85		10--169	375	418	112		27		100
Naphthalene	2	4	ug/Kg	5.02	375	179	46		12--97	375	202	53		14		100
Pentachlorophenol	10	20	ug/Kg	<MDL	375	379	101		17--170	375	419	112		10		100
Phenanthrene	2	4	ug/Kg	62.6	375	439	100		10--200	375	402	91		9		100
Phenol	4	8	ug/Kg	106	375	350	65		10--127	375	384	74		13		100
Pyrene	2	4	ug/Kg	97.7	375	481	102		20--174	375	448	93		9		100

Total HPAHS	2	4	ug/Kg	557	3750	4120	95	50--150	3750	4180	97	2	100
Total LPAHs	2	4	ug/Kg	117	2630	2150	77	50--150	2630	2230	80	4	100

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

LD:WG108497-5 L50380-6 Matrix: SALTWTRSED Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: 423062-200-4 (Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD^	Qual	Lab Limit
1,2,4-Trichlorobenzene	0.1	0.2	ug/Kg	<MDL	<MDL			35
1,2-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	<MDL			35
1,3-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	<MDL			35
1,4-Dichlorobenzene	0.2	0.4	ug/Kg	<MDL	<MDL			35
2,4-Dimethylphenol	1	2	ug/Kg	<MDL	<MDL			35
2-Methylnaphthalene	2	4	ug/Kg	<MDL	2			35
2-Methylphenol	2	4	ug/Kg	<MDL	<MDL			35
4-Methylphenol	4	8	ug/Kg	<MDL	<MDL			35
Acenaphthene	2	4	ug/Kg	5.27	4.48	16		35
Acenaphthylene	2	4	ug/Kg	<MDL	2.2			35
Anthracene	2	4	ug/Kg	19.2	18.4	4		35
Benzo(a)anthracene	2	4	ug/Kg	65.1	60.5	7		35
Benzo(a)pyrene	2	4	ug/Kg	41.3	33.2	22		35
Benzo(b)fluoranthene	2	4	ug/Kg	62.5	46.6	29		35
Benzo(g,h,i)perylene	2	4	ug/Kg	22.1	24.4	10		35
Benzo(k)fluoranthene	2	4	ug/Kg	51.4	40.5	24		35
Benzoic Acid	10	20	ug/Kg	66	67.5	2		35
Benzyl Alcohol	2	4	ug/Kg	<MDL	<MDL			35
Benzyl Butyl Phthalate	1	2	ug/Kg	13.7	15.9	15		35
Bis(2-Ethylhexyl)Phthalate	4	8	ug/Kg	84.7	88.5	4		35
Caffeine	4	8	ug/Kg	<MDL	<MDL			35
Carbazole	2	4	ug/Kg	7.18	7.84	9		35
Chrysene	2	4	ug/Kg	73.4	65.9	11		35
Coprostanol	40	80	ug/Kg	<MDL	<MDL			35
Di-N-Butyl Phthalate	4	8	ug/Kg	13.6	13.8	1		35
Di-N-Octyl Phthalate	4	8	ug/Kg	<MDL	<MDL			35
Dibenzo(a,h)anthracene	2	4	ug/Kg	10.7	11.7	9		35
Dibenzofuran	2	4	ug/Kg	4.18	4.08	2		35
Diethyl Phthalate	4	8	ug/Kg	<MDL	<MDL			35
Dimethyl Phthalate	4	8	ug/Kg	<MDL	<MDL			35
Fluoranthene	2	4	ug/Kg	173	145	18		35
Fluorene	2	4	ug/Kg	9.35	7.26	25		35
Hexachlorobenzene	0.1	0.2	ug/Kg	<MDL	<MDL			35
Hexachlorobutadiene	0.5	1	ug/Kg	<MDL	<MDL			35
Hexachloroethane	1	2	ug/Kg	<MDL	<MDL			35
Indeno(1,2,3-Cd)Pyrene	2	4	ug/Kg	21.8	19.7	10		35
N-Nitrosodiphenylamine	4	8	ug/Kg	<MDL	<MDL			35
Naphthalene	2	4	ug/Kg	2.2	3.2			35
Pentachlorophenol	10	20	ug/Kg	<MDL	<MDL			35
Phenanthrene	2	4	ug/Kg	57.8	53.2	8		35
Phenol	4	8	ug/Kg	381	396	4		35
Pyrene	2	4	ug/Kg	86.2	89.2	3		35

Total HPAHS	2	4	ug/Kg	608	453	29	35
Total LPAHs	2	4	ug/Kg	97.5	90.7	7	35

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

SRM:WG108497-6 Matrix: SALTWTRSED Listtype: ORBNASMS Method: SW846 3550B*SW846 8270D Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Anthracene	270	533	ug/Kg	1750	663	38		28--98
Benzo(a)anthracene	270	533	ug/Kg	4660	3900	84		66--124
Benzo(a)pyrene	270	533	ug/Kg	4240	2690	63		60--116
Benzo(b)fluoranthene	270	533	ug/Kg	3820	2970	78		52--190
Benzo(g,h,i)perylene	270	533	ug/Kg	2800	2210	79		15--120
Benzo(k)fluoranthene	270	533	ug/Kg	2270	2950	130		60--146
Chrysene	270	533	ug/Kg	4800	4530	94		77--136
Dibenzo(a,h)anthracene	270	533	ug/Kg	419	767	183		10--200
Fluoranthene	270	533	ug/Kg	8800	8590	98		45--126
Indeno(1,2,3-Cd)Pyrene	270	533	ug/Kg	2740	1950	71		33--121
Naphthalene	130	533	ug/Kg	1630	240	15		10--29
Phenanthrene	270	533	ug/Kg	5200	4130	79		51--106
Pyrene	270	533	ug/Kg	9570	7590	79		36--135

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

Surrogate: (Lab Limits)	2,4,6-Tribromo phenol 29--112	2-Fluoro biphenyl 31--101	2-Fluoro phenol 10--112	d14-Ter phenyl 51--130	d4-1,2-Dichloro benzene 24--91	d4-2-Chloro phenol 11--105	d5-Nitro benzene 28--94	d5-Phenol 10--106
L50380-1	109	78	52	91	50	59	64	69
L50380-2	110	77	56	96	54	64	69	71
L50380-3	81	80	58	97	61	65	74	76
L50380-4	100	77	56	89	53	59	69	73
L50380-5	109	73	58	90	53	59	64	70
L50380-6	105	75	54	74	46	57	64	69
L50380-7	102	79	49	98	46	58	64	68
L50380-8	106	78	63	95	58	65	73	75
L50380-9	99	75	50	94	39	52	63	61
L50381-1	99	77	55	99	51	60	66	66
L50381-2	95	81	49	98	48	57	61	69
L50381-3	99	79	53	98	49	58	62	74
L50381-4	105	83	62	95	58	64	81	68
L50381-5	92	71	51	93	48	50	59	60
L50381-6	94	57	40	83	35	41	49	44
L50381-7	98	71	60	91	47	56	66	69
L50381-8	107	65	47	95	44	52	59	62
WG108497-1	51	73	54	98	68	63	79	75
WG108497-2	67	61	54	72	88	52	51	57
WG108497-3	104	72	56	91	81	59	49	72
WG108497-4	103	76	62	92	87	65	53	76
WG108497-5	108	75	56	76	53	61	70	72
WG108497-6	96	79	63	90	57	71	73	83

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

Workgroup: WG108469 PCB

MB:WG108469-1 Matrix: OTHR SOLID Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: NONE
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Aroclor 1016	1	2	ug/Kg	<MDL	
Aroclor 1221	2	4	ug/Kg	<MDL	
Aroclor 1232	2	4	ug/Kg	<MDL	
Aroclor 1242	1	2	ug/Kg	<MDL	
Aroclor 1248	1	2	ug/Kg	<MDL	
Aroclor 1254	1	2	ug/Kg	<MDL	
Aroclor 1260	1	2	ug/Kg	<MDL	
Total Aroclors	1	2	ug/Kg	<MDL	

SB:WG108469-2 MB:WG108469-1 Matrix: OTHR SOLID Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Aroclor 1016	1	2	ug/Kg	<MDL	7.5	4.68	62		39--121
Aroclor 1260	1	2	ug/Kg	<MDL	7.5	7.76	103		53--140

MSD:WG108469-4 MS:WG108469-3 L50380-1 Matrix: SALTWTRSED Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: 423062-200-4
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Aroclor 1016	1	2	ug/Kg	<MDL	7.5	10.1	134		32--164	7.5	10.7	143		6		35
Aroclor 1260	1	2	ug/Kg	8.27	7.5	13.2	66		28--144	7.5	14.2	79		18		35

LD:WG108469-8 L50380-4 Matrix: SALTWTRSED Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: 423062-200-4
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD^	Qual	Lab Limit
Aroclor 1016	30	60	ug/Kg	<MDL	<MDL			35
Aroclor 1221	6	12	ug/Kg	<MDL	<MDL			35
Aroclor 1232	40	80	ug/Kg	<MDL	<MDL			35
Aroclor 1242	1	2	ug/Kg	41.2	34.1	19		35
Aroclor 1248	48	96	ug/Kg	<MDL	<MDL			35
Aroclor 1254	1	2	ug/Kg	58.5	53.8	8		35
Aroclor 1260	1	2	ug/Kg	24.9	20.7	19		35
Total Aroclors	1	2	ug/Kg	125	109	14		35

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

SRM:WG108469-9 Matrix: OTHR SOLID Listtype: ORPCBLL Method: SW846 3550B*SW846 8082A Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Aroclor 1254	2.7	5.33	ug/Kg	112	115	89		57--139

Surrogate: (Lab Limits)	2,4,5,6-Tetra chloro m-xylene 10--118	Deca chloro biphenyl 12--158
L50380-1	52	79
L50380-2	51	74
L50380-3	63	88
L50380-4	58	89
L50380-5	74	80
L50380-6	55	73
L50380-7	66	69
L50380-8	74	73
L50380-9	59	78
L50381-1	72	77
L50381-2	64	76
L50381-3	54	75
L50381-4	69	79
L50381-5	55	81
L50381-6	70	71
L50381-7	72	71
L50381-8	60	72
WG108469-1	38	97
WG108469-2	23	99
WG108469-3	69	70
WG108469-4	60	71
WG108469-8	54	82
WG108469-9	57	88

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

Workgroup: WG108461 Pesticides

MB:WG108461-1 Matrix: OTHR SOLID Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: NONE (Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
4,4'-DDD	1	2	ug/Kg	<MDL	
4,4'-DDE	1	2	ug/Kg	<MDL	
4,4'-DDT	1	2	ug/Kg	<MDL	
Aldrin	1	2	ug/Kg	<MDL	
Alpha-BHC	0.5	1	ug/Kg	<MDL	
Alpha-Chlordane	0.5	1	ug/Kg	<MDL	
Beta-BHC	0.5	1	ug/Kg	<MDL	
Delta-BHC	0.5	1	ug/Kg	<MDL	
Dieldrin	1	2	ug/Kg	<MDL	
Endosulfan I	1	2	ug/Kg	<MDL	
Endosulfan II	1	2	ug/Kg	<MDL	
Endosulfan Sulfate	1	2	ug/Kg	<MDL	
Endrin	1	2	ug/Kg	<MDL	
Endrin Aldehyde	1	2	ug/Kg	<MDL	
Gamma-BHC (Lindane)	0.5	1	ug/Kg	<MDL	
Gamma-Chlordane	0.5	1	ug/Kg	<MDL	
Heptachlor	0.5	1	ug/Kg	<MDL	
Heptachlor Epoxide	0.5	1	ug/Kg	<MDL	
Methoxychlor	5	10	ug/Kg	<MDL	
Toxaphene	10	20	ug/Kg	<MDL	

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

SB:WG108461-2 MB:WG108461-1 Matrix: OTHR SOLID Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: NONE
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
4,4'-DDD	1	2	ug/Kg	<MDL	10	8.48	85		78--121
4,4'-DDE	1	2	ug/Kg	<MDL	10	8.95	90		75--111
4,4'-DDT	1	2	ug/Kg	<MDL	10	8.34	83		57--145
Aldrin	1	2	ug/Kg	<MDL	10	6.88	69		28--113
Alpha-BHC	0.5	1	ug/Kg	<MDL	10	6.91	69		20--99
Beta-BHC	0.5	1	ug/Kg	<MDL	10	8.21	82		66--102
Delta-BHC	0.5	1	ug/Kg	<MDL	10	8.56	86		63--108
Dieldrin	1	2	ug/Kg	<MDL	10	8.66	87		58--139
Endosulfan I	1	2	ug/Kg	<MDL	10	8.12	81		62--104
Endosulfan II	1	2	ug/Kg	<MDL	10	8.57	86		72--109
Endosulfan Sulfate	1	2	ug/Kg	<MDL	10	7.36	74		61--104
Endrin	1	2	ug/Kg	<MDL	10	10.1	101		60--160
Endrin Aldehyde	1	2	ug/Kg	<MDL	10	1.1	11		10--77
Gamma-BHC (Lindane)	0.5	1	ug/Kg	<MDL	10	7.46	75		27--130
Heptachlor	0.5	1	ug/Kg	<MDL	10	9.72	97		20--137
Heptachlor Epoxide	0.5	1	ug/Kg	<MDL	10	8.21	82		59--107
Methoxychlor	5	10	ug/Kg	<MDL	10	9.7	97		72--131

MSD:WG108461-4 MS:WG108461-3 L50381-1 Matrix: SALTWTRSED Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: 423062-200-4
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
4,4'-DDD	1	2	ug/Kg	<MDL	10	7.57	76		41--157	10	8.79	88		15		35
4,4'-DDE	1	2	ug/Kg	<MDL	10	8.07	81		59--125	10	9.17	92		13		35
4,4'-DDT	1	2	ug/Kg	<MDL	10	6.94	69		50--144	10	7.91	79		14		35
Aldrin	1	2	ug/Kg	<MDL	10	6.99	70		61--119	10	8.03	80		13		35
Alpha-BHC	0.5	1	ug/Kg	<MDL	10	7.74	77		59--111	10	9.22	92		18		35
Beta-BHC	0.5	1	ug/Kg	<MDL	10	7.76	78		60--119	10	8.86	89		13		35
Delta-BHC	0.5	1	ug/Kg	<MDL	10	8.01	80		54--126	10	8.72	87		8		35
Dieldrin	1	2	ug/Kg	<MDL	10	7.4	74		60--139	10	8.31	83		11		35
Endosulfan I	1	2	ug/Kg	<MDL	10	7.12	71		64--113	10	8.03	80		12		35
Endosulfan II	1	2	ug/Kg	<MDL	10	6.97	70		36--146	10	7.47	75		7		35
Endosulfan Sulfate	1	2	ug/Kg	<MDL	10	6.04	60		46--113	10	6.61	66		10		35
Endrin	1	2	ug/Kg	<MDL	10	8.65	86		62--166	10	9.96	100		15		35
Endrin Aldehyde	1	2	ug/Kg	<MDL	10	1.1	11		10--66	10	1.4	14		24		35
Gamma-BHC (Lindane)	0.5	1	ug/Kg	<MDL	10	7.7	77		61--135	10	8.98	90		16		35
Heptachlor	0.5	1	ug/Kg	<MDL	10	7.43	74		52--157	10	8.76	88		17		35
Heptachlor Epoxide	0.5	1	ug/Kg	<MDL	10	7.27	73		61--118	10	8.25	82		12		35
Methoxychlor	5	10	ug/Kg	<MDL	10	8.2	82		53--129	10	9.6	96		16		35

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

LD:WG108461-5 L50381-3 Matrix: SALTWTRSED Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: 423062-200-4
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD^	Qual	Lab Limit
4,4'-DDD	1	2	ug/Kg	<MDL	<MDL			35
4,4'-DDE	1	2	ug/Kg	<MDL	<MDL			35
4,4'-DDT	1	2	ug/Kg	<MDL	<MDL			35
Aldrin	1	2	ug/Kg	<MDL	<MDL			35
Alpha-BHC	0.5	1	ug/Kg	<MDL	<MDL			35
Alpha-Chlordane	0.5	1	ug/Kg	<MDL	<MDL			35
Beta-BHC	0.5	1	ug/Kg	<MDL	<MDL			35
Delta-BHC	0.5	1	ug/Kg	<MDL	<MDL			35
Dieldrin	1	2	ug/Kg	<MDL	<MDL			35
Endosulfan I	1	2	ug/Kg	<MDL	<MDL			35
Endosulfan II	1	2	ug/Kg	<MDL	<MDL			35
Endosulfan Sulfate	1	2	ug/Kg	<MDL	<MDL			35
Endrin	1	2	ug/Kg	<MDL	<MDL			35
Endrin Aldehyde	1	2	ug/Kg	<MDL	<MDL			35
Gamma-BHC (Lindane)	0.5	1	ug/Kg	<MDL	<MDL			35
Gamma-Chlordane	0.5	1	ug/Kg	<MDL	<MDL			35
Heptachlor	0.5	1	ug/Kg	<MDL	<MDL			35
Heptachlor Epoxide	0.5	1	ug/Kg	<MDL	<MDL			35
Methoxychlor	5	10	ug/Kg	<MDL	<MDL			35
Toxaphene	10	20	ug/Kg	<MDL	<MDL			35

SRM:WG108461-6 Matrix: OTHR SOLID Listtype: ORPESTLL Method: SW846 3550B*SW846 8081B Project: NONE
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
4,4'-DDT	5.3	10.7	ug/Kg	119	134	113		10--200
Alpha-Chlordane	2.7	5.33	ug/Kg	16.5	20.6	125		48--144

King County Environmental Laboratory Analytical QC Report

Duwamish Diagonal Remediation Perimeter, 2010, L50380

Surrogate: (Lab Limits)	2,4,5,6-Tetra chloro m-xylene 10--118	Deca chloro biphenyl 12--158
L50380-1	69	94
L50380-2	55	79
L50380-3	82	93
L50380-4	82	87
L50380-5	72	76
L50380-6	104	109
L50380-7	81	83
L50380-8	80	90
L50380-9	78	85
L50381-1	75	126
L50381-2	39	44
L50381-3	65	85
L50381-4	70	77
L50381-5	57	79
L50381-6	72	87
L50381-7	75	84
L50381-8	80	82
WG108461-1	43	101
WG108461-2	50	91
WG108461-3	56	72
WG108461-4	69	81
WG108461-5	77	94
WG108461-6	87	109

CHAIN OF CUSTODY FORMS

Login: P50380

DUDI SEDS, STAS. C, PERIMETER Personnel:_____

Project: 423062-200-4

CHAIN OF CUSTODY

RELINQUISHED BY	Date	Time
Bob Kruger	3/29/10	1545
RECEIVED BY	Date	Time
[illegible]	3-29-10	1545
Sample Number(s) 50380-1 → 6		(All)

SAMPLENUM	P50380-1	P50380-2	P50380-3
QC LINK			
LOCATOR	DUD_1C	DUD_2C	DUD_8C
Short Loc. Desc.	DUD_1C	DUD_2C	DUD_8C
Locator Desc	CLEANUP AREA PERIMETER ASSESSMENT LOCATI	CLEANUP AREA PERIMETER ASSESSMENT LOCATI	CLEANUP AREA PERIMETER ASSESSMENT LOCATI
SITE	DUWAMISH RIVER	DUWAMISH RIVER	DUWAMISH RIVER
COMMENTS	~~10~~ 3 Grab Comp, 0-10 cm	~~10~~ 3 Grab Comp, 0-10 cm	~~10~~ 3 Grab Comp, 0-10 cm, AREP
Start Date/Time	3/29/10 1235	→ 1250	→ 1310
End Date/Time			
Time Span			
Sample Depth			
SAMP FUNC	**********	**********	**********
PERSONNEL	SH, JO, JB, BK, JDD	→	→
SAMP METH			
SED DEPTH	15, 15, 15	15, 14, 15	12, 13, 14
SED SAMP RANGE	0-10	0-10 cm	0-10 cm
SED TYPE	12N31	12N31	13N12
TIDE COND	F	F	F
TIDE HT	2.2	2.7	3.3
Dept. Matrix Prod	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL

a few worms

Login: P50380 DUDI SEDS, STAS. C, PERIMETER Personnel:_____

Project: 423062-200-4

SAMPLENUM	P50380-4	P50380-5	P50380-6
QC LINK			
LOCATOR	DUD_~~8C~~ 10 C	DUD_9C	DUD_10C
Short Loc. Desc.	DUD_~~8C~~ 10 C	DUD_9C	DUD_10C
Locator Desc	CLEANUP AREA PERIMETER ASSESSMENT LOCATI	CLEANUP AREA PERIMETER ASSESSMENT LOCATI	CLEANUP AREA PERIMETER ASSESSMENT LOCATI
SITE	DUWAMISH RIVER	DUWAMISH RIVER	DUWAMISH RIVER
COMMENTS	~~10~~ 3 Grab Comp, 0-10 cm, FREP	~~10~~ 3 Grab Comp, 0-10 cm	~~10~~ 3 Grab Comp, 0-10 cm
Start Date/Time	3/29/10 1428	3/29/10 1338	→ 1403
End Date/Time			
Time Span		multiple tries to get more than 11 cm - no success	
Sample Depth			
SAMP FUNC	FREP @ 50380-6	**********	**********
PERSONNEL	SH, JO, JB, BK, JDD	→	→
SAMP METH			
SED DEPTH	12, 11, 11	10, 7, 7	11, 11, 11
SED SAMP RANGE	0-10 cm	0-10 cm	0-10 cm
SED TYPE	12N31	32W21	12N31
TIDE COND	F	F	F
TIDE HT	6.5	4.5	5.5
Dept. Matrix Prod			
	3 SF PSD	3 SF PSD	3 SF PSD
	3 SF TOC	3 SF TOC	3 SF TOC
	3 SF TOTS	3 SF TOTS	3 SF TOTS
	6 SF AL-ICP	6 SF AL-ICP	6 SF AL-ICP
	6 SF FE-ICP	6 SF FE-ICP	6 SF FE-ICP
	6 SF HG-CVAA-H	6 SF HG-CVAA-H	6 SF HG-CVAA-H
	6 SF MN-ICP	6 SF MN-ICP	6 SF MN-ICP
	6 SF PP ICP	6 SF PP ICP	6 SF PP ICP
	7 SF BNASMS	7 SF BNASMS	7 SF BNASMS
	7 SF PCBLL	7 SF PCBLL	7 SF PCBLL
	7 SF PESTLL	7 SF PESTLL	7 SF PESTLL
		some gravel + shells too	a few amphipods

Login: P50380

DUDI SEDS, STAS. C, PERIMETER Personnel: BK, CB, JDD, JC

Project: 423062-200-4

CHAIN OF CUSTODY

RELINQUISHED BY	Date 3/30/10	Time 1340
RECEIVED BY	3-30-10	1340
Sample Number(s)	7, 8, 9	(All)

SAMPLENUM	P50380-7	P50380-8	P50380-9
QC LINK			
LOCATOR	DUD_11C	DUD_12C	DUD_13C
Short Loc. Desc.	DUD_11C	DUD_12C	DUD_13C
Locator Desc	CLEANUP AREA PERIMETER ASSESSMENT LOCATI	CLEANUP AREA PERIMETER ASSESSMENT LOCATI	PERIMETER LOCATION 13C
SITE	DUWAMISH RIVER	DUWAMISH RIVER	DUWAMISH RIVER
COMMENTS	~~10~~ 3 Grab Comp, 0-10 cm	~~10~~ 3 Grab Comp, 0-10 cm	~~10~~ 3 Grab Comp, 0-10 cm
Start Date/Time	3/30/10 / 0910	/ 0935	/ 0955
End Date/Time			
Time Span			
Sample Depth	10, 9, 10	12, 9.5, 9.5	15, 15, 13
SAMP FUNC	**********	**********	**********
PERSONNEL			
SAMP METH			
SED DEPTH			
SED SAMP RANGE			
SED TYPE	~~3N21~~ 32N21	23T26	23N26
TIDE COND	E	E	E
TIDE HT	5.1	3.6	2.8
Dept. Matrix Prod	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL	3 SF PSD 3 SF TOC 3 SF TOTS 6 SF AL-ICP 6 SF FE-ICP 6 SF HG-CVAA-H 6 SF MN-ICP 6 SF PP ICP 7 SF BNASMS 7 SF PCBLL 7 SF PESTLL

LABORATORY WORK ORDER
Chain of Custody

King County Department of Natural Resources
Water and Land Resources Division
Environmental Laboratory
322 West Ewing Street
Seattle, Washington 98119-1507

Project Name: Duwamish/Diagonal Sediments
Project Number: 423062-200-4
Laboratory Project Manager: Fritz Grothkopp/Bob Kruger
Telephone Number: 684 2327/2384

Note: Use only one Login No. per sheet. Sample Number	Client Locator	Collect Date	Collect Time	Analyses: TOC/TOTS	PSD	Metals-ICP/HG-CVAA-~~H~~	BNASMS/PESTLL/PCBLL	Number of Containers	Comments
L 50380 - 1	DUD-1C	3/29/10	1235	X	X	X	X	4	
L 50380 - 2	DUD-2C	3/29/10	1250	X	X	X	X	5	
L 50380 - 3	DUD-8C	3/29/10	1310	X	X	X	X	4	
L 50380 - 4	DUD-10C	3/29/10	1428	X	X	X	X	4	Frep
L 50380 - 5	DUD-9C	3/29/10	1338	X	X	X	X	4	
L 50380 - 6	DUD-10C	3/29/10	1403	X	X	X	X	4	
L -									
L -									
L -									
L -									
L -									

Additional Comments:

Total Number of Containers 25

Sampled By: SH, JB, JO, JOD, BH

Relinquished By:
Signature [signature] Date 3/29/10
Printed Name Bob Kruger Time 1545
Organization King County Environmental Laboratory

Received By:
Signature [signature] Date 3-29-10
Printed Name Jason Kinnard Time 1545
Organization King County Environmental Laboratory

LABORATORY WORK ORDER
Chain of Custody

King County Department of Natural Resources
Water and Land Resources Division
Environmental Laboratory
322 West Ewing Street
Seattle, Washington 98119-1507

Project Name: Duwamish/Diagonal Sediments
Project Number: 423062-200-4
Laboratory Project Manager: Fritz Grothkopp/Bob Kruger
Telephone Number: 684 2327/2384

Note: Use only one Login No. per sheet. Sample Number	Client Locator	Collect Date	Collect Time	TOC/TOTS	PSD	Metals-ICP/HG-CVAA-H	BNASMS/PESTLL/PCBLL	Number of Containers	Comments
L50390 - 7	DuD_11C	30-MAR-10	0910	X	X	X	X	4	
L50380 - 8	DuD_12C	↓	0935	X	X	X	X	4	
L50380 - 9	DuD_13C	↓	0955	X	X	X	X	4	
L -								4	
L -									
L -									
L -									
L -									
L -									
L -									
L -									

Analyses

Additional Comments:

Total Number of Containers 16

Sampled By: BK, CB, JDD, JC

Relinquished By:
Signature
Date 3/30/2010
Printed Name Christopher Barnes
Time 1340
Organization King County Environmental Laboratory

Received By:
Signature
Date 3-30-10
Printed Name Jason Kinnard
Time 1340
Organization King County Environmental Laboratory

Appendix B

2010 Data Validation Memoranda

King County

Technical Memorandum

Date: February 10, 2012

To: Jenée Colton, King County Toxicology and Contaminant Assessment Group

From: Scott Mickelson, King County Marine and Sediment Assessment Group

Subject: Data Validation Report
Duwamish/Diagonal 2010 Sediment Monitoring Event

This technical memorandum summarizes the data validation review performed on 26 estuarine sediment samples collected between March 29 and 30, 2010 by staff of King County's Environmental Laboratory Field Services Unit. These 24 samples were submitted for analysis of particle size distribution (PSD), total organic carbon (TOC), total solids, mercury, other metals, base/neutral/acid semivolatile organic compounds (BNAs), polychlorinated biphenyls (PCBs), and chlorinated pesticides.

1.0 Introduction

This data validation review has been based, in part, on guidance found in *USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review* (EPA 2001) and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA 2004). Materials reviewed included Batch Reports and Analytical Quality Control (QC) Reports downloaded from King County's Laboratory Information System (LIMS) database, which are attached to this memorandum. The QC parameters reviewed during this data validation include; holding time, method blanks, spike blanks, matrix spikes, matrix spike duplicates, laboratory control samples, standard reference materials, laboratory replicates, and surrogates. These QC samples are described below in the following sections.

1.1 Holding Time

The analytical holding time is a method-specific time frame, during which sample preparation and analysis should occur to provide valid data. All samples should be analyzed within this prescribed holding time.

1.2 Method Blank

A method blank is an aliquot of clean reference matrix that is generally processed through the entire analytical procedure. Please see the individual analytical sections for a description of the method blank for each analysis. Analysis of the method blank is used to evaluate the levels of

contamination that might be associated with the processing and analysis of samples. All method blank results should be less than the method detection limit. Method blanks were used for all analyses on this project, except PSD.

1.3 Spike Blank

A spike blank is an aliquot of the clean reference matrix used for the method, to which a known concentration of target analyte(s) has been added. The spiked aliquot is processed through the entire analytical procedure. Analysis of the spike blank is used as an indicator of method accuracy. Spike blanks were used on this project during TOC, mercury, metals, BNA, PCB, and chlorinated pesticide analyses. Spike blanks are not addressed in the *National Functional Guidelines*; however, King County has empirically-derived control limits for spike blank analytes, which are shown on the attached QC reports. Spike blank results should be within these control limits.

1.4 Matrix Spike

A matrix spike is a sample aliquot fortified with a known concentration of a target analyte(s). The spiked sample is processed through the entire analytical procedure. Analysis of the matrix spike is used as an indicator of sample matrix effect on the recovery of target analyte(s). Matrix spikes were used on this project during TOC, mercury, metals, BNA, PCB, and chlorinated pesticide analyses. Control limits for individual organic analytes and total organic carbon are not addressed in the *National Functional Guidelines*; however, King County has empirically-derived control limits for percent recoveries of these matrix spike analytes, which are shown on the attached QC reports. Matrix spike recoveries should be within these control limits. Matrix spike recoveries for metals are addressed in the *National Functional Guidelines* and should be within 75 to 125% (EPA 2004).

1.5 Matrix Spike Duplicate

A matrix spike duplicate is a second sample aliquot fortified with a known concentration of a target analyte(s). The spiked sample is processed through the entire analytical procedure. Analysis of the matrix spike duplicate is used as an additional indicator of sample matrix effect on the recovery of target analyte(s) as well as an indicator of method precision. Matrix spike duplicates were used on this project during mercury, BNA, PCB, and chlorinated pesticide analyses. The relative percent difference (RPD) between matrix spike and matrix spike duplicate results for trace organic analytes are not addressed in the *National Functional Guidelines*; however, King County uses empirically-derived control limits for this QC analysis, which are shown on the attached QC reports. The RPD for matrix spike/matrix spike duplicate results for mercury analysis are addressed in the National Functional Guidelines and should be less than 20% (EPA 2004).

1.6 Laboratory Control Sample and Standard Reference Material

A laboratory control sample is a sample of known analyte concentration(s) that is prepared in the lab from a separate source of analyte(s) relative to the calibration standards. Since the laboratory control sample analysis should follow the entire analytical process, it should be stored and prepared following the same procedures as a field sample. A standard reference

material is a commercially-prepared laboratory control sample. Analysis of a laboratory control sample or standard reference material is used as an indicator of method accuracy and long-term analytical precision. Laboratory control samples were used during metals analyses and standard reference materials were during analysis of TOC, mercury, and all trace organics. King County uses percent recovery control limits of 80 to 120% for TOC and mercury analyses. Percent recoveries for standard reference material results should be within these control limits. Percent recoveries for laboratory control samples (or standard reference materials) for metals are addressed in *National Functional Guidelines* and results should be within control limits of 80 to 120% (EPA 2004). King County also has empirically-derived control limits for metals' laboratory control samples, which are shown on the attached QC reports. Empirically-derived control limits for trace organic standard reference material recoveries are also shown on the attached QC reports.

1.7 Laboratory Replicate (Duplicate or Triplicate)

A laboratory replicate is a second (duplicate) or third (triplicate) aliquot of a sample, processed concurrently and in an identical manner with the original sample. Analysis of the laboratory replicate is used as an indicator of method precision and laboratory subsampling procedures. The laboratory replicate can also be used to provide information regarding the homogeneity of the sample matrix. QC results are reported as either a RPD between the sample and laboratory duplicate results or percent relative standard deviation (%RSD) between the sample and laboratory triplicate results. Laboratory duplicates were used during all mercury and other metals analyses and the RPD should be below 20% (EPA 2004). Laboratory duplicates were also used during analysis of all trace organics; however, control limits for organics' RPDs are not addressed in the *National Functional Guidelines*. King County used RPD control limits of 100% for BNA laboratory duplicate analysis and 35% for PCB and chlorinated pesticide laboratory duplicate analyses during this project. Laboratory triplicates were used during PSD, TOC, and total solids analyses; however, control limits for conventional analyses are also not addressed under the *National Functional Guidelines*. King County used %RSD control limits of 20% during this project for PSD, TOC, and total solids analyses. The %RSD for laboratory triplicate results should be below these control limits.

1.8 Surrogates

A surrogate is a known concentration of non-target analyte which is added to each sample (both analytical and QC samples) prior to extraction and analysis for BNA, PCB, and chlorinated pesticide analyses. Surrogate recovery is used as a sample-specific indication of method or matrix bias for target analytes. The surrogate is selected to behave in a similar manner to the target analytes.

The King County Environmental Laboratory uses two surrogate compounds, decachlorobiphenyl and 2,4,5,6-tetrachloro-m-xylene during both PCB and chlorinated pesticide analyses. *National Functional Guidelines* provides control limits for percent recoveries of these surrogate compounds and King County has empirically-derived control limits as well, which are shown in Table 1-1. Surrogate recoveries should be within these control limits.

Table 1-1
Surrogate Recovery QC Limits for PCB Analysis

Compound	King County Environmental Lab Recovery Limits	National Functional Guidelines Quality Control Recovery Limits
2,4,5,6-Tetrachloro-m-xylene	10 – 118	30 – 150
Decachlorobiphenyl	12 – 158	30 – 150

The King County Environmental Laboratory uses eight surrogate compounds during analysis of the full suite of BNAs. Four of these compounds are deuterated monitoring compounds (DMCs). Three of the DMCs are recommended in *National Functional Guidelines*. King County has empirically-derived laboratory QC control limits, which are shown in Table 1-2 and compared to the *National Functional Guidelines* recoveries for the three DMCs.

Table 1-2
Surrogate Recovery QC Limits for SVOC Analysis

Compound	King County Environmental Lab Recovery Limits	National Functional Guidelines Quality Control Recovery Limits
2,4,6-Tribromophenol	29 – 112	--
2-Fluorobiphenyl	31 – 101	--
2-Flurophenol	10 – 112	--
d14-Terphenyl	51 – 130	--
d4-1,2-Dichlorobenzene	24 – 91	--
d4-2-Chlorophenol	11 – 105	33 – 110
d5-Nitrobenzene	28 – 94	35 – 114
d5-Phenol	10 – 106	10 – 110

2.0 Conventional Analyses

Samples L50379-1 through -9, L50380-1 through -9, and L50381-1 through -8 were all submitted for analysis of PSD, TOC, and total solids. Each analysis was split into two analytical work groups in order to maintain proper QC batch size of 20 samples or less.

2.1 Particle Size Distribution – Work Groups WG108448 and WG108848

PSD analysis was performed using a combination of sieve and hydrometer analysis following ASTM Method D422 (ASTM 2002). Associated QC samples for each work group included laboratory triplicates.

2.1.1 Holding Time

All 26 samples were analyzed between April 6 and 29, 2010, which was within the prescribed 6-month holding time.

2.1.2 Laboratory Triplicate

The RSD for laboratory triplicate results in the four major particle-size fractions – clay, silt, sand, and gravel – were all at or below the 20% QC limit in both work groups. The RSD for the laboratory triplicate results in work group WG108448 ranged from 1 to 6% and in work group WG108848 ranged from 5 to 20%.

2.2 Total Organic Carbon – Work Groups WG108840 and WG108993

TOC analysis was performed using high-temperature combustion and infrared spectroscopy following EPA Method 9060 – SW846 (EPA 1995). Associated QC samples for each work group included two method blanks, a spike blank, matrix spike, laboratory triplicate, and standard reference material.

2.2.1 Holding Time

All 26 samples were analyzed between May 6 and 12, 2010, which was within the prescribed 6-month holding time.

2.2.2 Method Blank

A TOC method blank consists of a conditioned sample cup containing quartz wool that is submitted to the entire analytical procedure. The TOC results in both method blanks in each of the work groups were less than the MDL, indicating that laboratory contamination was not an issue during analysis of the samples included in these work groups.

2.2.3 Spike Blank

The TOC spike blank recoveries of 102% in work group WG108840 and 104% in work group WG108993 were within the laboratory QC limits of 80 to 120%.

2.2.4 Matrix Spike

The TOC matrix spike recoveries of 96% in work group WG108840 and 94% in work group WG108993 was within the laboratory QC limits of 75 to 125%.

2.2.5 Laboratory Triplicate

The RSD of 2% for TOC laboratory triplicate results in work group WG108840 and 9% in work group WG108993 were both below the 20% QC limit.

2.2.6 Standard Reference Material

The TOC standard reference material recoveries of 102% in work group WG108840 and 95% in work group WG108993 were within the laboratory QC limits of 80 to 120%.

2.3 Total Solids – Work Groups WG108912 and WG108974

Total (percent) solids analysis was performed using a gravimetric determination following Standard Method SM2540-G (APHA 1998). Associated QC samples in both work groups included a method blank and laboratory triplicate.

2.3.1 Holding Time

All 26 samples were analyzed between May 3 and 5, 2010, which is within the prescribed 6-month holding time.

2.3.2 Method Blank

A total solids method blank consists of a conditioned sample cup that is processed empty through the entire analytical procedure. The total solids results in the method blanks from both work groups were less than the MDL, indicating acceptable balance and method performance.

2.3.3 Laboratory Triplicate

The RSD of 0% for total solids laboratory triplicate results in both work groups was below the 25% QC limit.

3.0 Metal Analyses

Samples L50379-1 through -9, L50380-1 through -9, and L50381-1 through -8 were all submitted for analysis of mercury and ICP metals. Each analysis was split into two analytical work groups in order to maintain proper QC batch size of 20 samples or less.

3.1 Mercury – Work Groups WG108403 and WG108486

Mercury analysis was performed by cold-vapor atomic absorption spectroscopy (CVAA) following EPA Method 7471B – SW846 (EPA 1995). Associated QC samples in each work group included a method blank, spike blank, matrix spike, matrix spike duplicate, a laboratory duplicate, and two standard reference materials.

3.1.1 Holding Time

All 26 samples were digested and analyzed on between April 7 and 12, 2010, which was within the prescribed 28-day holding time.

3.1.2 Method Blank

A mercury method blank consists of an aliquot of reagent water that is digested and then analyzed. The mercury results for both method blanks were less than the MDL, indicating that laboratory contamination was not an issue during analysis of the samples included in these work groups.

3.1.3 Spike Blank

The mercury spike blank recoveries of 103% in work group W108403 and 102% in work group WG108486 were both within the laboratory QC limits of 85 to 115%.

3.1.4 Matrix Spike and Matrix Spike Duplicate

The mercury matrix spike and matrix spike duplicate recoveries of 101% in work group WG108403 were within the laboratory QC limits of 75 to 125% and the RPD of 0% between these results was below the QC limit of 20%. The mercury matrix spike and matrix spike duplicate recoveries of 102% and 101%, respectively, in work group WG108486 were also within the laboratory QC limits of 75 to 125% and the RPD of 1% between these results was below the QC limit of 20%.

3.1.5 Laboratory Duplicate

The RPD of 3% between the mercury laboratory duplicate results in work group WG108403 and 13% in work group WG 108486 were both below the QC limit of 20%.

3.1.6 Standard Reference Materials

Mercury recoveries in all four SRM samples analyzed with these two work groups were all within the laboratory QC limits of 80 to 120%, ranging 106 to 116%.

3.2 ICP Metals – Work Groups WG108387 and WG108557

Metals were analyzed by inductively-coupled plasma optical emission spectroscopy (ICP) following EPA Method 6010C – SW846 (EPA 1995). Target analytes included 15 metals, shown on the attached LIMS analytical QC report. Associated QC samples in each work group included a method blank, spike blank, matrix spike, laboratory duplicate, standard reference material, and two laboratory control samples.

3.2.1 Holding Time

All 26 samples were digested and analyzed between April 6 and 16, 2010, which was within the prescribed 6-month holding time.

3.2.2 Method Blank

An ICP metals method blank consists of an aliquot of reagent water and associated acids that is digested and then analyzed. Results for all target metals in both method blanks were less than the MDL, indicating that laboratory contamination was not an issue during analysis of the samples included in these work groups.

3.2.3 Spike Blank

Recoveries for all target metals in both spike blanks were within the 85 to 115% QC limits, ranging from 94 to 107%.

3.2.4 Matrix Spike

The antimony matrix spike recoveries of 20% in work group WG108387 and 26% in work group WG 108557 were below the lower QC limit of 75%. Matrix spike recoveries for all other ICP metals were within the 75 to 125% QC limits. A post-digestion spike was performed, with recoveries for all 15 target metals within the 75 to 125% QC limits. Additionally, a serial dilution of both spiked samples was performed with antimony returning acceptable QC results. The antimony matrix spike results do indicate a matrix interference, which is inherent in marine sediments digested using EPA Method 3050B. Antimony results for all 26 samples in work groups WG108387 and WG108557 should be qualified with the "J" flag, with bias considered low.

3.2.5 Laboratory Duplicate

The RPD of 27% between laboratory duplicate results for cadmium in work group WG108387 was greater than the 20% QC limit. The cadmium sample concentration, however, was less than the laboratory reporting detection limit, below which there is inherent uncertainty in analyte quantitation. Cadmium sample results will not be qualified based solely on the laboratory duplicate results. Laboratory duplicate RPD results for all other target metals in both work groups were below the 20% laboratory QC limit.

3.2.6 Standard Reference Material

The standard reference material used for both of the work groups contains a partial list of the target metals – a total of eight metal analytes. SRM recoveries of all eight metals in both work groups were within the empirically-derived laboratory QC limits.

3.2.7 Laboratory Control Samples

Recoveries for all 15 metals in both laboratory control samples in each of the two work groups were within the empirically-derived laboratory QC limits.

4.0 Organic Analyses

Samples L50379-1 through -9, L50380-1 through -9, and L50381-1 through -8 were all submitted for analysis of BNAs, PCBs, and chlorinated pesticides. Each analysis was split into two analytical work groups in order to maintain proper QC batch size of 20 samples or less.

4.1 BNAs – Work Groups WG108497 and WG108498

BNA analysis was performed by gas chromatography/mass spectroscopy (GC/MS) following EPA Methods 3550B/8270D – SW846 (EPA 1995). Target analytes included 42 BNA compounds, shown on the attached LIMS analytical QC report. Associated QC samples for each work group included a method blank, spike blank, matrix spike and matrix spike duplicate, laboratory duplicate, standard reference material, and surrogates.

4.1.1 Holding Time

All 26 samples were extracted on April 13, 2010 and analyzed between May 6 and 20, 2010, which is within the prescribed frozen holding time of one year until extraction and, then, 40 days to analysis.

4.1.2 Method Blanks

Di-N-butyl phthalate was detected in both method blanks at wet-weight concentrations of 12.6 and 12.5 µg/Kg. Di-N-butyl phthalate was detected in all 26 samples at concentrations that were all less than 10 times the concentrations detected in the associated method blanks. Di-N-butyl phthalate results in all 26 samples should be qualified with a "U" flag and considered undetected. Sample-specific numeric MDL values should be raised to the value reported as the sample result.

Bis(2-ethylhexyl) phthalate was detected in both method blanks at wet-weight concentrations of 11.6 and 11.4 µg/Kg. Bis(2-ethylhexyl) phthalate was detected in 13 of 26 samples at concentrations less than 10 times the concentrations detected in the associated method blanks. Bis(2-ethylhexyl) phthalate results in these 13 samples should be qualified with a "U" flag and considered undetected (see Section 5.0). Sample-specific numeric MDL values for these 13 samples should be raised to the value reported as the sample result. Bis(2-ethylhexyl) phthalate results in the other 13 samples were all greater than 10 times the concentrations detected in the associated method blanks and these sample results may be used as reported, without qualification (see Section 5.0).

Results for the other 40 compounds in both method blanks were all less than the MDL.

4.1.3 Spike Blanks and Spike Blank Duplicate

Recoveries of all 42 BNA compounds in both spike blanks were within the empirically-derived QC limits shown on the attached LIMS analytical QC report.

4.1.4 Matrix Spike and Matrix Spike Duplicate

Recoveries of all 42 BNA compounds in each of the matrix spike and matrix spike duplicate pairs were within the empirically-derived laboratory QC limits. All of the RPD results between matrix spike and matrix spike duplicate recoveries were below the 100% QC limit, ranging from 0 to 34%.

4.1.5 Laboratory Duplicate

The RPDs between naphthalene laboratory duplicate results of 37% (work group WG108497) and 36% (work group WG108498) exceeded the laboratory QC limit of 35%. The naphthalene sample concentrations, however, were less than the laboratory reporting detection limit, below which there is inherent uncertainty in analyte quantitation. Naphthalene sample results will not be qualified based solely on the laboratory duplicate results. Laboratory duplicate RPD results for all other BNA compounds in both work groups were below the 35% laboratory QC limit.

4.1.6 Standard Reference Material

The standard reference material used during BNA analysis included 13 compounds – all polycyclic aromatic hydrocarbons (PAHs). SRM recoveries for all 13 PAH compounds in both work groups were within the empirically-derived laboratory QC limits shown on the attached LIMS analytical QC report.

4.1.7 Surrogates

Recoveries of the eight surrogate compounds in all 26 analytical samples and all 12 QC samples in these two work groups were within the empirically-derived control limits as well as the control limits recommended in *National Functional Guidelines*.

4.2 PCBs – Work Groups WG108469 and WG108473

PCBs were analyzed by gas chromatography with electron capture detector (GC/ECD) following EPA Method 3550B/8082A – SW846 (EPA 1995). Target analytes included seven Aroclors®, shown on the attached LIMS analytical QC report. Associated QC samples for each work group included a method blank, spike blank, matrix spike and matrix spike duplicate, laboratory duplicate, standard reference material, and surrogates.

4.2.1 Holding Time

All 26 samples were extracted and analyzed between April 9 and May 7, 2010, which is within the prescribed frozen holding time of one year until extraction and, then, 40 days to analysis.

4.2.2 Method Blanks

Results for all seven Aroclors in both method blanks were less than the MDL, indicating that laboratory contamination was not an issue during analysis of the samples included in these work groups.

4.2.3 Spike Blanks

Two Aroclors, 1016 and 1260, were used in both spike blanks as well as matrix spikes (see Section 4.2.4). Recoveries of both Aroclors in both spike blanks were within the empirically-derived QC limits shown on the attached LIMS analytical QC report.

4.2.4 Matrix Spikes and Matrix Spike Duplicates

Recoveries of both Aroclors in each of the matrix spike and matrix spike duplicate pairs were within the empirically-derived laboratory QC limits. All of the RPD results between matrix spike and matrix spike duplicate recoveries were below the 35% QC limit, ranging from 2 to 18%.

4.2.5 Laboratory Duplicate

The RPDs between laboratory duplicate results for all detected Aroclors in both work groups were below the 35% laboratory QC limit, ranging from 8 to 19%.

4.2.6 Standard Reference Material

The standard reference material used for PCB analysis included Aroclor 1254. SRM recoveries for Aroclor 1254 in both work groups were within the empirically-derived laboratory QC limits, shown on the attached LIMS analytical QC report.

4.2.7 Surrogates

Recoveries for both surrogates in all 26 analytical samples and all 12 QC samples were within the empirically-derived laboratory QC limits. Surrogate recoveries were also within the control limits recommended in *National Functional Guidelines*, with one exception. The 23% surrogate recovery for 2,4,5,6-tetrachloro-m-xylene in the spike blank associated with work group WG108469 was below the lower control limit of 30% recommended in *National Functional Guidelines*. The recovery of the other surrogate in this sample (decachlorobiphenyl) was within *National Functional Guidelines* recommended QC limits. Data have not been qualified based on this exception.

4.3 Chlorinated Pesticides – Work Groups WG108461 and WG108462

Chlorinated pesticides were analyzed by gas chromatography with electron capture detector (GC/ECD) following EPA Method 3550B/8081B – SW846 (EPA 1995). Target analytes included 20 chlorinated pesticides, shown on the attached LIMS analytical QC report. Associated QC samples for each work group included a method blank, spike blank, matrix spike and matrix spike duplicate, laboratory duplicate, standard reference material, and surrogates.

4.3.1 Holding Time

All 26 samples were extracted on April 11, 2010 and analyzed on April 28 and 29, 2010, which is within the prescribed frozen holding time of one year until extraction and, then, 40 days to analysis.

4.3.2 Method Blanks

Results for all 20 chlorinated pesticides in both method blanks were less than the MDL, indicating that laboratory contamination was not an issue during analysis of the samples included in these work groups.

4.3.3 Spike Blanks

The spiking solution for both spike blanks and matrix spikes (see Section 4.3.4) contains 17 of the 20 target compounds. Spike blank recoveries for all 17 compounds in both spike blanks were within the empirically-derived QC limits shown on the attached LIMS analytical QC report.

4.3.4 Matrix Spikes and Matrix Spike Duplicates

Recoveries for all 17 chlorinated pesticides in the matrix spike and matrix spike duplicate in both work groups were within the empirically-derived QC limits. All of the RPD results between matrix spike and matrix spike duplicate recoveries were below the 35% QC limit, ranging from 1 to 24%.

4.3.5 Laboratory Duplicate

Results for all 20 chlorinated compounds in the laboratory duplicate sample were less than the method detection limit.

4.3.6 Standard Reference Material

The standard reference material used for chlorinated pesticide analysis included two compounds – alpha-chlordane and 4,4'-DDT. SRM recoveries for both compounds in both work groups were within the empirically-derived laboratory QC limits, shown on the attached LIMS analytical QC report.

4.3.7 Surrogates

Recoveries for both surrogates in all 26 analytical samples and all 12 QC samples were within the empirically-derived laboratory QC limits. Surrogate recoveries were also within the control limits recommended in *National Functional Guidelines*.

5.0 Data Usability

As a general data reporting format, sample results that are reported as "<MDL" should be assigned a "U" flag in all cases. Analytical data for samples L50379-1 through -9, L50380-1 through -9, and L50381-1 through -8 may be used as reported, without qualification, with the exceptions shown below.

- Sample results for mercury and ICP metals that are reported as "less than the reporting detection limit" (<RDL) should be assigned a "J" flag and considered estimated.
- Results for antimony in all 26 samples should be assigned a "J" flag, with bias considered low.
- Results for di-N-butyl phthalate in all 26 samples should be assigned a "U" flag and considered undetected. The sample-specific numeric MDL value should be raised to the reported sample result.
- Results for bis(2-ethylhexyl) phthalate in the following samples should be assigned a "U" flag and considered undetected: L50379-5, L50379-7, L50379-8, L50379-9, L50380-6, L50380-9, L50381-2, L50381-3, L50381-4, L50381-5, L50381-6, L50381-7, and L50381-8. The sample-specific numeric MDL value should be raised to the reported sample result.
- Results for bis(2-ethylhexyl) phthalate in the following samples may be used as reported, without qualification: L50379-1, L50379-2, L50379-3, L50379-4, L50379-6, L50380-1, L50380-2, L50380-3, L50380-4, L50380-5, L50380-7, L50380-8, and L50381-1.

6.0 References

APHA 1998. *Standard Methods for the Examination of Water and Wastewater, 20th Edition.* American Public Health Association. Washington, D.C.

ASTM 2002. *Standard Test Method for Particle-Size Analysis of Soils D422-63(2002)*. American Society for Testing and Materials. West Conshohocken, Pennsylvania.

EPA 1995. *Test Methods for Evaluating Solid Waste*. *Laboratory Manual – Physical/Chemical Methods, SW-846, 3rd Edition, Update IIB*. United States Environmental Protection Agency, Office of Solid Waste and Emergency Response. Washington, D.C.

EPA 2001. *USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review*. OSWER 9240.1-34, EPA540-R-00-006. United States Environmental Protection Agency. Washington, D.C. June 2001.

EPA 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.* OSWER 9240.1-45, EPA 540-R-00-004. United States Environmental Protection Agency. Washington, D.C. October 2004.

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Should you have any questions regarding the information included in this memorandum, please contact the undersigned.

Sincerely,

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Marine and Sediment Assessment Group
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Attachments (2)

Appendix D1

Long-term Monitoring Chemistry Comparison to SMS

D1-1 2003 Pre-Dredge Baseline

D1-2 2004 Cap Area A, Cap Area B and Perimeter Area

D1-3 2005 Cap Area A, Cap Area B and ENR Area

D1-4 2005 Perimeter Area

D1-5 2006 Cap Area A, Cap Area B, ENR Area and Perimeter Area

D1-6 2007 Cap Area A, Cap Area B, ENR Area and Perimeter Area

D1-7 2008 Cap Area A, Cap Area B, ENR Area and Perimeter Area

D1-8 2009 Cap Area A, Cap Area B, ENR Area and Perimeter Area

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Pre-Dredge Baseline DUD_1C	DUD_2C	DUD_3C	October* DUD_4C Average	December* DUD_4C	DUD_5C	DUD_6C
Conventionals (%)									
Total Solids			**45.6**	**50.4**	**49.5**	**49.2**	**48**	**60.2**	**61.1**
Total Organic Carbon			**3.36**	**2.36**	**2.16**	**2.25**	**2.48**	**1.27**	**1.43**
Metals (mg/kg dw)									
Arsenic	57	93	**28.5 J**	**28.0**	**24.2 J**	**25.5 J**	**NA**	**24.8**	**26.0**
Cadmium	5.1	6.7	**1.96**	**1.23 J**	**0.73 J**	**0.74 J**	**NA**	**0.61 J**	**1.41**
Chromium	260	270	**52.4**	**39.7**	**37.2**	**38.3**	**NA**	**33.6**	**35.7**
Copper	390	390	**139**	**104**	**96.4**	**97.0**	**NA**	**83.1**	**73.0**
Lead	450	530	**96.7**	**66.5**	**67.9**	**69.0**	**NA**	**92.2**	**129**
Mercury	0.41	0.59	**0.29 J**	**0.22 J**	**0.24 J**	**0.29 J**	**0.576**	**0.27 J**	**0.41**
Silver	6.1	6.1	**2.54**	**1.65 J**	**1.43 J**	**1.37 J**	**NA**	**1.18 J**	**1.64 J**
Zinc	410	960	**303**	**204**	**164**	**182**	**NA**	**152**	**201**
PCBs (mg/kg-OC)									
Total PCBs	12	65	**18.5**	**16.2**	**15.1**	**75.0**	**42.3**	**26.9**	**90.3**
LPAH (mg/kg-OC)									
2-Methylnaphthalene	38	64	36.6 U	47.1 U	52.3 U	50.8 U	4.67 U	7.32 U	6.41 U
Acenaphthylene	66	66	39.2 U	50.4 U	56.1 U	54.4 U	5.00 U	7.84 U	6.87 U
Acenaphthene	16	57	18.3 U	23.5 U	26.2 U	25.4 U	**2.50 J**	3.66 U	3.21 U
Anthracene	220	1200	**6.54 J**	**21.8 J**	**5.61 J**	**5.91 J**	**6.13**	**4.56**	**5.07**
Fluorene	23	79	34.0 U	43.7 U	48.6 U	47.1 U	4.33 U	6.80 U	5.96 U
Naphthalene	99	170	36.6 U	47.1 U	52.3 U	50.8 U	4.67 U	7.32 U	6.41 U
Phenanthrene	100	480	**15.7 J**	**29.0**	**11.2 J**	**11.3 J**	**17.3**	**13.3**	**10.9**
Total LPAHs	370	780	**22.2**	**50.8**	**16.8**	**17.2**	**25.9**	**17.9**	**15.9**
HPAH (mg/kg-OC)									
Benzo(a)anthracene	110	270	**20.6**	**33.0**	**21.5**	**18.8**	**15.9**	**19.7**	**13.6**
Benzo(a)pyrene	99	210	**19.2**	**26.6**	**23.6**	**19.1 J**	**17.0**	**21.8**	**18.9**
Benzo(g,h,i)perylene	31	78	**13.7 J**	**14.3 J**	**13.1 J**	**14.1 J**	**10.0**	**13.5**	**10.5**
Chrysene	110	460	**32.5**	**41.7**	**29.0 J**	**29.5 J**	**22.8**	**26.3**	**21.3**
Dibenzo(a,h)anthracene	12	33	18.3 U	23.5 U	26.2 U	25.4 U	**3.08 J**	**4.31 J**	3.21 U
Fluoranthene	160	1200	**37.3 J**	**74.1**	**30.8 J**	**31.2 J**	**41.3**	**39.7**	**23.8**
Indeno(1,2,3-Cd)Pyrene	34	88	**12.4 J**	**13.4 J**	**13.1 J**	**12.7 J**	**9.50**	**13.0**	**10.3**
Total Benzofluoranthenes	230	450	**47.6**	**66.1**	**55.4**	**45.0**	**36.6**	**46.1**	**41.2**
Pyrene	1000	1400	**41.2**	**98.3**	**33.8**	**32.8**	**39.6**	**47.2**	**44.1**
Total HPAHs	960	5300	**225**	**368**	**220**	**203**	**196**	**232**	**184**

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Pre-Dredge Baseline DUD_1C	DUD_2C	DUD_3C	October* DUD_4C Average	December* DUD_4C	DUD_5C	DUD_6C
Chlorobenzenes (mg/kg-OC)									
1,2-Dichlorobenzene	2.3	2.3	0.72 U	0.92 U	1.03 U	1.00 U	**0.69 J**	0.14 U	0.13 U
1,2,4-Trichlorobenzene	0.81	1.8	0.72 U	0.92 U	1.03 U	1.00 U	0.092 U	0.14 U	0.13 U
1,4-Dichlorobenzene	3.1	9	0.35 U	0.45 U	0.50 U	0.48 U	0.442 U	0.07 U	**20.7**
Hexachlorobenzene	0.38	2.3	1.76 U	2.27 U	2.52 U	2.45 U	0.23 U	0.35 U	0.31 U
Phthalates (mg/kg-OC)									
Bis(2-Ethylhexyl)Phthalate	47	78	**177**	**114**	**75.7**	**46.7 J**	**86.7**	**42.7**	**46.2**
Benzyl Butyl Phthalate	4.9	64	15.7 U	20.2 U	22.4 U	21.8 U	4.42 U	3.14 U	2.75 U
Diethylphthalate	61	110	15.7 U	20.2 U	22.4 U	21.8 U	4.42 U	3.14 U	2.75 U
Dimethylphthalate	53	53	28.8 U	37.0 U	41.1 U	39.9 U	4.42 U	5.75 U	5.04 U
Di-N-Butylphthalate	220	1700	13.1 U	16.8 U	18.7 U	18.1 U	4.42 U	2.61 U	2.29 U
Di-N-Octylphthalate	58	4500	20.9 U	26.9 U	29.9 U	29.0 U	4.42 U	4.18 U	3.67 U
Ionic Organics (ug/kg dw)									
2-Methylphenol	63	63	1404 UJ	1270 U	1293 U	1301 U	157 U	106 U	105 U
4-Methylphenol	670	670	1404 UJ	1270 U	1293 U	1301 U	132 U	106 U	105 U
2,4-Dimethylphenol	29	29	614 UJ	556 UJ	566 UJ	569 UJ	57.9 UJ	46.5 UJ	45.8 UJ
Benzyl Alcohol	57	73	526 UJ	476 U	485 U	488 U	49.6 U	39.9 U	39.3 U
Benzoic Acid	650	650	R	R	R	R	R	**248 J**	R
Pentachlorophenol	360	690	592 U	536 U	545 U	549 U	R	44.9 U	44.2 U
Phenol	420	1200	789 U	714 U	727 U	732 U	74.4 U	59.8 U	58.9 U
Miscellaneous (mg/kg-OC)									
Dibenzofuran	15	58	36.6 UJ	47.1 U	52.3 U	50.8 U	4.67 U	7.32 U	6.41 U
Hexachlorobutadiene	3.9	6.2	1.96 U	2.52 U	2.80 U	2.72 U	0.25 U	0.39 U	0.34 U
N-Nitroso-di-phenylamine	11	11	52.3 U	67.2 U	74.8 U	72.5 U	6.67 U	10.5 U	9.16 U

* = PCB replicate samples were divergent. Repeat replicate sampling was conducted in December for organics and mercury; both are presented.
Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL

SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

NA: Not Analyzed
dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Pre-Dredge Baseline, Continued DUD_7C	DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C
Conventionals (%)								
Total Solids			54.6	55.1	69	65.6	59	58.8
Total Organic Carbon			1.54	1.84	0.78	1.02	1.36	1.32
Metals (mg/kg dw)								
Arsenic	57	93	33.9	35.7	14.4 J	24.4	23.9	23.1
Cadmium	5.1	6.7	0.88 J	5.15	0.40 J	0.67 J	0.68 J	0.80 J
Chromium	260	270	34.6	110	21.0	28.7	36.4	34.5
Copper	390	390	124	113	37.2	70.0	91.4	94.7
Lead	450	530	145	113	33.3	94.1	113	102
Mercury	0.41	0.59	0.39	0.86	0.14 J	0.27 J	0.27 J	0.41
Silver	6.1	6.1	1.83	6.19	0.81 J	1.28 J	1.51 J	1.48 J
Zinc	410	960	203	222	76.2	133	167	162
PCBs (mg/kg-OC)								
Total PCBs	12	65	27.8	250	13.3	36.6	27.7	19.9
LPAH (mg/kg-OC)								
2-Methylnaphthalene	38	64	6.67 U	5.54 U	10.39 UJ	8.36 UJ	6.97 UJ	7.22 U
Acenaphthylene	66	66	7.15 U	5.94 U	11.13 U	8.96 U	7.46 U	7.73 U
Acenaphthene	16	57	3.34 U	2.77 U	5.19 U	4.18 U	3.48 U	3.61 U
Anthracene	220	1200	4.58	5.09	5.38 J	5.91	5.80	6.19
Fluorene	23	79	6.20 U	5.15 U	9.65 U	7.76 U	6.47 U	6.70 U
Naphthalene	99	170	6.67 U	5.54 U	10.4 U	8.36 U	6.97 U	7.22 U
Phenanthrene	100	480	13.2	5.93	11.3 J	13.2 J	17.2	14.2
Total LPAHs	370	780	17.8	11.0	16.7	19.1	23.0	20.4
HPAH (mg/kg-OC)								
Benzo(a)anthracene	110	270	17.2	11.0	18.9	18.5	23.0	18.8
Benzo(a)pyrene	99	210	25.5	10.1	22.4 J	22.4	28.0	24.6
Benzo(g,h,i)perylene	31	78	14.9	6.77 J	12.8	12.6	20.8	17.4
Chrysene	110	460	22.4	13.8	22.4	21.6	28.9	25.8
Dibenzo(a,h)anthracene	12	33	4.05 J	2.77 U	5.19 U	4.78 J	4.60 J	4.38 J
Fluoranthene	160	1200	36.7	25.7	34.1 J	29.7	39.2	35.8
Indeno(1,2,3-Cd)Pyrene	34	88	14.7	5.87 J	11.9 J	12.8	18.8	16.4
Total Benzofluoranthenes	230	450	55.5	23.2	48.8	52.8	66.8	60.2
Pyrene	1000	1400	55.4	36.4	44.5 J	47.5	56.2	50.0
Total HPAHs	960	5300	246	133	216	223	286	253

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Pre-Dredge Baseline, Continued DUD_7C	DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C
Chlorobenzenes (mg/kg-OC)								
1,2-Dichlorobenzene	2.3	2.3	0.13 U	0.109 U	0.20 U	0.16 U	0.14 U	0.14 U
1,2,4-Trichlorobenzene	0.81	1.8	0.13 U	0.109 U	0.20 U	0.16 U	0.14 U	0.14 U
1,4-Dichlorobenzene	3.1	9	0.06 U	0.052 U	0.10 U	0.08 U	0.07 U	0.07 U
Hexachlorobenzene	0.38	2.3	0.32 U	0.267 U	0.50 U	0.40 U	0.34 U	0.35 U
Phthalates (mg/kg-OC)								
Bis(2-Ethylhexyl)Phthalate	47	78	**62.6**	**131**	**60.9 J**	**45.4**	**118**	**74.9**
Benzyl Butyl Phthalate	4.9	64	2.86 U	2.38 U	4.45 U	3.58 U	**6.97 J**	3.09 U
Diethylphthalate	61	110	2.86 U	2.38 U	4.45 U	3.58 U	2.99 U	3.09 U
Dimethylphthalate	53	53	5.24 U	4.36 U	8.16 U	6.57 U	5.47 U	5.67 U
Di-N-Butylphthalate	220	1700	2.38 U	1.98 U	**17.2**	2.99 U	2.49 U	2.58 U
Di-N-Octylphthalate	58	4500	3.81 U	3.17 U	5.94 U	4.78 U	3.98 U	4.12 U
Ionic Organics (ug/kg dw)								
2-Methylphenol	63	63	117 U	116 U	92.2 UJ	97.6 UJ	108 UJ	109 U
4-Methylphenol	670	670	117 U	116 U	92.2 UJ	97.6 UJ	108 UJ	**109**
2,4-Dimethylphenol	29	29	51.3 UJ	50.8 UJ	40.3 UJ	42.7 UJ	47.5 UJ	47.6 UJ
Benzyl Alcohol	57	73	44.0 U	43.6 U	34.6 UJ	36.6 UJ	40.7 UJ	40.8 U
Benzoic Acid	650	650	R		R	R	R	R
Pentachlorophenol	360	690	49.5 U	49.0 U	38.9 U	41.2 U	45.8 U	45.9 U
Phenol	420	1200	65.9 U	65.3 U	51.9 U	54.9 U	61.0 U	61.2 U
Miscellaneous (mg/kg-OC)								
Dibenzofuran	15	58	6.67 U	5.54 U	10.4 UJ	8.36 UJ	6.97 U	7.22 U
Hexachlorobutadiene	3.9	6.2	0.36 U	0.297 U	0.56 U	0.45 U	0.37 U	0.39 U
N-Nitroso-di-phenylamine	11	11	9.54 U	7.92 U	14.8 U	11.9 U	9.95 U	10.3 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Cap Area A DUD_1A	DUD_2A	DUD_4A	DUD_5A Average	Cap Area B DUD_1B	DUD_2B	DUD_3B
Conventionals (%)									
Total Solids			**83.7**	**81.2**	**79.1**	**78.8**	**85.5**	**83.4**	**93.5**
Total Organic Carbon			***0.34***	**0.57**	***0.11***	***0.05***	***0.22***	***0.29***	***0.17***
Metals (mg/kg dw)									
Arsenic	57	93	2.99 U	2.96 U	3.03 U	3.11 U	**3.51 J**	**5.88 J**	2.57 U
Cadmium	5.1	6.7	0.18 U	**0.20 J**	0.18 U	0.18 U	**0.18 J**	**0.25 J**	0.15 U
Chromium	260	270	**16.6**	**18.7**	**18.7**	**22.3**	**19.4**	**21.3**	**18.1**
Copper	390	390	**54.7**	**68.2**	**57.4**	**40.5**	**68.7**	**70.5**	**122**
Lead	450	530	**5.85 J**	**11.3**	**4.80 J**	**1.97 J**	**14.4**	**27.7**	**4.17 J**
Mercury	0.41	0.59	0.02 U	**0.04 J**	0.03 U	0.03 U	**0.02 J**	**0.03 J**	**0.02 J**
Silver	6.1	6.1	**0.84 J**	**0.76 J**	**0.97 J**	**0.88 J**	**1.03 J**	**0.96 J**	**0.65 J**
Zinc	410	960	**43.8**	**48.3**	**37.8**	**29.7**	**48.1**	**67.5**	**38.4**
PCBs (mg/kg-OC)									
Total PCBs	12	65	***5.38***	**8.16**	***18.2***	*6.33 U*	***54.1***	***28.1***	***18.6***
LPAH (mg/kg-OC)									
2-Methylnaphthalene	38	64	*19.4 U*	12.0 U	*64.4 U*	*142 U*	*30.1 U*	*23.0 U*	*36.1 U*
Acenaphthylene	66	66	*20.8 U*	12.9 U	*69.0 U*	*152 U*	*32.3 U*	*24.6 U*	*38.7 U*
Acenaphthene	16	57	*9.72 U*	6.02 U	*32.2 U*	*70.9 U*	*15.1 U*	*11.5 U*	*18.1 U*
Anthracene	220	1200	*5.56 U*	3.44 U	*18.4 U*	*40.5 U*	*8.60 U*	*6.56 U*	*10.32 U*
Fluorene	23	79	*18.1 U*	11.2 U	*59.8 U*	*132 U*	*28.0 U*	*21.3 U*	*33.5 U*
Naphthalene	99	170	*19.4 U*	12.0 U	*64.4 U*	*142 U*	*30.1 U*	*23.0 U*	*36.1 U*
Phenanthrene	100	480	***13.2***	**8.34**	***24.2 J***	*40.5 U*	***14.0 J***	***11.9 J***	*10.3 U*
Total LPAHs	370	780	***13.2***	**8.34**	***24.2***	*152 U*	***14.0***	***11.9***	*38.7 U*
HPAH (mg/kg-OC)									
Benzo(a)anthracene	110	270	***10.7***	**9.14**	***24.7***	***22.2 J***	***19.3***	***16.8***	***12.1***
Benzo(a)pyrene	99	210	***12.3***	**10.0**	***33.9***	*30.4 U*	***28.1***	***18.8***	***16.4***
Benzo(g,h,i)perylene	31	78	*11.1 U*	**7.74 J**	*36.8 U*	*81.0 U*	*17.2 U*	*13.1 U*	*20.6 U*
Chrysene	110	460	***17.4***	**19.6**	***39.2***	***40.5 U***	***28.3***	***26.4***	***20.6***
Dibenzo(a,h)anthracene	12	33	*9.72 U*	6.02 U	*32.2 U*	*70.9 U*	*15.1 U*	*11.5 U*	*18.1 U*
Fluoranthene	160	1200	***25.7***	**19.9**	***51.8 J***	*81.0 U*	***34.5***	***31.5***	***21.9 J***
Indeno(1,2,3-Cd)Pyrene	34	88	*12.5 U*	7.74 U	*41.4 U*	*91.2 U*	*19.4 U*	*14.8 U*	*23.2 U*
Total Benzofluoranthenes	230	450	***27.1***	**22.2**	***65.2***	***30.4***	***54.4***	***42.5***	***33.4***
Pyrene	1000	1400	***23.9***	**14.8**	*44.9*	*40.5 U*	***30.2***	***25.8***	***20.6***
Total HPAHs	960	5300	***117***	**103**	***260***	***27.2***	***195***	***162***	***125***

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Cap Area A DUD_1A	DUD_2A	DUD_4A	DUD_5A Average	Cap Area B DUD_1B	DUD_2B	DUD_3B
Chlorobenzenes (mg/kg-OC)									
1,2-Dichlorobenzene	2.3	2.3	*0.38 U*	0.24 U	*1.27 U*	*2.79 U*	*0.59 U*	*0.45 U*	*0.71 U*
1,2,4-Trichlorobenzene	0.81	1.8	*0.38 U*	0.24 U	*1.27 U*	*2.79 U*	*0.59 U*	*0.45 U*	*0.71 U*
1,4-Dichlorobenzene	3.1	9	*0.18 U*	0.11 U	*0.61 U*	*1.34 U*	*0.28 U*	*0.22 U*	*0.34 U*
Hexachlorobenzene	0.38	2.3	*0.94 U*	0.58 U	*3.11 U*	*6.84 U*	*1.45 U*	*1.11 U*	*1.74 U*
Phthalates (mg/kg-OC)									
Bis(2-Ethylhexyl)Phthalate	47	78	***128***	**65.4**	***128***	***68.4 U***	***72.6***	***57.4***	***53.8***
Benzyl Butyl Phthalate	4.9	64	*8.33 U*	5.16 U	*27.6 U*	*60.8 U*	*12.9 U*	*9.84 U*	*15.5 U*
Diethylphthalate	61	110	*8.33 U*	5.16 U	*27.6 U*	*60.8 U*	*12.9 U*	*9.84 U*	*15.5 U*
Dimethylphthalate	53	53	*15.3 U*	9.46 U	*50.6 U*	*111 U*	*23.7 U*	*18.0 U*	*28.4 U*
Di-N-Butylphthalate	220	1700	*6.94 U*	4.30 U	*23.0 U*	*50.6 U*	*10.8 U*	*8.20 U*	*12.9 U*
Di-N-Octylphthalate	58	4500	*11.1 U*	6.88 U	*36.8 U*	*81.0 U*	*17.2 U*	*13.1 U*	*20.6 U*
Ionic Organics (ug/kg dw)									
2-Methylphenol	63	63	76.5 U	78.8 U	80.9 U	81.2 U	74.9 U	76.7 U	68.4 U
4-Methylphenol	670	670	76.5 U	78.8 U	80.9 U	81.2 U	74.9 U	76.7 U	68.4 U
2,4-Dimethylphenol	29	29	33.5 UJ	34.5 UJ	35.4 UJ	35.5 UJ	32.7 UJ	33.6 UJ	29.9 UJ
Benzyl Alcohol	57	73	28.7 U	29.6 U	30.3 U	30.5 U	28.1 U	28.8 U	25.7 U
Benzoic Acid	650	650	**275 J**	**271 J**	67.0 U	67.3 U	62.0 U	**264 J**	**214 J**
Pentachlorophenol	360	690	32.3 U	33.3 U	34.1 U	34.3 U	31.6 U	32.4 U	28.9 U
Phenol	420	1200	43.0 U	44.3 U	45.5 U	45.7 U	42.1 U	43.2 U	38.5 U
Miscellaneous (mg/kg-OC)									
Dibenzofuran	15	58	*19.4 U*	12.0 U	*64.4 U*	*142 U*	*30.1 U*	*23.0 U*	*36.1 U*
Hexachlorobutadiene	3.9	6.2	*1.04 U*	0.65 U	*3.45 U*	*7.60 U*	*1.61 U*	*1.23 U*	*1.94 U*
N-Nitroso-di-phenylamine	11	11	*27.8 U*	17.2 U	*92.1 U*	*203 U*	*43.0 U*	*32.8 U*	*51.6 U*

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Perimeter Area DUD_1C	DUD_2C	DUD_3C	DUD_4C Average	DUD_5C	DUD_6C Average	DUD_7C
Conventionals (%)									
Total Solids			**72.2**	**67.3**	**62.6**	**76.4**	**57**	**60.1**	**58.9**
Total Organic Carbon			**0.68**	**0.78**	**1.19**	***0.24***	**1.73**	**1.55**	**1.51**
Metals (mg/kg dw)									
Arsenic	57	93	3.60 U	3.71 U	4.15 U	3.27 U	**7.19 J**	**10.1 J**	**9.17 J**
Cadmium	5.1	6.7	**0.40 J**	**0.65 J**	**0.97 J**	**0.26 J**	**1.48**	**1.44 J**	**1.09 J**
Chromium	260	270	**24.2**	**24.5**	**31.2**	**18.8**	**47.0**	**35.9**	**34.0**
Copper	390	390	**84.3**	**94.5**	**79.4**	**70.5**	**165**	**62.5**	**95.8**
Lead	450	530	**19.8**	**27.3**	**50.0**	**8.53 J**	**74.4**	**76.5**	**78.1**
Mercury	0.41	0.59	**0.06 J**	**0.08 J**	**0.21 J**	**0.04 J**	**0.30 J**	**0.29 J**	**0.25 J**
Silver	6.1	6.1	**1.22 J**	**1.29 J**	**1.87**	**1.03 J**	**2.95**	**2.11**	**2.05**
Zinc	410	960	**62.6**	**78.0**	**106**	**51.3**	**182**	**176**	**161**
PCBs (mg/kg-OC)									
Total PCBs	12	65	**35.3**	**47.3**	**107**	***71.8***	**153**	**211**	**74.9**
LPAH (mg/kg-OC)									
2-Methylnaphthalene	38	64	11.4 U	10.7 U	7.5 U	*30.6 U*	5.67 U	6.01 U	6.30 U
Acenaphthylene	66	66	12.2 U	11.5 U	8.1 U	*32.8 U*	6.07 U	6.43 U	6.75 U
Acenaphthene	16	57	5.69 U	**13.4**	3.76 U	*15.3 U*	2.83 U	3.00 U	3.15 U
Anthracene	220	1200	3.25 U	**8.55**	**5.73**	*8.75 U*	**6.05**	**5.80**	**5.47**
Fluorene	23	79	10.6 U	9.9 U	6.99 U	*28.4 U*	5.26 U	5.58 U	5.85 U
Naphthalene	99	170	11.4 U	10.7 U	7.53 U	*30.6 U*	5.67 U	6.01 U	6.30 U
Phenanthrene	100	480	**11.2**	**46.4**	**14.0**	***9.88 J***	**13.0**	**14.2**	**13.3**
Total LPAHs	370	780	**11.2**	**68.3**	**19.7**	***21.5***	**19.0**	**20.0**	**18.7**
HPAH (mg/kg-OC)									
Benzo(a)anthracene	110	270	**12.5**	**22.9**	**16.0**	***12.3***	**16.2**	**14.6**	**17.2**
Benzo(a)pyrene	99	210	**15.5**	**23.9**	**18.7**	***23.9***	**15.6**	**16.5**	**23.4**
Benzo(g,h,i)perylene	31	78	6.50 U	**11.1 J**	**8.06 J**	*17.5 U*	**6.85**	**7.9**	**12.0**
Chrysene	110	460	**15.2**	**26.1**	**20.0**	***16.7 J***	**16.6**	**18.0**	**20.6**
Dibenzo(a,h)anthracene	12	33	5.69 U	5.34 U	3.76 U	*15.3 U*	2.83 U	3.00 U	**3.71 J**
Fluoranthene	160	1200	**26.0**	**65.3**	**38.2**	***25.1 J***	**34.6**	**35.9**	**34.2**
Indeno(1,2,3-Cd)Pyrene	34	88	7.3 U	**11.8 J**	**9.14 J**	*19.7 U*	**7.54**	**7.50 J**	**12.3**
Total Benzofluoranthenes	230	450	**23.9**	**44.2**	**32.3**	***19.1***	**33.7**	**30.0**	**43.9**
Pyrene	1000	1400	**32.1**	**67.7**	**37.6**	***24.9***	**33.2**	**37.9**	**38.2**
Total HPAHs	960	5300	**125**	**273**	**180**	***122***	**164**	**168**	**206**

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Perimeter Area DUD_1C	DUD_2C	DUD_3C	DUD_4C Average	DUD_5C	DUD_6C Average	DUD_7C
Chlorobenzenes (mg/kg-OC)									
1,2-Dichlorobenzene	2.3	2.3	0.22 U	0.21 U	0.15 U	*0.60 U*	**0.57**	**0.60**	**0.17 J**
1,2,4-Trichlorobenzene	0.81	1.8	0.22 U	0.21 U	0.15 U	*0.60 U*	0.11 U	0.12 U	0.12 U
1,4-Dichlorobenzene	3.1	9	0.11 U	0.10 U	0.07 U	*0.29 U*	0.05 U	**0.37**	0.06 U
Hexachlorobenzene	0.38	2.3	0.55 U	0.52 U	0.36 U	*1.48 U*	0.27 U	0.29 U	0.30 U
Phthalates (mg/kg-OC)									
Bis(2-Ethylhexyl)Phthalate	47	78	**99.2**	**115**	**90.5**	***61.5***	**87.6**	**93.0**	**54.6**
Benzyl Butyl Phthalate	4.9	64	**22.6**	**7.06 J**	**5.65 J**	*13.1 U*	**4.45 J**	**6.74**	**5.06 J**
Diethylphthalate	61	110	4.88 U	4.58 U	3.23 U	*13.1 U*	2.43 U	2.57 U	2.70 U
Dimethylphthalate	53	53	8.94 U	8.40 U	5.91 U	*24.1 U*	4.45 U	4.72 U	4.95 U
Di-N-Butylphthalate	220	1700	4.07 U	3.82 U	2.69 U	*10.9 U*	2.02 U	2.14 U	2.25 U
Di-N-Octylphthalate	58	4500	6.50 U	6.11 U	4.30 U	*17.5 U*	3.24 U	3.43 U	3.60 U
Ionic Organics (ug/kg dw)									
2-Methylphenol	63	63	88.6 U	95.1 U	102 U	83.8 U	112 U	107 U	109 U
4-Methylphenol	670	670	88.6 U	95.1 U	102 U	83.8 U	112 U	107 U	109 U
2,4-Dimethylphenol	29	29	38.8 UJ	41.6 UJ	44.7 UJ	36.7 UJ	49.1 UJ	46.6 UJ	47.5 UJ
Benzyl Alcohol	57	73	33.2 U	35.7 UJ	38.3 U	31.4 U	42.1 U	39.9 U	40.7 U
Benzoic Acid	650	650	**235 J**	**253 J**	**304 J**	**183 J**	**351 J**	**274 J**	**272 J**
Pentachlorophenol	360	690	37.4 U	40.1 U	43.1 U	35.4 U	47.4 U	44.9 U	45.8 U
Phenol	420	1200	49.9 U	53.5 U	**146**	47.2 U	**132**	59.9 U	61.1 U
Miscellaneous (mg/kg-OC)									
Dibenzofuran	15	58	11.4 U	10.7 U	7.53 U	*30.6 U*	5.67 U	6.01 U	6.30 U
Hexachlorobutadiene	3.9	6.2	0.61 U	0.57 U	0.40 U	*1.64 U*	0.30 U	0.32 U	0.34 U
N-Nitroso-di-phenylamine	11	11	16.3 U	15.3 U	10.8 U	*43.8 U*	8.10 U	8.58 U	9.00 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Perimeter Area, Continued DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C
Conventionals (%)							
Total Solids			**66.00**	**70.5**	**65.2**	**79.4**	**69.1**
Total Organic Carbon			**1.17**	**0.77**	**1.03**	***0.05***	**0.81**
Metals (mg/kg dw)							
Arsenic	57	93	3.79 U	3.55 U	**7.36 J**	3.27 U	3.47 U
Cadmium	5.1	6.7	**1.19**	**0.74 J**	**0.97 J**	0.19 U	**0.74 J**
Chromium	260	270	**36.5**	**27.0**	**31.6**	**17.5**	**27.5**
Copper	390	390	**78.9**	**72.1**	**78.1**	**54.8**	**104**
Lead	450	530	**71.0**	**43.7**	**64.7**	**4.28 J**	**59.8**
Mercury	0.41	0.59	**0.28 J**	**0.12 J**	**12.2**	0.03 U	**0.14 J**
Silver	6.1	6.1	**2.30**	**1.57**	**1.53 J**	**0.84 J**	**2.08**
Zinc	410	960	**120**	**88.1**	**123**	**33.8**	**99.0**
PCBs (mg/kg-OC)							
Total PCBs	12	65	**163**	**94.9**	**64.5**	*22.1*	**79.8**
LPAH (mg/kg-OC)							
2-Methylnaphthalene	38	64	7.35 U	10.3 U	8.32 U	*130 U*	10.0 U
Acenaphthylene	66	66	7.87 U	11.0 U	8.92 U	*140 U*	10.8 U
Acenaphthene	16	57	3.67 U	5.14 U	4.16 U	*65.1 U*	5.02 U
Anthracene	220	1200	**4.88**	**5.89**	**6.09**	*37.2 U*	**5.75**
Fluorene	23	79	6.82 U	9.54 U	7.73 U	*121 U*	9.32 U
Naphthalene	99	170	7.35 U	10.3 U	8.32 U	*130 U*	10.0 U
Phenanthrene	100	480	**10.9**	**12.2**	**11.4**	*37.2 U*	**12.3**
Total LPAHs	370	780	**15.8**	**18.1**	**17.5**	*140 U*	**18.0**
HPAH (mg/kg-OC)							
Benzo(a)anthracene	110	270	**11.3**	**13.7**	**14.4**	*18.6 U*	**16.6**
Benzo(a)pyrene	99	210	**14.4**	**17.2**	**18.9**	*66.5*	**24.6**
Benzo(g,h,i)perylene	31	78	**5.56 J**	5.87 U	**7.43 J**	*74.4 U*	**12.0**
Chrysene	110	460	**13.9**	**16.3**	**19.5**	*37.2 U*	**22.2**
Dibenzo(a,h)anthracene	12	33	3.67 U	5.14 U	4.16 U	*65.1 U*	5.02 U
Fluoranthene	160	1200	**26.7**	**28.4**	**30.8**	*74.4 U*	**34.8**
Indeno(1,2,3-Cd)Pyrene	34	88	**6.31 J**	**8.26 J**	8.62 J	*83.7 U*	**12.9**
Total Benzofluoranthenes	230	450	**23.8**	**17.4**	**33.5**	***32.6***	**42.4**
Pyrene	1000	1400	**29.2**	**29.7**	**30.3**	*37.2 U*	**38.4**
Total HPAHs	960	5300	**129**	**139**	**163**	***99.1***	**204**

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Perimeter Area, Continued DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C
Chlorobenzenes (mg/kg-OC)							
1,2-Dichlorobenzene	2.3	2.3	0.14 U	0.20 U	0.16 U	*2.56 U*	0.20 U
1,2,4-Trichlorobenzene	0.81	1.8	0.14 U	0.20 U	0.16 U	*2.56 U*	0.20 U
1,4-Dichlorobenzene	3.1	9	0.07 U	**0.88**	0.08 U	*1.23 U*	**0.80**
Hexachlorobenzene	0.38	2.3	0.35 U	0.50 U	0.40 U	*6.28 U*	0.48 U
Phthalates (mg/kg-OC)							
Bis(2-Ethylhexyl)Phthalate	47	78	**94.3**	**88.1**	**52.3**	***95.3 J***	**95.3**
Benzyl Butyl Phthalate	4.9	64	**5.75 J**	**5.69 J**	**4.46 J**	*55.8 U*	**7.89 J**
Diethylphthalate	61	110	3.15 U	4.40 U	3.57 U	*55.8 U*	4.30 U
Dimethylphthalate	53	53	5.77 U	8.07 U	6.54 U	*102 U*	7.89 U
Di-N-Butylphthalate	220	1700	2.62 U	3.67 U	**2.97**	***46.5***	**4.12 J**
Di-N-Octylphthalate	58	4500	4.20 U	5.87 U	4.75 U	*74.4 U*	5.73 U
Ionic Organics (ug/kg dw)							
2-Methylphenol	63	63	97.0 U	90.8 U	98.2 U	80.6 U	92.6 U
4-Methylphenol	670	670	97.0 U	90.8 U	98.2 U	80.6 U	92.6 U
2,4-Dimethylphenol	29	29	42.4 UJ	39.7 UJ	42.9 UJ	35.3 UJ	40.5 UJ
Benzyl Alcohol	57	73	36.4 U	34.0 U	36.8 U	30.2 U	34.7 U
Benzoic Acid	650	650	**235 J**	**213 J**	**230 J**	**176 J**	**232 J**
Pentachlorophenol	360	690	40.9 U	38.3 U	41.4 U	34.0 U	39.1 U
Phenol	420	1200	54.6 U	51.1 U	55.2 U	45.3 U	52.1 U
Miscellaneous (mg/kg-OC)							
Dibenzofuran	15	58	7.35 U	10.3 U	8.32 U	*130 U*	10.0 U
Hexachlorobutadiene	3.9	6.2	0.39 U	0.55 U	0.45 U	*6.98 U*	0.54 U
N-Nitroso-di-phenylamine	11	11	10.5 U	14.7 U	11.9 U	*186 U*	14.3 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Cap Area A DUD_1A	DUD_2A	DUD_3A	DUD_4A	DUD_5A Average	Cap Area B DUD_1B	DUD_2B
Conventionals (%)									
Total Solids			**45.9**	**45.8**	**50.5**	**76.7**	**82.1**	**70.2**	**76.3**
Total Organic Carbon			***5.71***	**2.95**	**2.34**	***0.34***	***0.079***	**0.67**	**1.31**
Metals (mg/kg dw)									
Arsenic	57	93	**5.66 J**	**11.1 J**	**9.90 J**	3.26 U	3.05 U	**4.70 J**	**6.82 J**
Cadmium	5.1	6.7	**1.20 J**	**0.79 J**	**0.53 J**	0.20 U	0.18 U	**0.23 J**	**0.28 J**
Chromium	260	270	**36.6**	**37.3**	**30.7**	**19.0**	**16.1**	**18.9**	**20.6**
Copper	390	390	**91.3**	**113**	**87.9**	**68.4**	**37.7**	**44.6**	**59.8**
Lead	450	530	**89.3**	**69.0**	**57.8**	**12.2**	**2.6**	**18.7**	**27.9**
Mercury	0.41	0.59	**0.22 J**	**0.28 J**	**0.30 J**	**0.05 J**	0.02 U	**0.11 J**	**0.09 J**
Silver	6.1	6.1	**1.81 J**	**1.75 J**	**1.50 J**	**1.16 J**	**1.10 J**	**1.18 J**	**0.38 J**
Zinc	410	960	**305**	**202**	**156**	**56.3**	**30.3**	**59.7**	**81.3**
PCBs (mg/kg-OC)									
Total PCBs	12	65	***5.17***	**7.85**	**11.7**	***12.0***	***7.36***	**14.2**	**5.69**
LPAH (mg/kg-OC)									
2-Methylnaphthalene	38	64	***10.9 J***	1.04 U	1.19 U	*5.36 U*	*24.1 U*	3.00 U	0.27 U
Acenaphthylene	66	66	***0.61 J***	1.11 U	1.27 U	*5.75 U*	*25.8 U*	3.21 U	**0.52 J**
Acenaphthene	16	57	***1.03 J***	**0.89**	**1.36**	*2.68 U*	*12.0 U*	1.50 U	**0.57**
Anthracene	220	1200	***6.98***	**4.05**	**6.53**	***9.43***	***8.57 J***	**8.24**	**2.00**
Fluorene	23	79	***2.33***	**1.56 J**	**2.14**	*4.98 U*	*22.3 U*	2.78 U	**1.08**
Naphthalene	99	170	***1.74***	1.04 U	1.19 U	*5.36 U*	*24.1 U*	3.00 U	0.27 U
Phenanthrene	100	480	***23.8 J***	**12.0 J**	**21.3**	***21.3***	***11.8***	**15.5**	**11.2**
Total LPAHs	370	780	***36.5***	**18.5**	**31.3**	***30.8***	***28.3***	**23.7**	**15.4**
HPAH (mg/kg-OC)									
Benzo(a)anthracene	110	270	***12.2 J***	**15.3 J**	**16.0 J**	***19.6 J***	***9.95 J***	**18.1 J**	**5.40 J**
Benzo(a)pyrene	99	210	***7.48 J***	**10.4 J**	**16.6 J**	***17.9 J***	***11.7 J***	**19.1 J**	**6.21**
Benzo(g,h,i)perylene	31	78	***5.84***	**7.85**	**10.8**	***12.5***	*13.8 U*	**11.9**	**3.90**
Chrysene	110	460	***12.0 J***	**16.0 J**	**23.4 J**	***30.1 J***	***13.9 J***	**26.1 J**	**10.5 J**
Dibenzo(a,h)anthracene	12	33	***1.98***	**1.95**	**2.79**	***4.21 J***	*12.0 U*	**4.75**	**1.05**
Fluoranthene	160	1200	***33.5 J***	**30.9 J**	**41.4**	***45.2***	***20.3 J***	**35.1**	**31.9 J**
Indeno(1,2,3-Cd)Pyrene	34	88	***4.43***	**6.93**	**9.66**	***11.2***	*15.5 U*	**10.6**	**3.66**
Total Benzofluoranthenes	230	450	***16.5***	**23.9**	**35.2**	***42.9***	***23.0***	**44.8**	**16.3**
Pyrene	1000	1400	***24.5 J***	**25.6**	**34.2**	***39.1***	***19.1***	**30.8**	**19.6**
Total HPAHs	960	5300	***118***	**139**	**190**	***223***	***98.0***	**201**	**98.5**

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Cap Area A DUD_1A	DUD_2A	DUD_3A	DUD_4A	DUD_5A Average	Cap Area B DUD_1B	DUD_2B
Chlorobenzenes (mg/kg-OC)									
1,2-Dichlorobenzene	2.3	2.3	*0.01 U*	0.02 U	0.02 U	*0.10 U*	*0.45 U*	0.06 U	0.03 U
1,2,4-Trichlorobenzene	0.81	1.8	*0.01 U*	0.02 U	0.02 U	*0.10 U*	*0.45 U*	0.06 U	0.03 U
1,4-Dichlorobenzene	3.1	9	***1.14***	**0.30**	**0.80**	***1.06***	*0.22 U*	0.03 U	0.03 U
Hexachlorobenzene	0.38	2.3	*0.03 U*	0.05 U	0.06 U	*0.25 U*	*1.13 U*	0.14 U	0.05 U
Phthalates (mg/kg-OC)									
Bis(2-Ethylhexyl)Phthalate	47	78	***96.2 J***	**80.0**	**65.2**	***80.1***	***30.3 J***	**38.3**	**13.9**
Benzyl Butyl Phthalate	4.9	64	*0.23 U*	**5.0**	**8.42**	***5.90***	***10.8 J***	**3.66**	**1.82**
Diethylphthalate	61	110	*0.23 U*	0.44 U	0.51 U	*2.30 U*	*10.3 U*	1.28 U	0.53 U
Dimethylphthalate	53	53	***1.43***	0.81 U	0.93 U	*4.21 U*	*18.9 U*	2.36 U	0.53 U
Di-N-Butylphthalate	220	1700	*1.74 U*	2.07 U	2.98 U	*15.2 U*	*24.3 U*	5.44 U	**1.24**
Di-N-Octylphthalate	58	4500	*0.31 U*	0.59 U	0.68 U	*3.07 U*	*13.8 U*	1.71 U	0.53 U
Ionic Organics (ug/kg dw)									
2-Methylphenol	63	63	34.9 U	34.9 U	31.7 U	20.9 U	19.5 U	22.8 U	6.9 U
4-Methylphenol	670	670	34.9 U	34.9 U	31.7 U	20.9 U	19.5 U	22.8 U	6.9 U
2,4-Dimethylphenol	29	29	15.3 U	15.3 U	13.9 U	9.13 U	8.53 U	9.97 U	3.54 U
Benzyl Alcohol	57	73	**1198 J**	**29.7**	11.9 U	7.82 U	7.31 U	8.55 U	6.95 U
Benzoic Acid	650	650	28.3 U	**177**	**143**	**56.1 J**	**31.7 J**	**57.0 J**	**257**
Pentachlorophenol	360	690	14.6 U	14.6 U	13.3 U	8.74 U	8.16 U	9.54 U	17.0 U
Phenol	420	1200	**19.6**	**37.1**	17.8 U	11.7 U	11.0 U	12.8 U	**43.6**
Miscellaneous (mg/kg-OC)									
Dibenzofuran	15	58	***0.99 J***	1.04 U	1.19 U	*5.36 U*	*24.1 U*	3.00 U	**0.58**
Hexachlorobutadiene	3.9	6.2	*0.03 U*	0.06 U	0.06 U	*0.29 U*	*1.29 U*	0.16 U	0.13 U
N-Nitroso-di-phenylamine	11	11	*0.76 U*	1.48 U	1.69 U	*7.66 U*	*34.4 U*	4.28 U	0.53 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Pre ENR DUD_3C	DUD_4C Average	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
Conventionals (%)									
Total Solids			**53.5**	**58.6**	**54.5**	**55.3**	**56.1**	**60.8**	**57.8**
Total Organic Carbon			**1.14**	**1.31**	**1.75**	**1.31**	**1.38**	**1.71**	**1.58**
Metals (mg/kg dw)									
Arsenic	57	93	**6.18 J**	**7.65 J**	**11.8 J**	**8.22 J**	**11.1 J**	**8.60 J**	**13.6 J**
Cadmium	5.1	6.7	**0.75 J**	**0.48 J**	**1.70**	**0.77 J**	**0.67 J**	**0.90 J**	**0.79 J**
Chromium	260	270	**35.3**	**31.1**	**48.5**	**33.2**	**32.0**	**40.7**	**33.0**
Copper	390	390	**79.8**	**92.9**	**89.1**	**71.5**	**81.7**	**96.3**	**95.0**
Lead	450	530	**47.6**	**43.1**	**76.6**	**54.1**	**69.7**	**78.7**	**110**
Mercury	0.41	0.59	**0.23 J**	**0.24 J**	**0.29 J**	**0.23 J**	**0.26 J**	**0.28 J**	**0.25 J**
Silver	6.1	6.1	**2.08**	**1.72 J**	**2.80**	**1.97**	**1.78**	**2.54**	**2.24**
Zinc	410	960	**105**	**108**	**145**	**118**	**138**	**148**	**165**
PCBs (mg/kg-OC)									
Total PCBs	12	65	**71.9**	**16.6**	**125**	**75.6**	**28.8**	**36.4**	**15.8**
LPAH (mg/kg-OC)									
2-Methylnaphthalene	38	64	2.00 U	1.95 U	1.42 U	1.76 U	1.76 U	1.53 U	1.59 U
Acenaphthylene	66	66	2.14 U	2.09 U	1.52 U	1.88 U	1.89 U	**1.64 J**	1.70 U
Acenaphthene	16	57	**1.27 J**	**1.17 J**	**0.99 J**	**0.98 J**	**1.26 J**	**1.31 J**	**1.63**
Anthracene	220	1200	**4.45 J**	**4.94 J**	**3.86 J**	**5.55 J**	**5.99 J**	**6.08 J**	**4.45 J**
Fluorene	23	79	1.85 U	1.81 U	**1.42 J**	**2.14 J**	**1.76 J**	**1.75 J**	**1.82 J**
Naphthalene	99	170	2.00 U	1.95 U	1.42 U	1.76 U	1.76 U	1.53 U	1.59 U
Phenanthrene	100	480	**9.06 J**	**9.21 J**	**8.06 J**	**10.9 J**	**10.8 J**	**10.0 J**	**13.0 J**
Total LPAHs	370	780	**14.8**	**15.3**	**14.3**	**19.5**	**19.8**	**20.8**	**20.9**
HPAH (mg/kg-OC)									
Benzo(a)anthracene	110	270	**12.1 J**	**12.2 J**	**10.9 J**	**11.7 J**	**15.2 J**	**13.8 J**	**13.4 J**
Benzo(a)pyrene	99	210	**14.8**	**13.9**	**11.6**	**13.1**	**17.4**	**18.1**	**17.8**
Benzo(g,h,i)perylene	31	78	**8.59**	**8.18**	**6.6**	**7.42**	**9.67**	**10.3**	**10.4**
Chrysene	110	460	**18.0 J**	**19.3 J**	**15.0 J**	**17.8 J**	**24.0 J**	**23.5 J**	**18.1 J**
Dibenzo(a,h)anthracene	12	33	**3.77**	**3.52**	**2.80**	**3.56**	**4.79**	**4.03**	**4.44**
Fluoranthene	160	1200	**22.7**	**25.1**	**23.4**	**25.3**	**28.2**	**27.8**	**30.1**
Indeno(1,2,3-Cd)Pyrene	34	88	**7.46**	**7.11**	**5.75**	**6.29**	**9.07**	**9.47**	**9.19**
Total Benzofluoranthenes	230	450	**32.8**	**31.7**	**26.1**	**29.5**	**38.2**	**34.7**	**38.8**
Pyrene	1000	1400	**27.0**	**22.3**	**25.0**	**25.1**	**31.8**	**31.9**	**35.6**
Total HPAHs	960	5300	**147**	**143**	**127**	**140**	**178**	**174**	**178**

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Pre ENR DUD_3C	DUD_4C Average	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
Chlorobenzenes (mg/kg-OC)									
1,2-Dichlorobenzene	2.3	2.3	**0.51**	0.04 U	**0.59**	**0.52**	0.03 U	**0.39**	0.03 U
1,2,4-Trichlorobenzene	0.81	1.8	0.04 U	0.04 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
1,4-Dichlorobenzene	3.1	9	**0.63**	0.24 U	**0.58**	**0.51**	**0.41**	**0.48**	**0.39**
Hexachlorobenzene	0.38	2.3	0.09 U	0.09 U	0.07 U	0.08 U	0.08 U	0.07 U	0.08 U
Phthalates (mg/kg-OC)									
Bis(2-Ethylhexyl)Phthalate	47	78	**46.2**	**29.4**	**47.8**	**44.3**	**37.5**	**54.8**	**26.9**
Benzyl Butyl Phthalate	4.9	64	**2.65**	**2.74**	**2.08**	**2.27**	**1.79**	**2.69**	**2.15**
Diethylphthalate	61	110	0.86 UJ	0.83 UJ	0.61 UJ	0.75 UJ	0.75 UJ	0.66 UJ	**0.76 J**
Dimethylphthalate	53	53	1.57 U	**1.67 J**	1.12 U	1.38 U	1.38 U	1.20 U	1.25 U
Di-N-Butylphthalate	220	1700	3.88 U	3.62 U	2.88 U	4.54 U	3.60 U	1.66 U	1.45 U
Di-N-Octylphthalate	58	4500	1.14 U	1.11 U	0.81 U	1.01 U	1.01 U	0.88 U	0.91 U
Ionic Organics (ug/kg dw)									
2-Methylphenol	63	63	26.0 U	29.1 U	28.5 U	26.3 U	27.7 U	29.9 U	28.7 U
4-Methylphenol	670	670	26.0 U	29.1 U	28.5 U	26.3 U	27.7 U	29.9 U	28.7 U
2,4-Dimethylphenol	29	29	11.4 UJ	12.8 UJ	12.5 UJ	11.5 UJ	12.1 UJ	13.1 UJ	12.6 UJ
Benzyl Alcohol	57	73	9.76 U	10.9 U	10.7 U	9.87 U	10.4 U	11.2 U	10.8 U
Benzoic Acid	650	650	**143 J**	**167 J**	**194 J**	**149 J**	**180 J**	**182 J**	**140 J**
Pentachlorophenol	360	690	10.9 U	12.2 U	11.9 U	11.0 U	11.6 U	12.5 U	12.0 U
Phenol	420	1200	**22.8 J**	**24.6 J**	**26.7 J**	**18.1 J**	**19.0 J**	16.8 U	**26.9 J**
Miscellaneous (mg/kg-OC)									
Dibenzofuran	15	58	2.00 U	1.95 U	1.42 U	1.76 U	1.76 U	1.53 U	1.59 U
Hexachlorobutadiene	3.9	6.2	0.11 U	0.10 U	0.08 U	0.09 U	0.09 U	0.08 U	0.09 U
N-Nitroso-di-phenylamine	11	11	2.85 U	2.78 U	2.03 U	2.51 U	2.52 U	2.19 U	2.27 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Post ENR DUD_3C	DUD_4C Average	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
Conventionals (%)									
Total Solids			**86.4**	**83.9**	**87.7**	**88.3**	**86.8**	**81.8**	**88.3**
Total Organic Carbon			*0.05 U*	*0.05 U*	*0.05 U*	*0.05 U*	*0.05 U*	***0.30***	*0.05 U*
Metals (mg/kg dw)									
Arsenic	57	93	3.01 U	2.98 U	2.74 U	2.83 U	2.88 U	2.93 U	2.94 U
Cadmium	5.1	6.7	0.17 U	0.17 U	0.16 U	0.17 U	0.17 U	0.17 U	0.18 U
Chromium	260	270	**15.6**	**13.5**	**14.1**	**15.3**	**13.2**	**16.0**	**13.7**
Copper	390	390	**24.9**	**24.6**	**26.5**	**28.3**	**25.1**	**32.3**	**30.6**
Lead	450	530	**1.74**	**1.73**	1.60 U	**1.70**	**1.73**	**5.38**	**1.81**
Mercury	0.41	0.59	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Silver	6.1	6.1	**0.78 J**	**0.98 J**	**0.80 J**	**0.87 J**	**0.85 J**	**1.04 J**	**1.08 J**
Zinc	410	960	**22.9**	**23.7**	**19.7**	**25.1**	**21.0**	**32.0**	**27.7**
PCBs (mg/kg-OC)									
Total PCBs	12	65	*5.32 U*	***5.71***	***5.98***	***4.00***	*5.56 U*	***10.9***	*5.81 U*
LPAH (mg/kg-OC)									
2-Methylnaphthalene	38	64	*29.8 U*	*33.3 U*	*31.8 U*	*31.1 U*	*31.1 U*	*5.76 U*	*32.6 U*
Acenaphthylene	66	66	*31.9 U*	*35.7 U*	*34.1 U*	*33.3 U*	*33.3 U*	*6.17 U*	*34.9 U*
Acenaphthene	16	57	*14.9 U*	*16.7 U*	*15.9 U*	*15.6 U*	*15.6 U*	*2.88 U*	*16.3 U*
Anthracene	220	1200	*8.51 UJ*	*9.52 UJ*	***9.55 J***	*8.89 UJ*	*8.89 UJ*	***4.49 J***	*9.30 UJ*
Fluorene	23	79	*27.7 U*	*31.0 U*	*29.5 U*	*28.9 U*	*28.9 U*	*5.35 U*	*30.2 U*
Naphthalene	99	170	*29.8 U*	*33.3 U*	*31.8 U*	*31.1 U*	*31.1 U*	*5.76 U*	*32.6 U*
Phenanthrene	100	480	*8.51 U*	*9.52 U*	***13.0 J***	*8.89 U*	*8.89 U*	***8.19***	*9.30 U*
Total LPAHs	370	780	*31.9 U*	*35.7 U*	***22.5***	*33.3 U*	*33.3 U*	***12.7***	*34.9 U*
HPAH (mg/kg-OC)									
Benzo(a)anthracene	110	270	***5.96 J***	***7.26 J***	*12.3*	***6.89 J***	***4.89 J***	***8.44***	*4.65 U*
Benzo(a)pyrene	99	210	*6.38 U*	***7.98 J***	***9.77 J***	***7.56 J***	*6.67 U*	***8.85***	*6.98 U*
Benzo(g,h,i)perylene	31	78	*17.0 U*	*19.0 U*	*18.2 U*	*17.8 U*	*17.8 U*	***5.76 J***	*18.6 U*
Chrysene	110	460	*8.51 U*	***10.7 J***	***16.1 J***	***11.1 J***	*8.89 U*	***13.4***	*9.30 U*
Dibenzo(a,h)anthracene	12	33	*14.9 U*	*16.7 U*	*15.9 U*	*15.6 U*	*15.6 U*	*2.88 U*	*16.3 U*
Fluoranthene	160	1200	*17.0 U*	*19.0 U*	***22.7 J***	*17.8 U*	*17.8 U*	***18.7***	*18.6 U*
Indeno(1,2,3-Cd)Pyrene	34	88	*19.1 U*	*21.4 U*	*20.5 U*	*20.0 U*	*20.0 U*	***5.76 J***	*20.9 U*
Total Benzofluoranthenes	230	450	*6.38 U*	***13.2***	***25.4***	***17.3***	*6.67 U*	***20.9***	*6.98 U*
Pyrene	1000	1400	*9.57 J*	***12.9 J***	*23.2*	***12.4 J***	***9.33 J***	*17.1*	*9.30 U*
Total HPAHs	960	5300	***15.5***	***40.1***	***110***	***55.3***	***14.2***	***99.0***	*20.9 U*

Appendix D1-1. Long Term Monitoring Chemistry Comparison to SMS - 2003 Pre-Dredge Baseline

ANALYTE	SMS SQS	SMS CSL	Post ENR DUD_3C	DUD_4C Average	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
Chlorobenzenes (mg/kg-OC)									
1,2-Dichlorobenzene	2.3	2.3	*0.55 U*	*0.62 U*	*0.59 U*	*0.58 U*	*0.58 U*	*0.11 U*	*0.60 U*
1,2,4-Trichlorobenzene	0.81	1.8	*0.55 U*	*0.62 U*	*0.59 U*	*0.58 U*	*0.58 U*	*0.11 U*	*0.60 U*
1,4-Dichlorobenzene	3.1	9	*0.28 U*	*0.31 U*	*0.30 U*	*0.29 U*	*0.29 U*	*0.05 U*	*0.30 U*
Hexachlorobenzene	0.38	2.3	*1.40 U*	*1.57 U*	*1.50 U*	*1.47 U*	*1.47 U*	*0.27 U*	*1.53 U*
Phthalates (mg/kg-OC)									
Bis(2-Ethylhexyl)Phthalate	47	78	***16.8 J***	***25.2 J***	***29.5 J***	***24.4 J***	***17.3 J***	***23.6***	***17.9 J***
Benzyl Butyl Phthalate	4.9	64	***23.4 J***	***14.4 J***	*13.6 U*	*13.3 U*	*13.3 U*	***3.79 J***	*14.0 U*
Diethylphthalate	61	110	*12.8 U*	*14.3 U*	*13.6 U*	***15.3 J***	*13.3 U*	*2.47 U*	*14.0 U*
Dimethylphthalate	53	53	*23.4 U*	*26.2 U*	*25.0 U*	*24.4 U*	*24.4 U*	*4.53 U*	*25.6 U*
Di-N-Butylphthalate	220	1700	*26.4 U*	*30.2 U*	*27.0 U*	*25.6 U*	*28.0 U*	***7.41***	*25.6 U*
Di-N-Octylphthalate	58	4500	*17.0 U*	*19.0 U*	*18.2 U*	*17.8 U*	*17.8 U*	*3.29 U*	*18.6 U*
Ionic Organics (ug/kg dw)									
2-Methylphenol	63	63	18.5 U	19.1 U	18.2 U	18.1 U	18.4 U	19.6 U	18.1 U
4-Methylphenol	670	670	18.5 U	19.1 U	18.2 U	18.1 U	18.4 U	19.6 U	18.1 U
2,4-Dimethylphenol	29	29	8.10 UJ	8.35 UJ	7.98 UJ	7.93 UJ	8.06 UJ	8.56 UJ	7.93 UJ
Benzyl Alcohol	57	73	6.94 UJ	7.16 U	6.84 U	6.80 U	6.91 U	7.33 U	6.80 U
Benzoic Acid	650	650	**35.9 J**	**30.4 J**	**27.4 J**	**23.8 J**	**26.5 J**	**59.9 J**	**27.2 J**
Pentachlorophenol	360	690	7.75 U	7.99 U	7.64 U	7.59 U	7.72 U	8.19 U	7.59 U
Phenol	420	1200	10.4 U	10.7 U	10.3 U	10.2 U	10.4 U	11.0 U	10.2 U
Miscellaneous (mg/kg-OC)									
Dibenzofuran	15	58	*29.8 U*	*33.3 U*	*31.8 U*	*31.1 U*	*31.1 U*	*5.76 U*	*32.6 U*
Hexachlorobutadiene	3.9	6.2	*1.60 U*	*1.79 U*	*1.70 U*	*1.67 U*	*1.67 U*	*0.31 U*	*1.74 U*
N-Nitroso-di-phenylamine	11	11	*42.6 U*	*47.6 U*	*45.5 U*	*44.4 U*	*44.4 U*	*8.23 U*	*46.5 U*

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-4. Long Term Monitoring Chemistry Comparison to SMS - 2005 Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Pre-ENR Perimeter Area DUD_1C	DUD_2C	DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C	DUD_13C
Conventionals (%)										
Total Solids			62	57.6	66.5	66.8	67.8	84.5	69.2	50.8
Total Organic Carbon			1.24	1.65	1.08	1.11	0.86	*0.12*	0.74	1.87
Metals (mg/kg dw)										
Arsenic	57	93	6.13 J	7.47 J	6.32 J	7.93 J	10.5 J	2.96 U	4.77 J	10.2 J
Cadmium	5.1	6.7	0.55 J	0.92 J	0.90 J	1.24	0.77 J	0.18 U	0.68 J	1.30 J
Chromium	260	270	31.0	36.1	33.3	37.7	28.6	20.5	32.8	43.1
Copper	390	390	102	102	68.6	69.3	59.9	48.6	70.2	101
Lead	450	530	37.6	59.0	57.5	82.2	98.1	5.68 J	59.0	77.6
Mercury	0.41	0.59	0.16 J	0.23 J	0.23 J	0.27 J	0.24 J	0.03 J	0.16 J	0.33 J
Silver	6.1	6.1	1.79	2.14	2.11	2.29	1.78	1.21	2.04	2.64
Zinc	410	960	120	144	112	137	150	37.8	110	165
PCBs (mg/kg-OC)										
Total PCBs	12	65	15.7	20.7	72.2	84.8	38.1	*15.4*	45.1	37.9
LPAH (mg/kg-OC)										
2-Methylnaphthalene	38	64	1.82 U	2.53 J	1.98 U	1.88 U	2.40 U	*13.6 U*	2.72 U	1.47 U
Acenaphthylene	66	66	1.95 U	2.11 J	2.12 U	2.02 U	2.57 U	*14.6 U*	2.92 U	1.79 J
Acenaphthene	16	57	1.26 J	4.78	1.21 J	1.09 J	1.46 J	*6.80 U*	2.33 J	1.05 J
Anthracene	220	1200	6.90 J	7.55 J	4.72 J	4.11 J	5.48 J	*5.44 J*	7.37 J	7.05 J
Fluorene	23	79	2.33 J	4.24 J	1.90 J	1.75 U	2.23 J	*12.6 U*	3.70 J	2.00 J
Naphthalene	99	170	1.82 U	1.48 U	1.98 U	1.88 U	2.40 U	*13.6 U*	3.11 J	1.47 U
Phenanthrene	100	480	16.9 J	24.1 J	9.64 J	6.91 J	11.8 J	*6.80 J*	24.7 J	11.1 J
Total LPAHs	370	780	27.4	42.7	17.5	12.1	20.9	*12.2*	41.2	23.0
HPAH (mg/kg-OC)										
Benzo(a)anthracene	110	270	18.9 J	29.4 J	12.0 J	10.4 J	16.7 J	*13.6 J*	15.8 J	17.3 J
Benzo(a)pyrene	99	210	17.8	20.3	13.7	12.6	19.3	*17.6*	18.9	17.1
Benzo(g,h,i)perylene	31	78	11.1	10.3	7.87	7.2	11.0	*10.7 J*	11.9	9.98
Chrysene	110	460	35.1 J	30.8 J	16.6 J	13.4 J	23.6 J	*20.1 J*	20.6 J	25.5 J
Dibenzo(a,h)anthracene	12	33	4.70	4.53	3.27	2.89	5.33	*6.80 U*	4.90	4.56
Fluoranthene	160	1200	65.0	81.1	24.2	19.8	34.6	*16.0*	39.1	30.0
Indeno(1,2,3-Cd)Pyrene	34	88	9.35	9.38	6.52	6.49	10.3	*9.51 J*	10.4	9.34
Total Benzofluoranthenes	230	450	44.7	49.3	29.8	25.8	44.7	*36.5*	40.9	39.8
Pyrene	1000	1400	49.3	60.4	28.5	29.4	39.6	*16.1*	42.2	33.8
Total HPAHs	960	5300	256	296	143	128	205	*140*	205	188

Appendix D1-4. Long Term Monitoring Chemistry Comparison to SMS - 2005 Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Pre-ENR Perimeter Area DUD_1C	DUD_2C	DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C	DUD_13C
Chlorobenzenes (mg/kg-OC)										
1,2-Dichlorobenzene	2.3	2.3	0.03 U	0.03 U	0.04 U	0.03 U	0.04 U	*0.25 U*	0.05 U	0.03 U
1,2,4-Trichlorobenzene	0.81	1.8	0.03 U	0.03 U	0.04 U	0.03 U	0.04 U	*0.25 U*	0.05 U	0.03 U
1,4-Dichlorobenzene	3.1	9	**0.56**	**0.53**	**0.76**	**0.67**	0.02 U	*0.13 U*	**0.91**	**0.42**
Hexachlorobenzene	0.38	2.3	0.09 U	0.07 U	0.09 U	0.09 U	0.11 U	*0.64 U*	0.13 U	0.07 U
Phthalates (mg/kg-OC)										
Bis(2-Ethylhexyl)Phthalate	47	78	**70.6**	**63.2**	**71.3**	**62.4**	**34.9**	***51.1***	**59.3**	**41.1**
Benzyl Butyl Phthalate	4.9	64	**3.05**	**5.14**	**1.99**	0.81 U	**3.94**	***7.18 J***	**3.09**	**4.70**
Diethylphthalate	61	110	0.78 UJ	0.63 UJ	0.85 UJ	0.81 UJ	1.03 UJ	***6.21 J***	1.17 UJ	0.63 UJ
Dimethylphthalate	53	53	1.43 U	1.16 U	1.55 U	1.48 U	1.88 U	*10.7 U*	2.14 U	1.16 U
Di-N-Butylphthalate	220	1700	4.58 U	3.55 U	4.66 U	0.67 U	5.09 U	*24.5 U*	2.51 U	1.91 U
Di-N-Octylphthalate	58	4500	1.04 U	0.84 U	1.13 U	1.08 U	1.37 U	*7.77 U*	1.56 U	0.84 U
Ionic Organics (ug/kg dw)										
2-Methylphenol	63	63	25.8 U	27.8 U	24.1 U	24.0 U	23.6 U	18.9 U	23.1 U	31.5 U
4-Methylphenol	670	670	25.8 U	27.8 U	24.1 U	24.0 U	23.6 U	18.9 U	23.1 U	31.5 U
2,4-Dimethylphenol	29	29	11.3 UJ	12.2 UJ	10.5 UJ	10.5 UJ	10.3 UJ	8.28 UJ	10.1 UJ	13.8 UJ
Benzyl Alcohol	57	73	9.68 U	**17.4 J**	9.03 U	8.98 U	8.85 U	7.10 U	8.67 U	11.8 U
Benzoic Acid	650	650	**323 J**	**264 J**	**149 J**	**159 J**	**136 J**	**96.3 J**	**122 J**	**203 J**
Pentachlorophenol	360	690	10.8 U	11.6 U	10.1 U	10.0 U	9.88 U	7.93 U	9.68 U	13.2 U
Phenol	420	1200	**96.6**	**65.3 J**	**15.8 J**	13.5 U	13.3 U	10.7 U	13.0 U	**21.7 J**
Miscellaneous (mg/kg-OC)										
Dibenzofuran	15	58	1.82 U	**3.47 J**	1.98 U	1.88 U	2.40 U	*13.6 U*	**2.72 J**	1.47 U
Hexachlorobutadiene	3.9	6.2	0.10 U	0.08 U	0.11 U	0.10 U	0.13 U	*0.73 U*	0.15 U	0.08 U
N-Nitroso-di-phenylamine	11	11	2.59 U	2.11 U	2.82 U	2.69 U	3.42 U	*19.4 U*	3.89 U	2.10 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-5. Long Term Monitoring Chemistry Comparison to SMS - 2006 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Cap Area A DUD_1A	DUD_2A	DUD_3A	DUD_4A	DUD_5A Average	Cap Area B DUD_1B	DUD_2B	DUD_3B
Conventionals (%)										
Total Solids			**62.3**	**43.1**	**50.9**	**72.6**	**82.10**	**46.6**	**70.5**	**66.7**
Total Organic Carbon			**2.28**	**2.99**	**1.87**	**0.77**	***0.05***	**1.76**	**1.53**	**1.86**
Metals (mg/kg dw)										
Arsenic	57	93	**5.46 J**	**15.3 J**	**13.6 J**	**5.23 J**	2.98 U	**11.6 J**	**7.23 J**	**7.35 J**
Cadmium	5.1	6.7	**0.90 J**	**0.74 J**	**0.47 J**	**0.28 J**	0.18 U	**0.32 J**	**0.27 J**	**0.24 J**
Chromium	260	270	**42.4**	**40.8**	**33.4**	**28.4**	**15.3**	**28.8**	**21.8**	**25.6**
Copper	390	390	**64.5**	**103**	**85.3**	**55.8**	**47.2**	**60.5**	**55.0**	**48.4**
Lead	450	530	**46.9**	**65.0**	**47.0**	**23.8**	**2.19 J**	**29.2**	**26.0**	**20.2**
Mercury	0.41	0.59	**0.09 J**	**0.30 J**	**0.28 J**	**0.09 J**	0.02 U	**0.20 J**	**0.20 J**	**0.16 J**
Silver	6.1	6.1	**0.48 J**	**0.86 J**	**0.67 J**	**0.47 J**	**0.33 J**	**0.67 J**	**0.45 J**	**0.51 J**
Zinc	410	960	**246**	**209**	**145**	**76.9**	**29.9**	**101**	**83.4**	**79.9**
PCBs (mg/kg-OC)										
Total PCBs	12	65	**18.5**	**10.2**	**10.2**	**12.1**	***7.58***	**6.70**	**4.55**	**2.65**
LPAH (mg/kg-OC)										
2-Methylnaphthalene	38	64	**2.46 J**	1.01 U	**0.39 J**	0.48 U	*6.31 U*	0.33 U	**0.30 J**	0.22 U
Acenaphthylene	66	66	1.90 U	1.01 U	**0.62**	**0.56 J**	*6.31 U*	0.33 U	0.25 U	**0.32 J**
Acenaphthene	16	57	1.90 U	**1.47 J**	**0.63**	**0.77 J**	*6.31 U*	**0.79**	**0.51**	**0.37 J**
Anthracene	220	1200	**9.58**	**4.83**	**5.25**	**5.31**	*6.31 U*	**4.28**	**2.91**	**3.48**
Fluorene	23	79	**4.94**	**2.02 J**	**1.50**	**1.36**	*6.31 U*	**1.39**	**1.11 J**	**0.76**
Naphthalene	99	170	**1.90 J**	1.01 U	**0.51 J**	**0.50 J**	*6.31 U*	0.33 U	**0.28 J**	**0.22 J**
Phenanthrene	100	480	**34.2**	**11.6**	**7.90**	**12.7**	***7.72 J***	**9.43**	**6.99**	**5.13**
Total LPAHs	370	780	**50.6**	**19.9**	**16.4**	**21.2**	***7.72***	**15.9**	**11.8**	**10.3**
HPAH (mg/kg-OC)										
Benzo(a)anthracene	110	270	**29.9**	**10.2**	**9.90**	**13.6**	***9.48 J***	**9.85**	**12.2**	**4.61**
Benzo(a)pyrene	99	210	**29.2**	**10.6**	**11.4**	**14.0**	***16.7***	**10.6**	**8.76**	**4.67**
Benzo(g,h,i)perylene	31	78	**17.3**	**7.34**	**7.09**	**10.3**	***11.1 J***	**6.69**	**3.98**	**3.08**
Chrysene	110	460	**35.1 J**	**15.7 J**	**15.4 J**	**20.1 J**	***15.5 J***	**15.2 J**	**11.7 J**	**7.54 J**
Dibenzo(a,h)anthracene	12	33	**3.52 J**	**2.02 J**	**2.23**	**2.53**	*6.31 U*	**1.91**	**1.69**	**0.95**
Fluoranthene	160	1200	**74.6**	**30.9**	**23.2**	**35.4**	***17.7***	**24.0**	**15.1**	**10.9**
Indeno(1,2,3-Cd)Pyrene	34	88	**15.2**	**6.07**	**6.43**	**8.87**	***9.22 J***	**5.93**	**4.25**	**2.68**
Total Benzofluoranthenes	230	450	**53.9**	**22.8**	**25.6**	**31.0**	***33.7***	**24.0**	**16.9**	**10.9**
Pyrene	1000	1400	**67.1**	**25.7**	**21.0**	**29.1**	***17.3 J***	**20.4**	**12.8**	**8.79**
Total HPAHs	960	5300	**326**	**131**	**122**	**165**	***131***	**118**	**87.3**	**54.1**

Appendix D1-5. Long Term Monitoring Chemistry Comparison to SMS - 2006 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Cap Area A DUD_1A	DUD_2A	DUD_3A	DUD_4A	DUD_5A Average	Cap Area B DUD_1B	DUD_2B	DUD_3B
Chlorobenzenes (mg/kg-OC)										
1,2-Dichlorobenzene	2.3	2.3	0.19 U	0.10 U	0.03 U	0.05 U	*0.63 U*	0.03 U	0.03 U	0.02 U
1,2,4-Trichlorobenzene	0.81	1.8	0.19 U	0.10 U	0.03 U	0.05 U	*0.63 U*	0.03 U	0.03 U	0.02 U
1,4-Dichlorobenzene	3.1	9	1.65 U	0.10 U	0.03 U	0.05 U	*0.63 U*	0.03 U	0.03 U	0.02 U
Hexachlorobenzene	0.38	2.3	0.37 U	0.21 U	0.06 U	0.10 U	*1.24 U*	0.06 U	0.36 U	0.04 U
Phthalates (mg/kg-OC)										
Bis(2-Ethylhexyl)Phthalate	47	78	**161**	**73.8**	**44.5**	**92.5**	*58.5 U*	**32.3**	**32.5**	**24.8**
Benzyl Butyl Phthalate	4.9	64	**25.6**	**6.87**	4.01 U	5.13 U	*19.2 U*	3.77 U	2.50 U	1.90 U
Diethylphthalate	61	110	3.73 U	2.09 U	0.56 U	0.95 U	*12.4 U*	0.65 U	0.49 U	0.43 U
Dimethylphthalate	53	53	**5.49 J**	2.09 U	0.56 U	0.95 U	*12.4 U*	0.65 U	0.49 U	0.43 U
Di-N-Butylphthalate	220	1700	3.73 U	4.03 U	2.23 U	3.30 U	*17.2 U*	2.30 U	2.69 U	**0.98**
Di-N-Octylphthalate	58	4500	3.73 U	2.09 U	0.56 U	0.95 U	*12.4 U*	0.65 U	0.49 U	**2.24**
Ionic Organics (ug/kg dw)										
2-Methylphenol	63	63	85.1 U	62.6 U	10.4 U	7.30 U	6.46 U	11.4 U	7.52 U	7.95 U
4-Methylphenol	670	670	85.1 U	62.6 U	10.4 U	7.30 U	6.46 U	11.4 U	7.52 U	7.95 U
2,4-Dimethylphenol	29	29	43.3 UJ	30.2 UJ	5.30 UJ	3.72 UJ	3.29 UJ	5.79 UJ	3.83 UJ	4.05 UJ
Benzyl Alcohol	57	73	85.1 U	62.6 U	10.4 U	7.30 U	6.46 U	11.4 U	7.52 U	7.95 U
Benzoic Acid	650	650	**790**	**155**	**128**	**95.2**	**58.2**	**149**	**101**	**111**
Pentachlorophenol	360	690	209 U	155 U	25.5 U	17.9 U	15.8 U	27.9 U	18.4 U	19.5 U
Phenol	420	1200	85.1 U	62.6 U	10.4 U	7.30 U	6.46 U	11.4 U	7.52 U	27.6
Miscellaneous (mg/kg-OC)										
Dibenzofuran	15	58	**2.75 J**	1.01 U	**0.77**	**0.83 J**	*6.31 U*	**0.70**	**0.51**	**0.40 J**
Hexachlorobutadiene	3.9	6.2	0.92 U	0.52 U	0.14 U	0.23 U	*3.04 U*	0.16 U	0.12 U	0.10 U
N-Nitroso-di-phenylamine	11	11	3.73 U	2.09 U	0.56 U	0.95 U	*12.4 U*	0.65 U	0.49 U	0.43 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-5. Long Term Monitoring Chemistry Comparison to SMS - 2006 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	ENR Area DUD_3C	DUD_4C Average	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
Conventionals (%)									
Total Solids			**86.8**	**81.55**	**86.1**	**79.3**	**85.8**	**86.9**	**86.2**
Total Organic Carbon			***0.31***	***0.18***	**0.59**	***0.22***	***0.12***	***0.37***	***0.24***
Metals (mg/kg dw)									
Arsenic	57	93	**2.88 J**	2.94 U	**3.48 J**	**3.28 J**	2.80 U	**3.45 J**	**3.02 J**
Cadmium	5.1	6.7	0.17 U	0.18 U	0.17 U	0.19 U	0.16 U	0.17 U	0.17 U
Chromium	260	270	**12.2**	**13.7**	**14.3**	**14.5**	**15.2**	**13.9**	**14.2**
Copper	390	390	**27.9**	**29.2**	**29.5**	**32.0**	**30.2**	**29.0**	**29.0**
Lead	450	530	**6.68 J**	**4.17 J**	**7.08 J**	**4.79 J**	**2.45 J**	**7.94 J**	**4.06 J**
Mercury	0.41	0.59	**0.03 J**	**0.03 J**	**0.34**	**0.05 J**	0.02 U	**0.05 J**	**0.02 J**
Silver	6.1	6.1	**0.24 J**	0.24 U	**0.24 J**	**0.28 J**	**0.29 J**	**0.25 J**	**0.27 J**
Zinc	410	960	**31.1**	**30.4**	**36.0**	**30.9**	**27.6**	**34.8**	**31.4**
PCBs (mg/kg-OC)									
Total PCBs	12	65	***9.15***	***13.3***	**4.36**	***15.6***	***5.19***	***7.06***	***4.96***
LPAH (mg/kg-OC)									
2-Methylnaphthalene	38	64	*0.99 U*	*1.88 U*	0.53 U	*1.52 U*	*2.55 U*	*0.84 U*	*1.29 U*
Acenaphthylene	66	66	*0.99 U*	*1.88 U*	0.53 U	*1.52 U*	*2.55 U*	*0.84 U*	*1.29 U*
Acenaphthene	16	57	*0.99 U*	*1.88 U*	0.53 U	*1.52 U*	*2.55 U*	*0.84 U*	*1.29 U*
Anthracene	220	1200	***5.57 J***	***4.56***	**2.01**	***4.94***	*2.55 U*	***2.87***	***1.71 J***
Fluorene	23	79	***1.47 J***	***1.97 J***	**0.65 J**	*1.52 U*	*2.55 U*	*0.84 U*	*1.29 U*
Naphthalene	99	170	*0.99 U*	*1.88 U*	0.53 U	*1.52 U*	*2.55 U*	*0.84 U*	*1.29 U*
Phenanthrene	100	480	***8.90 J***	***11.9***	**4.49**	*10.4*	***3.58 J***	***5.68***	***3.84***
Total LPAHs	370	780	***15.9***	***17.5***	**7.15**	***15.3***	***3.58***	***8.56***	***5.56***
HPAH (mg/kg-OC)									
Benzo(a)anthracene	110	270	*12.1*	***16.5***	**5.35**	***16.7***	***5.85***	***8.73***	***6.33***
Benzo(a)pyrene	99	210	*12.5*	*18.0*	**5.49**	***17.2***	***8.72***	***9.60***	***7.38***
Benzo(g,h,i)perylene	31	78	*7.62*	*10.6*	**3.27**	***9.49***	***5.26***	***5.12***	***4.20***
Chrysene	110	460	*19.0 J*	*22.5*	**8.60**	***19.2***	***9.17***	***14.6***	***9.00***
Dibenzo(a,h)anthracene	12	33	*2.46*	*3.56 J*	**1.02 J**	***2.81 J***	*2.55 U*	***1.58 J***	***1.48 J***
Fluoranthene	160	1200	*24.2 J*	*33.7*	**11.0**	***29.8***	***12.3***	***15.2***	***11.5***
Indeno(1,2,3-Cd)Pyrene	34	88	*7.07*	*9.51*	**2.95**	***9.04***	***4.72 J***	***4.60***	***3.90***
Total Benzofluoranthenes	230	450	***27.2***	***39.7***	**11.9**	***37.5***	***18.4***	***19.2***	***15.4***
Pyrene	1000	1400	*20.1*	*30.0*	**8.98**	***24.7***	***11.1***	***14.3***	***10.2***
Total HPAHs	960	5300	***132***	***184***	**58.5**	***166***	***75.5***	***93.0***	***69.4***

Appendix D1-5. Long Term Monitoring Chemistry Comparison to SMS - 2006 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	ENR Area DUD_3C	DUD_4C Average	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
Chlorobenzenes (mg/kg-OC)									
1,2-Dichlorobenzene	2.3	2.3	*0.10 U*	*0.19 U*	0.05 U	*0.15 U*	*0.25 U*	*0.08 U*	*0.13 U*
1,2,4-Trichlorobenzene	0.81	1.8	*0.10 U*	*0.19 U*	0.05 U	*0.15 U*	*0.25 U*	*0.08 U*	*0.13 U*
1,4-Dichlorobenzene	3.1	9	*0.10 U*	*0.19 U*	0.05 U	*0.15 U*	*0.25 U*	*0.08 U*	*0.13 U*
Hexachlorobenzene	0.38	2.3	*0.19 U*	***0.51 J***	0.10 U	*0.30 U*	*0.50 U*	*0.16 U*	*0.25 U*
Phthalates (mg/kg-OC)									
Bis(2-Ethylhexyl)Phthalate	47	78	***26.0***	***35.8***	**17.7**	***41.6***	***23.1***	***22.0***	***21.4***
Benzyl Butyl Phthalate	4.9	64	***6.01***	***7.81***	**3.01**	***6.69***	***8.30 J***	***4.78***	***4.62 J***
Diethylphthalate	61	110	*1.94 U*	*3.69 U*	1.04 U	*2.98 U*	*5.00 U*	*1.65 U*	*2.52 U*
Dimethylphthalate	53	53	*1.94 U*	*3.69 U*	1.04 U	*2.98 U*	*5.00 U*	*1.65 U*	*2.52 U*
Di-N-Butylphthalate	220	1700	*5.20 U*	*7.66 U*	2.80 U	*12.8 U*	*15.1 U*	*2.48 U*	*11.1 U*
Di-N-Octylphthalate	58	4500	*1.94 U*	*3.69 U*	1.04 U	*2.98 U*	*5.00 U*	*1.65 U*	*2.52 U*
Ionic Organics (ug/kg dw)									
2-Methylphenol	63	63	6.11 U	6.50 U	6.16 U	6.68 U	6.18 U	6.10 U	6.15 U
4-Methylphenol	670	670	6.11 U	6.50 U	6.16 U	6.68 U	6.18 U	6.10 U	6.15 U
2,4-Dimethylphenol	29	29	3.11 UJ	3.31 UJ	3.14 UJ	3.40 UJ	3.15 UJ	3.11 UJ	3.13 UJ
Benzyl Alcohol	57	73	6.11 U	6.50 U	6.16 U	6.68 U	6.18 U	6.10 U	6.15 U
Benzoic Acid	650	650	**73.5**	**61.2**	**71.5**	**68.5**	**15.2**	**66.2**	**59.4**
Pentachlorophenol	360	690	15.0 U	15.9 U	15.1 U	16.4 U	15.2 U	15.0 U	15.1 U
Phenol	420	1200	6.11 U	6.50 U	6.16 U	6.68 U	6.18 U	6.10 U	6.15 U
Miscellaneous (mg/kg-OC)									
Dibenzofuran	15	58	*0.99 U*	*1.88 U*	0.53 U	*1.52 U*	*2.55 U*	*0.84 U*	*1.29 U*
Hexachlorobutadiene	3.9	6.2	*0.48 U*	*0.90 U*	0.26 U	*0.73 U*	*1.23 U*	*0.40 U*	*0.62 U*
N-Nitroso-di-phenylamine	11	11	*1.94 U*	*3.69 U*	1.04 U	*2.98 U*	*5.00 U*	*1.65 U*	*2.52 U*

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-5. Long Term Monitoring Chemistry Comparison to SMS - 2006 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Perimeter Area DUD_1C	DUD_2C	DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C	DUD_13C
Conventionals (%)										
Total Solids			55.4	54.6	74.0	76.1	66.6	78	70.7	55.6
Total Organic Carbon			2.00	1.96	0.61	*0.44*	0.94	0.59	0.66	1.64
Metals (mg/kg dw)										
Arsenic	57	93	10.8 J	12.8 J	5.22 J	5.12 J	9.91 J	4.36 J	6.93 J	11.5 J
Cadmium	5.1	6.7	1.08 J	0.70 J	0.52 J	0.37 J	0.53 J	0.19 J	0.52 J	0.72 J
Chromium	260	270	38.8	34.6	22.7	21.8	27.8	21.4	26.7	34.2
Copper	390	390	89.9	98.0	57.0	47.3	58.9	45.3	60.3	78.6
Lead	450	530	72.7	55.7	23.0	28.1	58.7	21.4	45.0	56.1
Mercury	0.41	0.59	0.31 J	0.29 J	0.12 J	0.10 J	0.49	0.10 J	0.14 J	0.32 J
Silver	6.1	6.1	1.16 J	0.97 J	1.29 J	0.58 J	0.80 J	0.38 J	0.71 J	0.99 J
Zinc	410	960	174	155	64.5	65.6	108	60.9	92.5	129
PCBs (mg/kg-OC)										
Total PCBs	12	65	30.2	14.0	49.0	*61.5*	33.7	6.82	57.8	21.7
LPAH (mg/kg-OC)										
2-Methylnaphthalene	38	64	2.43 U	6.32	0.65 J	*0.93 J*	0.43 U	0.59 U	0.71 J	0.30 U
Acenaphthylene	66	66	2.43 U	2.52 U	0.62 U	*0.81 U*	1.01	1.39	0.58 J	1.19
Acenaphthene	16	57	2.43 U	19.1	0.90 J	*1.72*	1.08	1.41	1.00 J	0.88
Anthracene	220	1200	2.97 J	20.4	7.60	*9.97*	6.84	8.52	7.74	7.26
Fluorene	23	79	2.43 U	18.2	1.59	*1.99*	1.89	2.42	1.63	1.74
Naphthalene	99	170	2.43 U	2.52 U	0.80 J	*1.17 J*	0.43 U	1.11 J	0.92 J	0.69
Phenanthrene	100	480	12.7	78.0	11.2	*13.6*	11.7	15.2	12.7	9.49
Total LPAHs	370	780	15.7	136	21.7	*28.4*	22.5	30.0	24.6	21.2
HPAH (mg/kg-OC)										
Benzo(a)anthracene	110	270	12.3	48.7	16.0	*16.9*	14.7	14.2	19.6	14.0
Benzo(a)pyrene	99	210	16.0	28.0	15.5	*22.7*	21.0	17.4	18.1	14.7
Benzo(g,h,i)perylene	31	78	11.3	14.1	9.22	*12.2*	10.8	10.9	13.4	8.52
Chrysene	110	460	16.8	49.9	20.7	*28.9*	24.8	26.8	23.5	22.2
Dibenzo(a,h)anthracene	12	33	3.33 J	4.99	2.48	*2.39*	2.10	2.40	3.68	2.30
Fluoranthene	160	1200	26.8	173	34.5	*41.0*	31.8	39.2	32.9	26.2
Indeno(1,2,3-Cd)Pyrene	34	88	9.28	12.6	8.59	*11.4*	10.1	9.98	12.0	7.93
Total Benzofluoranthenes	230	450	34.5	66.0	35.5	*42.3*	41.5	34.3	47.0	33.4
Pyrene	1000	1400	37.9	121	32.6	*44.9*	36.9	32.9	42.3	26.0
Total HPAHs	960	5300	168	518	175	*223*	194	188	213	155

Appendix D1-5. Long Term Monitoring Chemistry Comparison to SMS - 2006 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Perimeter Area DUD_1C	DUD_2C	DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C	DUD_13C
Chlorobenzenes (mg/kg-OC)										
1,2-Dichlorobenzene	2.3	2.3	0.24 U	0.25 U	0.06 U	*0.08 U*	0.04 U	0.06 U	0.06 U	0.03 U
1,2,4-Trichlorobenzene	0.81	1.8	0.24 U	0.25 U	0.06 U	*0.08 U*	0.04 U	0.06 U	0.06 U	0.03 U
1,4-Dichlorobenzene	3.1	9	0.24 U	0.25 U	0.06 U	*0.08 U*	0.04 U	0.06 U	0.06 U	0.03 U
Hexachlorobenzene	0.38	2.3	0.48 U	0.50 U	0.12 U	*0.16 U*	0.08 U	0.12 U	0.11 U	0.06 U
Phthalates (mg/kg-OC)										
Bis(2-Ethylhexyl)Phthalate	47	78	**118**	**90.3**	**65.2**	***79.3***	**47.7**	**128**	**101**	**36.2**
Benzyl Butyl Phthalate	4.9	64	**11.1**	**13.4**	**5.04**	***5.03***	**4.39**	**8.47**	**9.70**	**4.13**
Diethylphthalate	61	110	4.77 U	4.95 U	1.22 U	*1.59 U*	0.84 U	1.15 U	1.13 U	0.58 U
Dimethylphthalate	53	53	4.77 U	4.95 U	1.22 U	*1.59 U*	**0.84**	1.15 U	1.13 U	0.58 U
Di-N-Butylphthalate	220	1700	4.77 U	4.95 U	2.62 U	*3.26 U*	**16.9**	6.47 U	9.21 U	2.58 U
Di-N-Octylphthalate	58	4500	4.77 U	4.95 U	1.22 U	*1.59 U*	0.84 U	1.15 U	1.13 U	0.58 U
Ionic Organics (ug/kg dw)										
2-Methylphenol	63	63	95.7 U	97.1 U	7.17 U	6.96 U	7.96 U	6.79 U	7.50 U	9.53 U
4-Methylphenol	670	670	95.7 U	97.1 U	7.17 U	6.96 U	7.96 U	6.79 U	7.50 U	9.53 U
2,4-Dimethylphenol	29	29	48.7 UJ	49.5 UJ	3.65 UJ	3.55 UJ	4.05 UJ	3.46 UJ	3.82 UJ	4.9 UJ
Benzyl Alcohol	57	73	95.7 U	97.1 U	7.17 U	6.96 U	7.96 U	6.79 U	7.50 U	9.53 U
Benzoic Acid	650	650	**700**	**238**	**101**	**64.1**	**127**	**95.0**	**91.8**	**136**
Pentachlorophenol	360	690	235 U	238 U	17.6 U	17.1 U	19.5 U	16.7 U	18.4 U	23.4 U
Phenol	420	1200	**90.3 J**	**1511**	7.17 U	6.96 U	7.96 U	6.79 U	7.50 U	9.53 U
Miscellaneous (mg/kg-OC)										
Dibenzofuran	15	58	2.43 U	**11.7**	**0.84 J**	***1.23 J***	**0.92**	0.59 U	**0.98 J**	**0.91**
Hexachlorobutadiene	3.9	6.2	1.17 U	1.21 U	0.30 U	*0.39 U*	0.21 U	0.28 U	0.28 U	0.14 U
N-Nitroso-di-phenylamine	11	11	4.77 U	4.95 U	1.22 U	*1.59 U*	0.84 U	1.15 U	1.13 U	0.58 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-6. Long Term Monitoring Chemistry Comparison to SMS - 2007 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Cap Area A DUD_1A	DUD_2A	DUD_3A	DUD_4A	DUD_5A Average	Cap Area B DUD_1B	DUD_2B	DUD_3B
Conventionals (%)										
Total Solids			**74.7**	**43**	**44.1**	**63.1**	**81.5**	**54.5**	**41.7**	**42**
Total Organic Carbon			**1.39**	**2.91**	**2.05**	**1.32**	***0.28***	**1.42**	**2.00**	**2.03**
Metals (mg/kg dw)										
Arsenic	57	93	**4.82 J**	**14.2 J**	**12.2 J**	**6.02 J**	**5.22 J**	**8.99 J**	**13.2 J**	**12.9 J**
Cadmium	5.1	6.7	**0.66 J**	**0.56 J**	**0.32 J**	**0.36 J**	**0.12 J**	**0.28 J**	**0.31 J**	**0.31 J**
Chromium	260	270	**107**	**33.0**	**27.7**	**24.7**	**17.1**	**24.0**	**28.1**	**26.2**
Copper	390	390	**68.9**	**87.0**	**64.4**	**62.8**	**55.9**	**56.7**	**64.3**	**58.8**
Lead	450	530	**107**	**42.1**	**27.9**	**50.4**	**8.48 J**	**27.0**	**28.5**	**24.3**
Mercury	0.41	0.59	**0.08**	**0.20**	**0.19**	**0.10**	**0.02 J**	**0.17**	**0.17**	**0.16**
Silver	6.1	6.1	0.27 U	0.47 U	0.45 U	0.32 U	0.25 U	0.37 U	0.48 U	0.48 U
Zinc	410	960	**181**	**182**	**117**	**112**	**51.3**	**90.8**	**119**	**110**
PCBs (mg/kg-OC)										
Total PCBs	12	65	**10.6**	**4.93**	**3.98**	**3.88**	***6.00***	**6.95**	**3.35**	**3.05**
LPAH (mg/kg-OC)										
2-Methylnaphthalene	38	64	**0.32 J**	**0.32**	0.22 U	**0.31 J**	*0.88 U*	0.26 U	0.24 U	**0.27 J**
Acenaphthylene	66	66	**0.34 J**	**0.37**	**0.35 J**	**0.38 J**	*0.88 U*	0.26 U	**0.37 J**	**0.35 J**
Acenaphthene	16	57	**1.13**	**0.48**	0.22 U	**0.39 J**	*0.88 U*	**0.40 J**	**0.43 J**	**0.34 J**
Anthracene	220	1200	**3.18**	**1.93**	**1.54**	**2.38 J**	***1.52 J***	**2.05 J**	**2.14 J**	**3.49 J**
Fluorene	23	79	**1.37**	**0.79**	**0.51**	**0.79**	*0.88 U*	**0.67**	**0.76**	**0.83**
Naphthalene	99	170	**0.50**	**0.33**	**0.23 J**	0.31 J	*0.88 U*	0.26 U	**0.26 J**	0.23 U
Phenanthrene	100	480	**10.5 J**	**5.77 J**	**3.06 J**	**5.45 J**	***5.88 J***	**4.63 J**	**4.85 J**	**4.37 J**
Total LPAHs	370	780	**17.0**	**9.67**	**5.70**	**9.72**	***7.4***	**7.74**	**8.82**	**9.37**
HPAH (mg/kg-OC)										
Benzo(a)anthracene	110	270	**10.1 J**	**6.57 J**	**3.83 J**	**5.99 J**	***6.08 J***	**6.55 J**	**4.96 J**	**4.13 J**
Benzo(a)pyrene	99	210	**12.1**	**6.78**	**3.89**	**8.53**	***7.81***	**6.40**	**5.09**	**4.20**
Benzo(g,h,i)perylene	31	78	**8.70**	**4.67**	**2.72**	**6.21**	***4.90***	**3.97**	**3.54**	**3.10**
Chrysene	110	460	**19.2 J**	**11.0 J**	**5.75 J**	**12.4 J**	***8.59 J***	**9.99 J**	**8.32 J**	**6.87 J**
Dibenzo(a,h)anthracene	12	33	**2.96**	**1.44**	**0.66**	**1.51**	***1.35 J***	**1.18**	**0.91**	**0.86**
Fluoranthene	160	1200	**32.7**	**17.0**	**9.06**	**16.0 J**	***14.8 J***	**15.1 J**	**12.7 J**	**10.3 J**
Indeno(1,2,3-Cd)Pyrene	34	88	**7.59**	**4.35**	**2.80**	**6.03 J**	***5.83 J***	**3.90 J**	**3.39 J**	**3.05 J**
Total Benzofluoranthenes	230	450	**24.2**	**14.9**	**9.92**	**19.9**	***16.0***	**15.3**	**12.8**	**10.2**
Pyrene	1000	1400	**27.4**	**15.0**	**7.90**	**14.2**	***11.9***	**12.0**	**10.0**	**8.38**
Total HPAHs	960	5300	**145**	**81.6**	**46.5**	**90.9**	***77.3***	**74.4**	**61.7**	**51.1**

Appendix D1-6. Long Term Monitoring Chemistry Comparison to SMS - 2007 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Cap Area A DUD_1A	DUD_2A	DUD_3A	DUD_4A	DUD_5A Average	Cap Area B DUD_1B	DUD_2B	DUD_3B
Chlorobenzenes (mg/kg-OC)										
1,2-Dichlorobenzene	2.3	2.3	0.02 U	0.02 U	0.02 U	0.02 U	*0.09 U*	0.03 U	0.02 U	0.02 U
1,2,4-Trichlorobenzene	0.81	1.8	0.01 U	0.01 U	0.01 U	0.01 U	*0.04 U*	0.01 U	0.01 U	0.01 U
1,4-Dichlorobenzene	3.1	9	**1.06**	**0.11**	**0.07**	**0.40**	***0.11 J***	0.03 U	0.02 U	0.02 U
Hexachlorobenzene	0.38	2.3	0.01 U	0.01 U	0.01 U	0.01 U	*0.04 U*	0.01 U	0.01 U	0.01 U
Phthalates (mg/kg-OC)										
Bis(2-Ethylhexyl)Phthalate	47	78	**87.1**	**68.3**	**20.8**	**64.2**	***25.1***	**16.1**	**21.8**	**24.8**
Benzyl Butyl Phthalate	4.9	64	**5.02**	**3.68**	**2.02**	0.12 U	***4.83***	**1.93**	**2.02**	**1.62**
Diethylphthalate	61	110	0.38 UJ	0.32 UJ	0.44 UJ	0.48 UJ	*1.77 UJ*	0.52 UJ	0.48 UJ	0.47 UJ
Dimethylphthalate	53	53	**6.70**	0.32 U	0.44 U	0.48 UJ	*1.77 UJ*	0.52 Uj	0.48 UJ	0.47 UJ
Di-N-Butylphthalate	220	1700	**1.43**	**1.21**	**0.70 J**	0.48 U	*1.77 U*	**0.62 J**	**0.77 J**	**0.50 J**
Di-N-Octylphthalate	58	4500	0.38 U	0.32 U	0.44 U	0.48 U	*1.77 U*	0.52 U	0.48 U	0.47 U
Ionic Organics (ug/kg dw)										
2-Methylphenol	63	63	2.68 U	4.65 U	4.54 U	3.17 U	2.45 U	3.67 U	4.80 U	4.76 U
4-Methylphenol	670	670	5.35 U	9.30 U	9.07 U	6.34 U	4.91 U	7.34 U	9.59 U	9.52 U
2,4-Dimethylphenol	29	29	1.34 UJ	2.33 UJ	2.27 UJ	1.58 UJ	1.23 UJ	1.83 UJ	2.40 UJ	2.38 UJ
Benzyl Alcohol	57	73	2.68 U	4.65 U	4.54 U	3.17 U	**2.45**	3.67 U	4.80 U	4.76 U
Benzoic Acid	650	650	**84.7**	**138**	**116**	**98.4**	**58.0**	**89.9**	**122**	**124**
Pentachlorophenol	360	690	13.4 UJ	23.3 UJ	22.7 UJ	15.8 UJ	12.3 UJ	18.3 UJ	24.0 UJ	23.8 UJ
Phenol	420	1200	5.35 U	**32.8**	**12.0 J**	6.34 U	**8.24 J**	7.34 U	**10.6 J**	9.52 U
Miscellaneous (mg/kg-OC)										
Dibenzofuran	15	58	**0.70**	**0.45**	**0.25**	**0.39**	***0.88***	**0.31**	**0.37**	**0.43**
Hexachlorobutadiene	3.9	6.2	0.05 U	0.04 U	0.06 U	0.06 U	*0.22 U*	0.06 U	0.06 U	0.06 U
N-Nitroso-di-phenylamine	11	11	0.38 U	0.32 U	0.44 U	0.48 U	*1.77 U*	0.52 U	0.48 U	0.47 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-6. Long Term Monitoring Chemistry Comparison to SMS - 2007 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	ENR Area DUD_3C	DUD_4C Average	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
Conventionals (%)									
Total Solids			**54.1**	**68.7**	**67.3**	**78.8**	**55.7**	**65.6**	**55.1**
Total Organic Carbon			**1.24**	**0.83**	**0.75**	**0.70**	**1.36**	**1.02**	**1.53**
Metals (mg/kg dw)									
Arsenic	57	93	**9.43 J**	**5.98 J**	**5.50 J**	**5.08 J**	**10.1 J**	**7.32 J**	**9.62 J**
Cadmium	5.1	6.7	**0.18 J**	**0.16 J**	0.15 U	0.13 U	**0.22 J**	**0.26 J**	**0.20 J**
Chromium	260	270	**25.9**	**20.0**	**19.5**	**16.8**	**25.3**	**23.6**	**23.4**
Copper	390	390	**50.6**	**39.0**	**36.1**	**31.6**	**51.5**	**52.1**	**45.2**
Lead	450	530	**18.7**	**12.0**	**11.8**	**10.4**	**18.7**	**24.2**	**17.6**
Mercury	0.41	0.59	**0.11**	**0.08 J**	**0.05 J**	**0.05 J**	**0.12**	**0.14**	**0.12**
Silver	6.1	6.1	0.37 U	0.29 U	0.30 U	0.25 U	0.36 U	**0.47 J**	0.36 U
Zinc	410	960	**82.4**	**57.8**	**56.9**	**52.4**	**86.0**	**79.3**	**78.9**
PCBs (mg/kg-OC)									
Total PCBs	12	65	**6.44**	**4.89**	**5.22**	**4.69**	**5.70**	**11.9**	**2.78**
LPAH (mg/kg-OC)									
2-Methylnaphthalene	38	64	0.30 U	0.35 U	0.40 U	0.36 U	0.26 U	0.30 U	0.24 U
Acenaphthylene	66	66	0.30 U	**0.38 J**	0.40 U	0.36 U	0.26 U	**0.62**	0.24 U
Acenaphthene	16	57	**0.36 J**	**0.37 J**	**0.54 J**	**0.45 J**	**0.29 J**	**0.40 J**	**0.25 J**
Anthracene	220	1200	**1.88**	**1.42**	**2.07**	**1.48**	**1.87**	**3.99**	**1.28**
Fluorene	23	79	**0.78**	**0.43 J**	**0.88**	**0.60 J**	**0.55**	**1.02**	**0.43 J**
Naphthalene	99	170	0.30 U	0.35 U	0.40 U	0.36 U	0.26 U	**0.33 J**	0.24 U
Phenanthrene	100	480	**6.93 J**	**3.12 J**	**4.29 J**	**3.73 J**	**4.05 J**	**6.09 J**	**3.18 J**
Total LPAHs	370	780	**9.95**	**9.95**	**5.33**	**7.78**	**6.26**	**12.4**	**5.13**
HPAH (mg/kg-OC)									
Benzo(a)anthracene	110	270	**6.13 J**	**4.77 J**	**6.36 J**	**5.04 J**	**5.46 J**	**10.9 J**	**3.19 J**
Benzo(a)pyrene	99	210	**5.85**	**4.90**	**6.32**	**5.25**	**5.21**	**9.13**	**3.61**
Benzo(g,h,i)perylene	31	78	**3.30**	**3.21**	**3.60**	**3.25**	**3.52**	**5.55**	**2.45**
Chrysene	110	460	**9.45 J**	**6.74 J**	**7.93 J**	**7.55 J**	**8.88 J**	**17.8 J**	**5.44 J**
Dibenzo(a,h)anthracene	12	33	**0.87**	**1.00**	**1.04**	**0.87**	**0.92**	**1.54**	**0.66**
Fluoranthene	160	1200	**18.2**	**10.9**	**13.2**	**10.8**	**11.3**	**19.1**	**8.54**
Indeno(1,2,3-Cd)Pyrene	34	88	**4.09**	**3.43**	**3.94**	**3.71**	**3.63**	**5.45**	**2.55**
Total Benzofluoranthenes	230	450	**13.7**	**11.8**	**14.0**	**11.6**	**12.0**	**23.0**	**7.96**
Pyrene	1000	1400	**12.1**	**7.83**	**10.8**	**9.53**	**9.16**	**15.8**	**7.18**
Total HPAHs	960	5300	**73.6**	**54.5**	**67.1**	**57.7**	**60.2**	**108**	**41.6**

Appendix D1-6. Long Term Monitoring Chemistry Comparison to SMS - 2007 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	ENR Area DUD_3C	DUD_4C Average	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
Chlorobenzenes (mg/kg-OC)									
1,2-Dichlorobenzene	2.3	2.3	0.03 U	0.04 U	0.04 U	0.04 U	0.03 U	0.03 U	0.02 U
1,2,4-Trichlorobenzene	0.81	1.8	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U
1,4-Dichlorobenzene	3.1	9	0.03 U	0.04 U	0.04 U	0.04 U	0.03 U	0.03 U	0.02 U
Hexachlorobenzene	0.38	2.3	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U
Phthalates (mg/kg-OC)									
Bis(2-Ethylhexyl)Phthalate	47	78	**16.1**	**11.0**	**11.1**	**10.6**	**11.4**	**16.1**	**9.19**
Benzyl Butyl Phthalate	4.9	64	**3.54**	**2.08**	**2.17**	**2.60**	**1.91**	**2.07**	**1.46**
Diethylphthalate	61	110	0.60 UJ	0.71 UJ	0.80 UJ	0.73 UJ	0.53 UJ	0.60 UJ	0.47 UJ
Dimethylphthalate	53	53	0.60 U	0.71 U	0.80 U	0.73 U	0.53 U	0.60 U	0.47 U
Di-N-Butylphthalate	220	1700	**1.46**	**0.81 J**	0.80 U	0.76 J	0.61 **J**	**0.61 J**	**0.57 J**
Di-N-Octylphthalate	58	4500	0.60 U	0.71 U	0.80 U	0.73 U	0.53 U	0.60 U	0.47 U
Ionic Organics (ug/kg dw)									
2-Methylphenol	63	63	3.70 U	2.91 U	2.97 U	2.54 U	3.59 U	3.05 U	3.63 U
4-Methylphenol	670	670	7.39 U	5.83 U	5.94 U	5.08 U	7.18 U	6.10 U	7.26 U
2,4-Dimethylphenol	29	29	1.85 UJ	1.46 UJ	1.49 UJ	1.27 UJ	1.80 UJ	1.52 UJ	1.81 UJ
Benzyl Alcohol	57	73	3.70 U	2.91 U	2.97 U	2.54 U	3.59 U	3.05 U	**3.63**
Benzoic Acid	650	650	**172**	**70.0 J**	**67.0**	**62.1**	**97.8**	**75.5**	**83.5**
Pentachlorophenol	360	690	18.5 UJ	14.6 UJ	14.9 UJ	12.7 UJ	18.0 UJ	15.2 UJ	18.1 UJ
Phenol	420	1200	**9.61 J**	5.83 U	**6.54 J**	5.08 U	7.18 U	6.10 U	7.26 U
Miscellaneous (mg/kg-OC)									
Dibenzofuran	15	58	**0.40**	**0.35**	**0.40**	**0.44**	**0.34**	**0.45**	**0.26**
Hexachlorobutadiene	3.9	6.2	0.07 U	0.09 U	0.10 U	0.09 U	0.07 U	0.07 U	0.06 U
N-Nitroso-di-phenylamine	11	11	0.60 U	0.71 U	0.80 U	0.73 U	0.53 U	0.60 U	0.47 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-6. Long Term Monitoring Chemistry Comparison to SMS - 2007 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Perimeter Area DUD_1C	DUD_2C	DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C	DUD_13C
Conventionals (%)										
Total Solids			**42.7**	**44.1**	**64.1**	**69.4**	**57.4**	**67.7**	**69.5**	**55.3**
Total Organic Carbon			**2.34**	**2.14**	**1.09**	**0.79**	**1.17**	**1.21**	**0.82**	**1.52**
Metals (mg/kg dw)										
Arsenic	57	93	**14.3 J**	**13.2 J**	**7.27 J**	**6.92 J**	**10.5 J**	**8.71 J**	**7.19 J**	**10.8 J**
Cadmium	5.1	6.7	**0.49 J**	**0.41 J**	**0.44 J**	**0.40 J**	**0.26 J**	**0.24 J**	**0.43 J**	**0.58 J**
Chromium	260	270	**34.9**	**32.2**	**27.6**	**23.6**	**26.7**	**27.6**	**32.1**	**35.1**
Copper	390	390	**74.2**	**73.2**	**56.0**	**44.7**	**48.8**	**58.1**	**59.1**	**77.9**
Lead	450	530	**38.6**	**34.5**	**27.7**	**30.7**	**26.3**	**25.1**	**47.1**	**49.0**
Mercury	0.41	0.59	**0.31**	**0.17**	**0.12**	**0.12**	**0.11**	**0.10**	**0.14**	**0.25**
Silver	6.1	6.1	0.47 U	0.45 U	**0.76 J**	**0.40 J**	0.35 U	0.30 U	**0.45 J**	**0.61 J**
Zinc	410	960	**152**	**140**	**83.9**	**76.4**	**91.3**	**95.9**	**101**	**128**
PCBs (mg/kg-OC)										
Total PCBs	12	65	**6.27**	**7.38**	**40.3**	**39.2**	**11.4**	**9.13**	**37.6**	**24.4**
LPAH (mg/kg-OC)										
2-Methylnaphthalene	38	64	**0.38 J**	**1.61**	**0.38 J**	0.36 U	**0.46 J**	**0.37 J**	**0.58 J**	**0.35 J**
Acenaphthylene	66	66	0.20 UJ	**0.41 J**	0.29 U	0.36 U	**0.89**	**0.47 J**	**0.67 J**	**0.53**
Acenaphthene	16	57	**0.53 J**	**6.61**	**0.52 J**	**0.38 J**	**0.64**	**0.70**	**0.89**	**0.52**
Anthracene	220	1200	**2.65 J**	**4.45**	**1.87**	**1.49**	**2.57**	**2.81**	**3.70**	**4.49**
Fluorene	23	79	**0.86 J**	**4.97**	**0.84**	**0.60 J**	**1.50**	**1.14**	**1.23**	**1.21**
Naphthalene	99	170	**0.39 J**	**0.68**	**0.40 J**	0.36 U	**0.96**	**0.58**	**0.65 J**	**0.33 J**
Phenanthrene	100	480	**6.02 J**	**24.8 J**	**5.42 J**	**3.75 J**	**12.8 J**	**9.12 J**	**10.5 J**	**8.31 J**
Total LPAHs	370	780	**10.5**	**42.0**	**9.06**	**6.22**	**19.4**	**14.8**	**17.6**	**15.4**
HPAH (mg/kg-OC)										
Benzo(a)anthracene	110	270	**11.0 J**	**20.1 J**	**7.32 J**	**7.02 J**	**10.9 J**	**6.65 J**	**13.3 J**	**13.9 J**
Benzo(a)pyrene	99	210	**5.61 J**	**18.4**	**5.84**	**5.85**	**9.94**	**10.2**	**14.5**	**13.1**
Benzo(g,h,i)perylene	31	78	**5.18 J**	**5.27**	**3.73**	**3.96**	**6.08**	**6.41**	**9.47**	**7.76**
Chrysene	110	460	**10.3 J**	**13.4 J**	**7.32 J**	**6.85 J**	**13.4 J**	**14.8 J**	**17.9 J**	**18.2 J**
Dibenzo(a,h)anthracene	12	33	**1.31 J**	**1.38**	**1.17**	**1.25**	**1.57**	**1.89**	**2.40**	**2.79**
Fluoranthene	160	1200	**19.7 J**	**56.7**	**13.7**	**10.2**	**31.5**	**23.7**	**26.4**	**22.0**
Indeno(1,2,3-Cd)Pyrene	34	88	**4.74 J**	**5.33**	**3.83**	**3.91**	**6.22**	**6.00**	**9.07**	**7.87**
Total Benzofluoranthenes	230	450	**17.8**	**23.5**	**14.8**	**14.3**	**24.3**	**22.1**	**34.2**	**35.2**
Pyrene	1000	1400	**17.3 J**	**37.0**	**12.5**	**13.0**	**24.6**	**20.7**	**30.6**	**22.5**
Total HPAHs	960	5300	**92.9**	**181**	**70.2**	**66.3**	**128**	**112**	**158**	**143**

Appendix D1-6. Long Term Monitoring Chemistry Comparison to SMS - 2007 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Perimeter Area DUD_1C	DUD_2C	DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C	DUD_13C
Chlorobenzenes (mg/kg-OC)										
1,2-Dichlorobenzene	2.3	2.3	0.02 UJ	0.02 U	0.03 U	0.04 U	0.03 U	0.02 U	0.04 U	0.02 U
1,2,4-Trichlorobenzene	0.81	1.8	0.01 UJ	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.02 U	0.01 U
1,4-Dichlorobenzene	3.1	9	0.02 UJ	**0.08**	**0.16**	**0.14**	0.03 U	**0.51**	**0.42**	**0.09**
Hexachlorobenzene	0.38	2.3	0.01 UJ	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.02 U	0.01 U
Phthalates (mg/kg-OC)										
Bis(2-Ethylhexyl)Phthalate	47	78	**61.5 J**	**37.7**	**23.6**	**19.6**	**21.2**	**42.9**	**56.9**	**22.5**
Benzyl Butyl Phthalate	4.9	64	**2.64 J**	**4.95**	**2.18**	**2.78**	**2.26**	**7.13**	**4.66**	**2.07**
Diethylphthalate	61	110	0.40 UJ	0.42 UJ	0.57 UJ	0.73 UJ	0.59 UJ	0.49 UJ	0.70 UJ	0.48 UJ
Dimethylphthalate	53	53	0.40 UJ	**0.58 J**	0.57 U	0.73 U	0.59 U	0.49 U	0.70 U	0.48 U
Di-N-Butylphthalate	220	1700	**1.12 J**	0.42 U	**0.80 J**	0.73 U	**2.42**	**3.05**	**3.73**	**1.00**
Di-N-Octylphthalate	58	4500	**1.58 J**	0.42 U	0.57 U	0.73 U	0.59 U	0.49 U	0.70 U	0.48 U
Ionic Organics (ug/kg dw)										
2-Methylphenol	63	63	4.68 UJ	4.54 U	3.13 U	2.88 U	3.48 U	2.95 U	2.88 U	3.62 U
4-Methylphenol	670	670	9.37 UJ	9.07 U	6.26 U	5.76 U	6.97 U	5.91 U	5.76 U	7.23 U
2,4-Dimethylphenol	29	29	2.34 UJ	2.27 UJ	1.56 UJ	1.44 UJ	1.74 UJ	1.48 UJ	1.44 UJ	1.81 UJ
Benzyl Alcohol	57	73	4.68 UJ	4.54 U	3.13 U	2.88 U	3.48 U	2.95 U	2.88 U	3.62 U
Benzoic Acid	650	650	**123**	**131**	**74.9**	**65.4**	**78.9**	**86.1**	**94.4**	**92.9**
Pentachlorophenol	360	690	23.4 UJ	22.7 UJ	15.6 UJ	14.4 UJ	17.4 UJ	14.8 UJ	14.4 UJ	18.1 UJ
Phenol	420	1200	9.37 UJ	9.07 U	6.26 U	5.76 U	6.97 U	5.91 U	5.76 U	7.23 U
Miscellaneous (mg/kg-OC)										
Dibenzofuran	15	58	**0.52**	**3.80**	0.47	**0.36**	**0.77**	**0.59**	**0.73**	**0.51**
Hexachlorobutadiene	3.9	6.2	0.05 UJ	0.05 U	0.07 U	0.09 U	0.07 U	0.06 U	0.09 U	0.06 U
N-Nitroso-di-phenylamine	11	11	0.40 UJ	0.42 U	0.57 U	0.73 U	0.59 U	0.49 U	0.70 U	0.48 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-7. Long Term Monitoring Chemistry Comparison to SMS - 2008 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Cap Area A DUD_1A	DUD_2A	DUD_3A	DUD_4A	DUD_5A Average	Cap Area B DUD_1B	DUD_2B	DUD_3B
Conventionals (%)										
Total Solids			77.1	41.4	47.4	63.8	81.7	57.5	44.7	44.8
Total Organic Carbon			*0.36*	3.60	2.17	1.45	*0.13*	1.47	2.14	2.28
Metals (mg/kg dw)										
Arsenic	57	93	3.37 J	16.4	13.7	7.37 J	2.39 J	9.22 J	13.4 J	13.2 J
Cadmium	5.1	6.7	0.56 J	0.70 J	0.49 J	0.42 J	0.12 U	0.33 J	0.47 J	0.42 J
Chromium	260	270	22.4	36.0	31.2	30.7	23.9	29.2	31.5	31.3
Copper	390	390	31.8	98.3	77.8	56.0	47.7	63.8	85.2	75.7
Lead	450	530	37.2	66.9	43.2	36.1	5.38	33.0	45.4	40.8
Mercury	0.41	0.59	0.03 J	0.21	0.19 J	0.12	0.02 J	0.32	0.17	0.24
Silver	6.1	6.1	0.26 U	0.48 U	0.42 U	0.31 U	0.24	0.35 U	0.45 U	0.45 U
Zinc	410	960	153	211	153	135	40.2	106	152	146
PCBs (mg/kg-OC)										
Total PCBs	12	65	*7.71*	3.87	4.32	5.26	*5.83*	11.2	5.39	5.72
LPAH (mg/kg-OC)										
2-Methylnaphthalene	38	64	*3.24*	0.29	0.47	0.59	*1.92 U*	0.34 J	0.37 J	0.32 J
Acenaphthylene	66	66	*0.73 U*	0.35	0.41	0.36 J	*1.92 U*	0.62	0.27 J	0.55
Acenaphthene	16	57	*1.98*	0.45	0.71	1.43	*1.96 J*	0.75	0.46	0.54
Anthracene	220	1200	*3.04*	2.34	3.73	10.3	*4.73 J*	4.39	3.23	3.04
Fluorene	23	79	*2.71*	0.89	1.20	3.37	*4.04 J*	1.43	2.12	1.01
Naphthalene	99	170	*0.88 J*	0.52	0.41	3.44	*1.92 U*	0.52	0.38 J	0.36 J
Phenanthrene	100	480	*18.3*	5.40	7.16	26.0	*17.1*	8.67	5.60	5.87
Total LPAHs	370	780	*26.9*	9.96	13.6	44.9	*26.8*	16.4	12.1	11.4
HPAH (mg/kg-OC)										
Benzo(a)anthracene	110	270	*10.5*	7.25	7.89	21.4	*12.2*	9.30	7.28	8.16
Benzo(a)pyrene	99	210	*12.5*	7.32	8.54	19.6	*15.1*	10.6	7.80	8.38
Benzo(g,h,i)perylene	31	78	*9.53*	4.95	5.61	14.1	*6.7*	6.07	5.17	5.53
Chrysene	110	460	*17.7*	10.8	11.8	24.4	*19.5*	15.6	11.0	12.2
Dibenzo(a,h)anthracene	12	33	*4.01*	2.17	2.78	6.54	*2.1 J*	2.31	1.93	2.58
Fluoranthene	160	1200	*29.3*	14.6	14.7	38.5	*26.3*	16.6	12.5	13.4
Indeno(1,2,3-Cd)Pyrene	34	88	*9.05*	5.07	6.17	13.7	*8.28*	6.00	5.01	5.43
Total Benzofluoranthenes	230	450	*22.5*	17.3	19.8	42.3	*29.9*	25.6	20.7	21.7
Pyrene	1000	1400	*30.5*	17.2	15.6	41.4	*29.5*	17.6	13.2	13.7
Total HPAHs	960	5300	*146*	86.7	92.9	222	*108*	110	84.5	91.1

Appendix D1-7. Long Term Monitoring Chemistry Comparison to SMS - 2008 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Cap Area A DUD_1A	DUD_2A	DUD_3A	DUD_4A	DUD_5A Average	Cap Area B DUD_1B	DUD_2B	DUD_3B
Chlorobenzenes (mg/kg-OC)										
1,2-Dichlorobenzene	2.3	2.3	*0.07 U*	0.01 U	0.02 U	0.02 U	*0.19 U*	**0.16**	0.02 U	0.02 U
1,2,4-Trichlorobenzene	0.81	1.8	*0.04 U*	0.01 U	0.01 U	0.01 U	*0.10 U*	0.01 U	0.01 U	0.01 U
1,4-Dichlorobenzene	3.1	9	***179***	**0.08**	**0.32**	**0.69**	***0.95***	**0.14**	**0.11**	**0.12**
Hexachlorobenzene	0.38	2.3	*0.04 U*	0.01 U	0.01 U	0.01 U	*0.10 U*	0.01 U	0.01 U	0.01 U
Phthalates (mg/kg-OC)										
Bis(2-Ethylhexyl)Phthalate	47	78	***203***	**52.1**	**50.8**	**76.5**	*56.8 U*	**28.3**	**33.0**	**43.5**
Benzyl Butyl Phthalate	4.9	64	***34.5***	4.11 U	2.96 U	**10.4**	***10.4***	**3.28**	**3.63**	**2.70**
Diethylphthalate	61	110	*1.46 U*	0.27 U	0.39 U	0.43 U	*4.17 J*	0.55 J	0.42 U	0.39 U
Dimethylphthalate	53	53	***82.5***	0.27 U	**0.93**	**4.91**	***9.09***	0.47 U	**4.23**	**0.92**
Di-N-Butylphthalate	220	1700	***99.6***	**1.91 U**	**0.81 U**	**1.33**	***4.30 J***	**0.93 J**	**1.16**	**1.41**
Di-N-Octylphthalate	58	4500	*1.46 U*	0.27 U	0.39 U	0.43 U	*3.85 U*	0.47 U	0.42 U	0.39 U
Ionic Organics (ug/kg dw)										
2-Methylphenol	63	63	2.59 U	4.83 U	4.22 U	3.13 U	2.45 U	3.48 U	4.47 U	4.46 U
4-Methylphenol	670	670	5.19 U	9.66 U	8.44 U	**34.5**	4.90 U	**44.9**	**69.8**	**51.8**
2,4-Dimethylphenol	29	29	1.30 U	2.42 U	2.11 U	1.57 UJ	1.22 UJ	1.74 U	2.24 UJ	2.23 UJ
Benzyl Alcohol	57	73	2.59 U	4.83 U	4.22 U	3.13 U	2.45 U	3.48 U	4.47 U	4.46 U
Benzoic Acid	650	650	171 U	365 U	338 U	**318**	**152**	**289**	**331**	**299**
Pentachlorophenol	360	690	13.0 U	24.2 U	21.1 U	15.7 U	12.2 U	17.4 U	22.4 U	22.3 U
Phenol	420	1200	5.19 U	9.66 U	8.44 U	190	**84.0**	**400**	**436**	**413**
Miscellaneous (mg/kg-OC)										
Dibenzofuran	15	58	***1.24 J***	**0.42**	**0.70**	**0.91**	*1.92 U*	**0.66**	**0.58**	**0.50**
Hexachlorobutadiene	3.9	6.2	*0.18 U*	0.03 U	0.05 U	0.05 U	*0.48 U*	0.06 U	0.05 U	0.05 U
N-Nitroso-di-phenylamine	11	11	*1.46 U*	0.27 U	0.39 U	0.43 U	*3.85 U*	0.47 U	0.42 U	0.39 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darklylyly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-7. Long Term Monitoring Chemistry Comparison to SMS - 2008 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	ENR Area DUD_3C	DUD_4C Average	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
Conventionals (%)									
Total Solids			**63.2**	**80.7**	**74.5**	**82.7**	**60.9**	**62.3**	**65.1**
Total Organic Carbon			**1.30**	***0.43***	**0.52**	***0.28***	**1.16**	**1.31**	**1.07**
Metals (mg/kg dw)									
Arsenic	57	93	**9.02 J**	**4.53 J**	**4.70 J**	**3.14 J**	**8.37 J**	**9.15 J**	**9.06 J**
Cadmium	5.1	6.7	**0.30 J**	**0.19 J**	**0.16 J**	0.12 U	**0.28 J**	**0.34 J**	**0.23 J**
Chromium	260	270	**23.9**	**16.7**	**18.7**	**11.7**	**23.6**	**23.3**	**22.6**
Copper	390	390	**52.2**	**33.2**	**38.5**	**26.1**	**46.8**	**53.3**	**48.2**
Lead	450	530	**31.3**	**11.2**	**10.8**	**6.53**	**25.8**	**28.7**	**26.4**
Mercury	0.41	0.59	**0.12**	**0.05 J**	**0.05 J**	**0.14**	**0.10**	**0.12**	**0.12**
Silver	6.1	6.1	0.32 U	0.25 U	0.27 U	0.24 U	0.33 U	0.32 U	0.31 U
Zinc	410	960	**91.3**	**47.2**	**54.5**	**36.2**	**88.5**	**97.1**	**86.0**
PCBs (mg/kg-OC)									
Total PCBs	12	65	**10.8**	***8.00***	**7.46**	***5.00***	**4.93**	**9.78**	**6.49**
LPAH (mg/kg-OC)									
2-Methylnaphthalene	38	64	0.24 U	*0.58 U*	0.51 U	*0.86 U*	0.28 U	0.25 U	0.29 U
Acenaphthylene	66	66	**0.47 J**	***0.67 J***	**0.87 J**	*0.86 U*	0.28 U	**0.59**	**0.46 J**
Acenaphthene	16	57	**0.44 J**	*0.58 U*	**0.72 J**	*0.86 U*	**0.34 J**	**0.52**	**0.79**
Anthracene	220	1200	**2.87**	***3.91***	**4.83**	***2.78***	**1.58**	**3.96**	**3.42**
Fluorene	23	79	**0.97**	***1.62***	**1.91**	***1.94***	**0.74**	**1.22**	**1.38**
Naphthalene	99	170	**0.35 J**	*0.58 U*	0.51 U	*0.86 U*	0.28 U	**0.36 J**	**0.44 J**
Phenanthrene	100	480	**5.57**	***6.06***	**8.84**	***5.56***	**2.73**	**6.88**	**8.44**
Total LPAHs	370	780	**10.7**	***12.3***	**17.2**	***10.3***	**5.38**	**13.5**	**14.9**
HPAH (mg/kg-OC)									
Benzo(a)anthracene	110	270	**6.73**	***8.29***	**9.92**	***5.47***	**4.04**	**9.69**	**8.65**
Benzo(a)pyrene	99	210	**7.68**	***10.1***	**11.1**	***7.28***	**4.24**	**10.4**	**9.8**
Benzo(g,h,i)perylene	31	78	**3.58**	***4.40***	**4.76**	***2.96***	**1.61**	**4.45**	**3.87**
Chrysene	110	460	**10.9**	***13.7***	**15.7**	***11.9***	**6.50**	**15.0**	**13.8**
Dibenzo(a,h)anthracene	12	33	**1.72**	***1.34***	**1.45**	*0.86 U*	**0.30 J**	**2.52**	**2.29**
Fluoranthene	160	1200	**13.1**	***14.4***	**19.7**	***14.2***	**6.54**	**15.7**	**16.3**
Indeno(1,2,3-Cd)Pyrene	34	88	**4.17**	***5.27***	**5.66**	***3.95***	**2.09**	**5.41**	**5.09**
Total Benzofluoranthenes	230	450	**19.0**	***24.3***	**27.0**	***17.5***	**9.11**	**26.0**	**24.2**
Pyrene	1000	1400	**12.2**	***14.3***	**16.3**	***13.6***	**6.16**	**14.6**	**18.3**
Total HPAHs	960	5300	**79.0**	***96.0***	**112**	***76.9***	**40.6**	**104**	**102**

Appendix D1-7. Long Term Monitoring Chemistry Comparison to SMS - 2008 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	ENR Area DUD_3C	DUD_4C Average	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
Chlorobenzenes (mg/kg-OC)									
1,2-Dichlorobenzene	2.3	2.3	0.02 U	*0.06 U*	0.05 U	*0.09 U*	0.03 U	0.02 U	0.03 U
1,2,4-Trichlorobenzene	0.81	1.8	**0.02 J**	*0.03 U*	0.03 U	*0.04 U*	0.01 U	0.01 U	0.01 U
1,4-Dichlorobenzene	3.1	9	**0.07**	***0.08 J***	**0.10 J**	*0.09 U*	**0.04 J**	**0.06**	**0.07**
Hexachlorobenzene	0.38	2.3	0.01 U	*0.03 U*	0.03 U	*0.04 U*	0.01 U	0.01 U	0.01 U
Phthalates (mg/kg-OC)									
Bis(2-Ethylhexyl)Phthalate	47	78	**15.7**	***27.8***	24.8 U	*23.4 U*	8.95 U	**17.0**	**22.1**
Benzyl Butyl Phthalate	4.9	64	2.29 U	*3.43 U*	3.01 U	*4.96 U*	1.77 U	2.32 U	2.09 U
Diethylphthalate	61	110	**0.64 J**	***1.44 J***	**1.23 J**	*1.72 U*	**0.68 J**	0.49 U	**0.76 J**
Dimethylphthalate	53	53	**1.17**	***1.89***	1.03 U	*1.72 U*	0.56 U	1.09	0.57 U
Di-N-Butylphthalate	220	1700	1.16 U	*1.53 U*	2.20 U	*1.81 U*	0.88 U	1.05 U	0.97 U
Di-N-Octylphthalate	58	4500	0.49 U	*1.17 U*	**5.94**	*1.72 U*	0.56 U	0.49 U	0.57 U
Ionic Organics (ug/kg dw)									
2-Methylphenol	63	63	3.16 U	2.48 U	2.68 U	2.42 U	3.28 U	3.21 U	3.07 U
4-Methylphenol	670	670	6.33 U	4.96 U	5.37 U	4.84 U	6.57 U	6.42 U	6.14 U
2,4-Dimethylphenol	29	29	1.58 U	1.24 U	1.34 U	1.21 U	1.64 U	1.61 U	1.54 U
Benzyl Alcohol	57	73	3.16 U	2.48 U	2.68 U	2.42 U	3.28 U	3.21 U	3.07 U
Benzoic Acid	650	650	275 U	50.5 U	200 U	145 U	192 U	238 U	192 U
Pentachlorophenol	360	690	15.8 U	12.4 U	13.4 U	12.1 U	16.4 U	16.1 U	15.36 U
Phenol	420	1200	**69.8**	**41.2 E**	**33.8**	**28.7**	**14.1**	**62.3**	**29.0**
Miscellaneous (mg/kg-OC)									
Dibenzofuran	15	58	**0.40 J**	*0.58 U*	**1.09**	*0.86 U*	**0.35 J**	**0.47 J**	**0.57**
Hexachlorobutadiene	3.9	6.2	0.06 U	*0.15 U*	0.13 U	*0.22 U*	0.07 U	0.06 U	0.07 U
N-Nitroso-di-phenylamine	11	11	0.49 U	*1.17 U*	1.03 U	*1.72 U*	0.56 U	0.49 U	0.57 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darklylyly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
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LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

E = Exceeds Calibrated Linear Range, See Dilution Data
dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-7. Long Term Monitoring Chemistry Comparison to SMS - 2008 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Perimeter Area DUD_1C	DUD_2C	DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C	DUD_13C
Conventionals (%)										
Total Solids			44.6	45.6	74.6	72.1	65.7	72.8	64.9	56.4
Total Organic Carbon			2.89	2.41	*0.42*	0.67	0.93	0.67	1.26	1.71
Metals (mg/kg dw)										
Arsenic	57	93	15.2	14.6	5.43 J	6.24 J	9.62	5.49 J	11.96	9.93 J
Cadmium	5.1	6.7	0.70 J	0.53 J	0.32 J	0.43 J	0.44 J	0.21 J	0.74 J	0.53 J
Chromium	260	270	35.9	34.2	22.9	21.6	25.6	21.2	32.7	30.9
Copper	390	390	91.3	82.5	52.8	52.1	49.3	49.7	71.3	71.8
Lead	450	530	60.1	50.7	22.2	39.1	43.5	19.8	94.9	47.2
Mercury	0.41	0.59	0.21	0.18	0.06 J	0.08	0.13	0.07	0.19	0.20
Silver	6.1	6.1	0.49 J	0.48 J	0.27 J	0.36 J	0.30 U	0.27 U	0.51 J	0.44 J
Zinc	410	960	199	168	62.5	74.8	107	74.0	147	129
PCBs (mg/kg-OC)										
Total PCBs	12	65	9.09	5.86	*67.2*	41.9	17.2	8.99	19.5	14.0
LPAH (mg/kg-OC)										
2-Methylnaphthalene	38	64	0.41	1.90	*1.04 J*	0.76 J	0.73	0.70 J	0.81	0.37 J
Acenaphthylene	66	66	0.41	0.82	*0.67 J*	0.62 J	0.41 J	0.58 J	0.59	0.43
Acenaphthene	16	57	0.61	4.39	*1.53 J*	0.74 J	0.57 J	0.52 J	0.81	0.53
Anthracene	220	1200	2.80	6.87	*6.20*	3.73	4.43	4.17	4.49	3.50
Fluorene	23	79	1.81	5.38	*4.56*	4.02	3.12	3.78	2.86	2.32
Naphthalene	99	170	0.34	0.54	*0.74 J*	0.60 J	0.33 U	0.41 U	0.78	0.28 J
Phenanthrene	100	480	8.14	27.5	*14.5*	6.76	7.19	9.88	11.9	6.0
Total LPAHs	370	780	14.1	45.5	*28.2*	16.5	15.7	18.9	21.4	13.0
HPAH (mg/kg-OC)										
Benzo(a)anthracene	110	270	11.2	29.0 J	*12.6*	7.75	9.16	13.7	12.9	9.01
Benzo(a)pyrene	99	210	9.15	15.9	*13.6*	10.6	11.7	13.8	15.4	9.65
Benzo(g,h,i)perylene	31	78	6.02	6.73	*7.55*	5.86	6.90	8.12	9.66	5.22
Chrysene	110	460	15.7	31.1	*18.3*	13.0	13.9	17.7	16.6	13.7
Dibenzo(a,h)anthracene	12	33	3.33	4.13	*2.42*	2.33	2.79	3.10	4.87	2.28
Fluoranthene	160	1200	18.5	65.4 J	*23.4*	11.6	14.4	22.5	20.2	12.3
Indeno(1,2,3-Cd)Pyrene	34	88	6.65	8.65	*8.56*	6.58	7.50	9.01	10.4	6.16
Total Benzofluoranthenes	230	450	22.9	42.0	*32.2*	23.6	26.8	32.4	34.0	22.4
Pyrene	1000	1400	31.5 J	88.5 J	*36.9*	24.3	24.3	31.0	45.2	18.9
Total HPAHs	960	5300	125	285	*156*	106	117	151	169	99.6

Appendix D1-7. Long Term Monitoring Chemistry Comparison to SMS - 2008 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Perimeter Area DUD_1C	DUD_2C	DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C	DUD_13C
Chlorobenzenes (mg/kg-OC)										
1,2-Dichlorobenzene	2.3	2.3	0.02 U	0.02 U	***0.10 J***	**0.12**	0.03 U	0.04 U	0.02 U	**0.03 J**
1,2,4-Trichlorobenzene	0.81	1.8	0.01 U	0.01 U	*0.03 U*	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U
1,4-Dichlorobenzene	3.1	9	**0.08**	**0.07 J**	***0.15***	**0.48**	**0.39**	**0.22**	**0.46**	**0.08**
Hexachlorobenzene	0.38	2.3	0.01 U	0.01 U	*0.03 U*	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U
Phthalates (mg/kg-OC)										
Bis(2-Ethylhexyl)Phthalate	47	78	**80.6 J**	**65.6**	***92.8***	**58.4**	**35.5**	**84.1**	**76.1**	**28.2**
Benzyl Butyl Phthalate	4.9	64	**6.04**	5.32 U	*6.07 U*	3.73 U	4.76 U	11.10 U	7.59 U	3.37 U
Diethylphthalate	61	110	0.31 U	0.36 U	*1.32 U*	0.82 U	0.66 U	0.83 U	0.49 U	0.41 U
Dimethylphthalate	53	53	0.31 U	0.36 U	***2.76***	0.82 U	0.66 U	0.83 U	0.49 U	**4.54**
Di-N-Butylphthalate	220	1700	1.81 U	1.49 U	*3.00 U*	**196**	1.38 U	2.23 U	1.58 U	1.27 U
Di-N-Octylphthalate	58	4500	0.31 U	0.36 U	*1.32 U*	0.82 U	0.66 U	0.83 U	0.49 U	0.41 U
Ionic Organics (ug/kg dw)										
2-Methylphenol	63	63	4.48 U	4.39 U	2.68 U	2.77 U	3.04 U	2.75 U	3.08 U	3.55 U
4-Methylphenol	670	670	8.97 U	8.77 U	5.36 U	5.55 U	6.09 U	5.49 U	6.16 U	7.09 U
2,4-Dimethylphenol	29	29	2.24 U	2.19 U	1.34 U	1.39 U	1.52 U	1.37 U	1.54 U	1.77 U
Benzyl Alcohol	57	73	4.48 U	4.39 U	2.68 U	2.77 U	3.04 U	2.75 U	3.08 U	3.55 U
Benzoic Acid	650	650	661 U	**1287**	237 U	239 U	286 U	217 U	260 U	264 U
Pentachlorophenol	360	690	22.4 U	21.9 U	13.4 U	13.9 U	15.2 U	13.7 U	15.4 U	17.7 U
Phenol	420	1200	**83.4**	**43.4 J**	5.36 UJ	5.55 U	6.09 U	5.49 U	**70.7**	**24.1**
Miscellaneous (mg/kg-OC)										
Dibenzofuran	15	58	**0.50**	**2.9**	***1.43 J***	**0.64 J**	**0.56 J**	**0.70 J**	**0.61**	**0.44**
Hexachlorobutadiene	3.9	6.2	0.039 U	0.045 U	*0.165 U*	0.103 U	0.082 U	0.103 U	0.06 U	0.052 U
N-Nitroso-di-phenylamine	11	11	0.31 U	0.36 U	*1.32 U*	0.82 U	0.66 U	0.83 U	0.49 U	0.41 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darklylyly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-8 Long Term Monitoring Chemistry Comparison to SMS - 2009 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Cap Area A DUD_1A	DUD_2A	DUD_3A	DUD_4A	DUD_5A Average	Cap Area B DUD_1B	DUD_2B	DUD_3B
Conventionals (%)										
Total Solids			**76.1**	**41.9**	**48.6**	**60.3**	**82.2**	**46.4**	**40.9**	**40.9**
Total Organic Carbon			**1.63**	**2.83**	**1.92**	**1.57**	**0.19**	**1.83**	**1.80**	**1.77**
Metals (mg/kg dw)										
Arsenic	57	93	**6.58 J**	**14.0 J**	**11.8 J**	**7.67 J**	**3.04 J**	**11.5 J**	**12.4 J**	**12.0 J**
Cadmium	5.1	6.7	**0.68**	**0.69 J**	**0.47 J**	**0.37 J**	0.14 U	**0.46 J**	**0.44 J**	**0.41 J**
Chromium	260	270	**---**	**33.3**	**29.6**	**27.7**	**16.2**	**29.1**	**32.0**	**28.5**
Copper	390	390	**46.8**	**78.6**	**72.0**	**71.0**	**37.0**	**61.3**	**62.2**	**55.9**
Lead	450	530	**43.8 J**	**35.5**	**30.8**	**22.7**	**5.51 J**	**22.8**	**20.9**	**15.7**
Mercury	0.41	0.59	**0.06**	**0.19**	**0.21**	**0.11**	**0.02 J**	**0.17**	**0.16**	**0.13**
Silver	6.1	6.1	0.25 U	0.48 U	0.41 U	0.53 J	0.27 U	0.43 U	0.51 U	0.46 U
Zinc	410	960	**164**	**148**	**119**	**95.3**	**36.5**	**97.6**	**101**	**90.5**
PCBs (mg/kg-OC)										
Total PCBs	12	65	**3.49**	**3.62**	**4.39**	**3.37**	**5.52**	**3.19**	**2.47**	**1.23**
LPAH (mg/kg-OC)										
2-Methylnaphthalene	38	64	**1.02**	**0.30 J**	**0.44**	**0.37 J**	***1.64 J***	**0.29 J**	**0.32 J**	**0.68**
Acenaphthylene	66	66	0.16 U	0.17 U	**0.43**	**0.30 J**	*1.32 U*	**0.32 J**	0.27 U	0.28 U
Acenaphthene	16	57	**2.52**	**0.48**	**0.41 J**	**0.58**	***4.19***	**0.25 J**	**0.28 J**	**0.41 J**
Anthracene	220	1200	**5.78**	**1.75**	**3.29**	**4.50**	***11.3 J***	**1.91**	**1.84**	**1.13**
Fluorene	23	79	**2.38**	**0.62**	**0.93**	**0.98**	***4.24 J***	**0.64**	**0.68**	**0.74**
Naphthalene	99	170	**11.6**	**1.77**	**0.86**	**4.19**	*1.32 U*	0.24 U	**0.42 J**	**0.41 J**
Phenanthrene	100	480	**29.5 J**	**3.84**	**5.43**	**8.40**	***37.0***	**3.37**	**3.38**	**4.60**
Total LPAHs	370	780	**51.8**	**8.46**	**11.3**	**19.0**	***56.0***	**6.49**	**6.60**	**7.30**
HPAH (mg/kg-OC)										
Benzo(a)anthracene	110	270	**19.0**	**5.72**	**8.77**	**10.1**	***23.4***	**4.82**	**5.28**	**2.79**
Benzo(a)pyrene	99	210	**16.0**	**4.87**	**8.40**	**8.79**	***20.4***	**4.41**	**4.83**	**2.82**
Benzo(g,h,i)perylene	31	78	**12.8**	**3.41**	**5.68**	**6.33**	***11.2***	**2.91**	**3.17**	**1.75**
Chrysene	110	460	**19.3**	**7.11**	**10.5**	**12.1**	***25.1***	**6.73**	**7.04**	**3.96**
Dibenzo(a,h)anthracene	12	33	**5.74**	**1.45**	**2.21**	**2.39**	***4.91 J***	**1.14**	**1.28**	**0.71**
Fluoranthene	160	1200	**44.2 J**	**10.3**	**14.0**	**19.7**	***54.7***	**9.67**	**9.69**	**7.53**
Indeno(1,2,3-Cd)Pyrene	34	88	**11.6**	**2.93**	**5.49**	**5.49**	***11.3***	**2.71**	**2.95**	**1.69**
Total Benzofluoranthenes	230	450	**34.0**	**12.8**	**20.4**	**20.0**	***43.0***	**11.7**	**12.0**	**7.68**
Pyrene	1000	1400	**58.4 J**	**10.6**	**15.5**	**21.2**	***51.9***	**9.50**	**9.45**	**7.11**
Total HPAHs	960	5300	**221**	**59.2**	**91.0**	**106**	***246***	**53.6**	**55.6**	**36.0**

Appendix D1-8 Long Term Monitoring Chemistry Comparison to SMS - 2009 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Cap Area A DUD_1A	DUD_2A	DUD_3A	DUD_4A	DUD_5A Average	Cap Area B DUD_1B	DUD_2B	DUD_3B
Chlorobenzenes (mg/kg-OC)										
1,2-Dichlorobenzene	2.3	2.3	0.02 U	0.02 U	0.02 U	0.02 U	*0.13 U*	0.02 U	0.03 U	0.03 U
1,2,4-Trichlorobenzene	0.81	1.8	0.01 U	0.01 U	0.01 U	0.01 U	*0.07 U*	0.01 U	0.01 U	0.01 U
1,4-Dichlorobenzene	3.1	9	**0.69**	0.02 U	**0.15**	**0.23**	*0.13 U*	0.02 U	0.03 U	0.03 U
Hexachlorobenzene	0.38	2.3	0.01 U	0.01 U	0.01 U	0.01 U	*0.07 U*	0.01 U	0.01 U	0.01 U
Phthalates (mg/kg-OC)										
Bis(2-Ethylhexyl)Phthalate	47	78	**53.8 J**	**34.3**	**27.1**	**39.6**	*29.7 U*	**14.9**	**16.6**	**17.1**
Benzyl Butyl Phthalate	4.9	64	0.08 U	3.18 U	1.94 U	2.71 U	*5.30 U*	1.38 U	2.11 U	2.38 U
Diethylphthalate	61	110	0.32 U	0.34 U	0.42 U	0.42 U	*2.64 U*	0.48 U	0.54 U	0.55 U
Dimethylphthalate	53	53	0.32 U	0.34 U	0.42 U	**3.27**	*2.64 U*	0.48 U	0.54 U	0.55 U
Di-N-Butylphthalate	220	1700	1.93 UJ	1.19 U	2.22 U	1.65 U	*7.02 U*	1.56 U	1.71 U	2.00 U
Di-N-Octylphthalate	58	4500	**50.4**	0.34 U	0.42 U	0.42 U	*2.64 U*	0.48 U	0.54 U	0.55 U
Ionic Organics (ug/kg dw)										
2-Methylphenol	63	63	2.63 UJ	4.76 UJ	4.08 UJ	3.33 UJ	2.43 UJ	4.35 UJ	4.88 UJ	4.88 UJ
4-Methylphenol	670	670	5.26 UJ	9.52 UJ	8.16 UJ	6.67 UJ	4.85 UJ	8.70 UJ	9.76 UJ	9.76 UJ
2,4-Dimethylphenol	29	29	1.32 U	2.38 U	2.04 U	1.67 U	1.21 U	2.17 U	2.44 U	2.44 U
Benzyl Alcohol	57	73	2.63 UJ	4.76 UJ	4.08 UJ	3.33 UJ	2.43 UJ	4.35 UJ	4.88 UJ	4.88 UJ
Benzoic Acid	650	650	13.2 UJ	**345**	**318**	**193**	**101**	**184**	**249**	**320**
Pentachlorophenol	360	690	13.2 U	23.8 U	20.4 U	16.7 U	12.1 U	21.7 U	24.4 U	24.4 U
Phenol	420	1200	5.26 U	9.52 U	**150**	**32.7**	**37.1**	8.70 U	9.76 U	9.76 U
Miscellaneous (mg/kg-OC)										
Dibenzofuran	15	58	**1.83**	**0.38**	**0.53**	**0.49**	*2.57 UJ*	**0.32 J**	**0.35 J**	**0.54 J**
Hexachlorobutadiene	3.9	6.2	0.04 U	0.04 U	0.05 U	0.05 U	*0.33 U*	0.06 U	0.07 U	0.07 U
N-Nitroso-di-phenylamine	11	11	0.32 U	0.34 U	0.42 U	0.42 U	*2.64 U*	0.48 U	0.54 U	0.55 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-8 Long Term Monitoring Chemistry Comparison to SMS - 2009 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	ENR Area DUD_3C	DUD_4C Average	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
Conventionals (%)									
Total Solids			**55.4**	**76.6**	**57**	**77.4**	**47.4**	**50.8**	**46.6**
Total Organic Carbon			**1.61**	**0.63**	**1.24**	**0.57**	**1.71**	**1.74**	**1.61**
Metals (mg/kg dw)									
Arsenic	57	93	**9.64 J**	**4.19 J**	**7.19 J**	**4.42 J**	**10.6 J**	**10.6 J**	**10.0 J**
Cadmium	5.1	6.7	**0.42 J**	**0.16 J**	**0.25 J**	**0.16 J**	**0.32 J**	**0.39 J**	**0.30 J**
Chromium	260	270	**27.6**	**17.1**	**23.5**	**16.5**	**27.7**	**28.0**	**27.7**
Copper	390	390	**66.5**	**38.8**	**39.1**	**29.4**	**48.9**	**61.6**	**48.5**
Lead	450	530	**29.3**	**9.70**	**10.7**	**7.94**	**14.2**	**27.1**	**13.8**
Mercury	0.41	0.59	**0.18**	**0.07**	**0.10**	**0.07**	**0.13**	**0.20**	**0.13**
Silver	6.1	6.1	0.36 U	0.25 U	0.37 U	0.21 U	0.45 U	0.39 U	0.43 U
Zinc	410	960	**106**	**46.0**	**63.0**	**42.6**	**80.9**	**105**	**77.9**
PCBs (mg/kg-OC)									
Total PCBs	12	65	**6.82**	**7.86**	**2.77**	**5.17**	**2.77**	**8.25**	**1.91**
LPAH (mg/kg-OC)									
2-Methylnaphthalene	38	64	0.23 UJ	0.42 UJ	0.28 UJ	0.46 UJ	0.25 UJ	0.23 UJ	0.26 UJ
Acenaphthylene	66	66	**0.24 J**	0.42 U	0.28 U	0.46 U	0.25 U	0.25 J	0.26 U
Acenaphthene	16	57	**0.23 J**	0.42 U	0.28 U	0.46 U	0.25 U	0.34 J	0.26 U
Anthracene	220	1200	**2.09**	**2.82**	**0.94**	**1.67**	**0.60**	**2.57**	**0.74**
Fluorene	23	79	**0.54**	**0.80 J**	**0.51 J**	**0.80 J**	**0.37 J**	**0.65**	**0.42 J**
Naphthalene	99	170	0.23 U	0.42 U	0.28 U	0.46 U	0.25 U	0.23 U	0.26 U
Phenanthrene	100	480	**3.59**	**3.28**	**2.42**	**3.06**	**1.57**	**4.07**	**1.76**
Total LPAHs	370	780	**6.69**	**6.89**	**3.87**	**5.53**	**2.54**	**7.88**	**2.92**
HPAH (mg/kg-OC)									
Benzo(a)anthracene	110	270	**5.48**	**5.26**	**2.23**	**5.14**	**1.38**	**6.50**	**1.68**
Benzo(a)pyrene	99	210	**2.34**	**4.60**	**2.38**	**4.54**	**1.46**	**5.97**	**1.77**
Benzo(g,h,i)perylene	31	78	**0.86**	**2.33 J**	**1.25**	**2.37**	**0.87**	**2.88**	**0.90**
Chrysene	110	460	**7.74**	**8.46**	**3.06**	**6.44**	**1.91**	**8.61**	**2.29**
Dibenzo(a,h)anthracene	12	33	**0.35 J**	**1.03**	**0.62**	**0.91 J**	**0.44 J**	**1.04**	**0.44 J**
Fluoranthene	160	1200	**10.9**	**10.1**	**5.39**	**15.6**	**3.39**	**11.1**	**4.15**
Indeno(1,2,3-Cd)Pyrene	34	88	**0.81**	**2.28 J**	**1.30**	**2.17**	**0.88**	**2.97**	**0.90**
Total Benzofluoranthenes	230	450	**6.78**	**12.1**	**6.07**	**12.1**	**3.90**	**13.9**	**4.68**
Pyrene	1000	1400	**12.5**	**13.1**	**5.11**	**13.2**	**3.72**	**13.5**	**4.16**
Total HPAHs	960	5300	**47.8**	**59.1**	**27.4**	**62.4**	**17.9**	**66.4**	**21.0**

Appendix D1-8 Long Term Monitoring Chemistry Comparison to SMS - 2009 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	ENR Area DUD_3C	DUD_4C Average	DUD_5C	DUD_6C	DUD_7C	DUD_14C	DUD_15C
Chlorobenzenes (mg/kg-OC)									
1,2-Dichlorobenzene	2.3	2.3	0.02 U	0.04 U	0.03 U	0.05 U	0.02 U	0.02 U	0.03 U
1,2,4-Trichlorobenzene	0.81	1.8	0.01 U	0.02 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U
1,4-Dichlorobenzene	3.1	9	0.02 U	0.04 U	0.03 U	0.05 U	0.02 U	0.02 U	0.03 U
Hexachlorobenzene	0.38	2.3	0.01 U	0.02 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U
Phthalates (mg/kg-OC)									
Bis(2-Ethylhexyl)Phthalate	47	78	16.4 U	332	30.7 U	26.7 U	13.0 U	15.7 U	36.3 U
Benzyl Butyl Phthalate	4.9	64	1.23 U	1.81 U	0.95 U	1.47 U	0.69 U	1.41 U	0.81 U
Diethylphthalate	61	110	0.45 U	0.84 U	0.57 U	0.91 U	0.50 U	0.45 U	0.53 U
Dimethylphthalate	53	53	0.45 U	0.84 U	0.57 U	0.91 U	0.50 U	0.45 U	0.53 U
Di-N-Butylphthalate	220	1700	**0.83 J**	**1.13 J**	**0.68 J**	**0.96 J**	**0.83 J**	**0.91**	0.53 U
Di-N-Octylphthalate	58	4500	0.45 U	0.84 U	0.57 U	0.91 U	0.50 U	0.45 U	0.53 U
Ionic Organics (ug/kg dw)									
2-Methylphenol	63	63	3.64 UJ	2.61 UJ	3.51 UJ	2.60 UJ	4.26 UJ	3.92 UJ	4.26 UJ
4-Methylphenol	670	670	7.27 UJ	5.23 UJ	7.02 UJ	5.19 UJ	8.51 UJ	7.84 UJ	8.51 UJ
2,4-Dimethylphenol	29	29	1.82 U	1.31 U	1.75 U	1.30 U	2.13 U	1.96 U	2.13 U
Benzyl Alcohol	57	73	3.64 UJ	2.61 UJ	3.51 UJ	2.60 UJ	4.26 UJ	3.92 UJ	4.26 UJ
Benzoic Acid	650	650	**95.8**	**51.7**	**84.6**	**56.0**	**122**	**90.2**	**79.1**
Pentachlorophenol	360	690	18.2 U	13.1 U	17.5 U	13.0 U	21.3 U	19.6 U	21.3 U
Phenol	420	1200	7.27 U	5.23 U	7.02 U	5.19 U	8.51 U	7.84 U	8.51 U
Miscellaneous (mg/kg-OC)									
Dibenzofuran	15	58	**0.30 J**	0.42 UJ	0.28 UJ	0.46 UJ	0.25 UJ	**0.34 J**	0.26 UJ
Hexachlorobutadiene	3.9	6.2	0.06 U	0.10 U	0.07 U	0.11 U	0.06 U	0.06 U	0.07 U
N-Nitroso-di-phenylamine	11	11	0.45 U	0.84 U	0.57 U	0.91 U	0.50 U	0.45 U	0.53 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D1-8 Long Term Monitoring Chemistry Comparison to SMS - 2009 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Perimeter Area DUD_1C	DUD_2C	DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C	DUD_13C
Conventionals (%)										
Total Solids			**42.1**	**43**	**61.4**	**62.3**	**63.9**	**62.3**	**63.9**	**46.7**
Total Organic Carbon			**2.23**	**2.08**	**2.25**	**1.11**	**1.00**	**1.11**	**1.18**	**1.89**
Metals (mg/kg dw)										
Arsenic	57	93	**13.8 J**	**12.3 J**	**15.5**	**7.42 J**	**8.91 J**	**7.42 J**	**9.06 J**	**11.3 J**
Cadmium	5.1	6.7	**0.57 J**	**0.47 J**	**3.46**	**0.63 J**	**0.36 J**	**0.32 J**	**0.50 J**	**0.40 J**
Chromium	260	270	**33.8**	**30.9**	**80.9**	**27.1**	**24.1**	**26.1**	**29.2**	**29.6**
Copper	390	390	**77.1**	**72.1**	**92.0**	**46.3**	**53.8**	**54.4**	**66.1**	**62.1**
Lead	450	530	**34.0**	**32.1**	**89.6**	**18.4**	**26.6**	**19.7**	**58.0**	**27.2**
Mercury	0.41	0.59	**0.18**	**0.17**	**0.61**	**0.12**	**0.13**	**0.11**	**0.16**	**0.19**
Silver	6.1	6.1	0.45 U	0.47 U	3.73	0.32 U	0.31 U	0.31 U	0.36 J	0.43 U
Zinc	410	960	**143**	**125**	**181**	**66.6**	**82.3**	**86.1**	**112**	**101**
PCBs (mg/kg-OC)										
Total PCBs	12	65	**4.27**	**4.47**	**131**	**15.1**	**14.2**	**6.05**	**20.3**	**4.81**
LPAH (mg/kg-OC)										
2-Methylnaphthalene	38	64	**0.39 J**	**1.74 J**	**0.94**	0.29 UJ	0.31 UJ	0.29 UJ	0.26 UJ	**0.35 J**
Acenaphthylene	66	66	**0.32 J**	**0.56 J**	**0.47**	0.29 U	**0.70**	**0.29 J**	**0.29 J**	0.23 U
Acenaphthene	16	57	**0.40 J**	**5.23 J**	**0.46**	**0.31 J**	**2.83**	**0.42 J**	**0.57**	0.23 U
Anthracene	220	1200	**2.15**	**4.75 J**	**2.37**	**1.36**	**7.34**	**3.98**	**3.01**	**1.50**
Fluorene	23	79	**0.70**	**3.61 J**	**0.77**	**0.63**	**3.06**	**1.01**	**0.84**	**0.49**
Naphthalene	99	170	0.34 J	**0.82**	**0.55**	0.29 U	**0.34 J**	**0.52 J**	0.26 UJ	0.23 U
Phenanthrene	100	480	**5.48**	**24.1 J**	**4.23**	**3.80**	**22.2**	**8.33**	**6.21**	**2.40**
Total LPAHs	370	780	**9.38**	**39.0**	**8.85**	**6.10**	**36.5**	**14.6**	**10.9**	**4.39**
HPAH (mg/kg-OC)										
Benzo(a)anthracene	110	270	**8.66**	**15.7 J**	**4.40**	**3.94**	**23.1**	**9.67**	**6.69**	**4.00**
Benzo(a)pyrene	99	210	**6.70**	**7.47 J**	**3.06**	**2.89**	**7.23**	**4.67**	**3.42**	**1.70**
Benzo(g,h,i)perylene	31	78	**2.95**	**2.17 J**	**1.41**	**1.24**	**2.28**	**1.92**	**1.34**	**0.52**
Chrysene	110	460	**11.0**	**15.9 J**	**5.27**	**4.83**	**21.6**	**12.3**	**10.1**	**5.78**
Dibenzo(a,h)anthracene	12	33	**1.54**	**1.11 J**	**0.62**	**0.61**	**0.97**	**0.96**	**0.62**	**0.27 J**
Fluoranthene	160	1200	**19.3**	**49.4 J**	**11.5**	**8.56**	**53.9**	**19.7**	**14.3**	**7.82**
Indeno(1,2,3-Cd)Pyrene	34	88	**2.83**	**2.21 J**	**1.14**	**1.12**	**2.34**	**1.92**	**1.28**	**0.55**
Total Benzofluoranthenes	230	450	**19.2**	**22.3**	**6.43**	**7.29**	**19.3**	**12.7**	**9.55**	**5.07**
Pyrene	1000	1400	**17.4**	**42.9 J**	**28.4**	**10.8**	**56.4**	**22.2**	**19.9**	**8.54**
Total HPAHs	960	5300	**89.5**	**159**	**62.3**	**41.3**	**187**	**86.1**	**67.1**	**34.2**

Appendix D1-8 Long Term Monitoring Chemistry Comparison to SMS - 2009 Cap Area A, Cap Area B, ENR Area, and Perimeter Area

ANALYTE	SMS SQS	SMS CSL	Perimeter Area DUD_1C	DUD_2C	DUD_8C Average	DUD_9C	DUD_10C	DUD_11C	DUD_12C	DUD_13C
Chlorobenzenes (mg/kg-OC)										
1,2-Dichlorobenzene	2.3	2.3	0.02 U	0.02 U	0.15	0.03 U	0.03 U	0.03 U	0.03 UJ	0.02 U
1,2,4-Trichlorobenzene	0.81	1.8	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 UJ	0.01 U
1,4-Dichlorobenzene	3.1	9	0.02 U	**0.07**	**0.25**	**0.19**	0.03 U	**0.14**	**0.19**	0.02 U
Hexachlorobenzene	0.38	2.3	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 UJ	0.01 U
Phthalates (mg/kg-OC)										
Bis(2-Ethylhexyl)Phthalate	47	78	26.6 U	23.2 U	**42.1**	42.1 U	30.5 U	**104**	39.3 UJ	15.5 U
Benzyl Butyl Phthalate	4.9	64	3.59 U	2.16 UJ	0.07 U	1.14 U	2.31 U	**11.2**	1.87 U	1.87 U
Diethylphthalate	61	110	0.43 U	0.45 U	0.29 U	0.58 U	0.63 U	0.58 U	0.53 U	0.45 U
Dimethylphthalate	53	53	0.43 U	0.45 U	0.29 U	0.58 U	0.63 U	0.58 U	0.53 U	0.45 U
Di-N-Butylphthalate	220	1700	**1.25**	**0.81 J**	**1.41**	**0.92 J**	**1.08 J**	**0.96 J**	**0.99 J**	**0.63 J**
Di-N-Octylphthalate	58	4500	0.43 U	0.45 U	0.29 U	0.58 U	0.63 U	0.58 U	0.53 U	0.45 U
Ionic Organics (ug/kg dw)										
2-Methylphenol	63	63	4.76 UJ	4.65 UJ	3.25 UJ	3.23 UJ	3.13 UJ	3.23 UJ	3.13 UJ	4.26 UJ
4-Methylphenol	670	670	9.52 UJ	9.30 UJ	6.51 UJ	6.45 UJ	6.25 UJ	6.77 J	6.25 UJ	8.51 UJ
2,4-Dimethylphenol	29	29	2.38 U	2.33 U	1.63 UJ	1.61 U	1.56 U	1.61 U	1.56 U	2.13 U
Benzyl Alcohol	57	73	4.76 UJ	4.65 UJ	3.25 UJ	3.23 UJ	3.13 UJ	3.23 UJ	3.13 UJ	4.26 UJ
Benzoic Acid	650	650	**426**	**256 J**	**171**	**104**	**117**	**143**	**78.8**	**86.8**
Pentachlorophenol	360	690	23.8 U	23.3 U	16.3 UJ	16.1 U	15.6 U	16.1 U	15.6 U	21.3 U
Phenol	420	1200	9.52 U	26.7 J	6.51 UJ	6.45 U	6.25 U	6.45 U	6.25 U	8.51 U
Miscellaneous (mg/kg-OC)										
Dibenzofuran	15	58	**0.37 J**	**3.20 J**	**0.52**	**0.35 J**	**1.29**	**0.45 J**	**0.45 J**	0.23 UJ
Hexachlorobutadiene	3.9	6.2	0.05 U	0.06 U	0.04 U	0.07 U	0.08 U	0.07 U	0.07 U	0.06 U
N-Nitroso-di-phenylamine	11	11	0.43 U	0.45 U	0.3 U	0.58 U	0.63 U	0.58 U	0.53 U	0.45 U

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
SMS: Sediment Management Standards (Chapter 173-204 WAC)
SQS: Sediment Quality Standard (Table I, Chapter 173-204 WAC)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls

dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D2

Long-term Monitoring Chemistry Comparison to AETs

D2-1 2004 Cap Area A, Cap Area B and Perimeter Area

D2-2 2005 Cap Area A, ENR Area and Perimeter Area

D2-3 2006 Cap Area A, ENR Area and Perimeter Area

D2-4 2007 Cap Area A

D2-5 2008 Cap Area A, ENR Area and Perimeter Area

D2-6 2009 Cap Area A

D2-7 2010 Cap Area A, ENR Area and Perimeter Area

Footnotes for Appendix D2 Tables

Italics: TOC <0.5% or >4%; Organic Carbon Normalized Values Compared to LAET and 2LAET (Appendix D2)
Bold Values: Detected.
Blue/Lightly Shaded Values: Detected Value Exceeds SMS SQS
Orange/Darkly Shaded Values: Detected Value Exceeds SMS CSL
LAET: Lowest Apparent Effects Threshold (EPA 1988)
2LAET: Second Lowest Apparent Effect Threshold (EPA 1988)
CSL: Cleanup Screening Level (Table III, Chapter 173-204 WAC)
LPAHs: Low Molecular Weight Polynuclear Aromatic Hydrocarbons
HPAHs: High Molecular Weight Polynuclear Aromatic Hydrocarbons
PCBs: Polychlorinated Biphenyls
dw: Dry Weight Normalized
J: <RDL, Result Estimated
-OC: Organic Carbon Normalized
R: Result Rejected During Data Validation
U: <MDL, Not Detected

Appendix D2-1. Long Term Monitoring Chemistry Comparison to AETs - 2004 Cap Area A, Cap Area B, and Perimeter Area

			CAP AREA A			CAP AREA B			PERIMETER AREA	
ANALYTE	LAET	2LAET	DUD_1A	DUD_4A	Average DUD_5A	DUD_1B	DUD_2B	DUD_3B	DUD_4C	DUD_11C
PCBs (mg/kg dw)										
Total PCBs	130	1000	**18.5**	**19.9**	3.17 U	**118**	**82.3**	**30.8**	**170**	**12.0**
LPAH (mg/kg dw)										
2-Methylnaphthalene	670	1400	66.9 U	70.8 U	71.1 U	65.5 U	67.1 U	59.9 U	73.3 U	70.5 U
Acenaphthylene	1300	1300	71.7 U	75.9 U	76.1 U	70.2 U	71.9 U	64.2 U	78.6 U	75.6 U
Acenaphthene	500	730	33.5 U	35.4 U	35.5 U	32.7 U	33.6 U	29.9 U	36.7 U	35.3 U
Anthracene	960	4400	19.1 U	20.2 U	20.3 U	18.7 U	19.2 U `	U	21.0 U	20.2 U
Fluorene	540	1000	62.1 U	65.7 U	66.0 U	60.8 U	62.4 U	55.6 U	68.1 U	65.5 U
Naphthalene	2100	2400	66.9 U	70.8 U	71.1 U	65.5 U	67.1 U	59.9 U	73.3 U	70.5 U
Phenanthrene	1500	5400	**45.5**	**26.5 J**	20.3 U	**30.4 J**	**34.8 J**	17.1 U	**23.5 J**	20.2 U
Total LPAHs	5200	13000	**45.5**	**26.5**	76.1 U	**30.4**	**34.8**	64.2 U	**23.5**	75.6 U
HPAH (mg/kg dw)										
Benzo(a)anthracene	1300	1600	**36.8**	**27.2**	11.1 U	**42.0**	**49.0**	**20.1**	**29.4**	10.1 U
Benzo(a)pyrene	1600	3000	**42.4**	**37.3**	15.2 U	**61.2**	**54.9**	**27.2**	**57.1**	**36.0**
Benzo(g,h,i)perylene	670	720	38.2 U	40.5 U	40.6 U	37.4 U	38.4 U	34.2 U	41.9 U	40.3 U
Chrysene	1400	2800	**59.7**	**43.1**	20.3 U	**61.6**	**77.3**	**34.2**	**40.0**	20.2 U
Dibenzo(a,h)anthracene	230	540	33.5 U	35.4 U	35.5 U	32.7 U	33.6 U	29.9 U	36.7 U	35.3 U
Fluoranthene	1700	2500	**88.4**	**56.9 J**	40.6 U	**75.1**	**92.2**	**36.4 J**	**59.6**	40.3 U
Indeno(1,2,3-Cd)Pyrene	600	690	43.0 U	45.5 U	45.7 U	42.1 U	43.2 U	38.5 U	47.2 U	45.3 U
Total Benzofluoranthenes	3200	---	**93.3**	**71.7**	15.2 U	**118**	64.2 U	**55.4**	**45.5**	**17.6**
Pyrene	2600	3300	**82.1**	**49.3**	20.3 U	**65.7**	**75.4**	**34.2**	**59.3**	20.2 U
Total HPAHs	---	17000	**403**	**285**	45.7 U	**424**	**473**	**207**	**291**	**53.7**
Chlorobenzenes (mg/kg dw)										
1,2-Dichlorobenzene	35	50	1.31 U	1.39 U	1.40 U	1.29 U	1.32 U	1.18 U	1.44 U	1.39 U
1,2,4-Trichlorobenzene	31	51	1.31 U	1.39 U	1.40 U	1.29 U	1.32 U	1.18 U	1.44 U	1.39 U
1,4-Dichlorobenzene	110	120	0.63 U	0.67 U	0.67 U	0.62 U	0.64 U	0.57 U	0.69 U	0.67 U
Hexachlorobenzene	22	70	3.23 U	3.41 U	3.43 U	3.16 U	3.24 U	2.89 U	3.54 U	3.40 U
Phthalates (mg/kg dw)										
Bis(2-Ethylhexyl)Phthalate	1300	1900	**442**	**140**	34.3 U	**158**	**168**	**89.2**	**146**	**51.6 J**
Benzyl Butyl Phthalate	63.0	900	28.7 U	30.3 U	30.5 U	28.1 U	28.8 U	25.7 U	31.4 U	30.2 U
Diethylphthalate	200	1200	28.7 U	30.3 U	30.5 U	28.1 U	28.8 U	25.7 U	31.4 U	30.2 U
Dimethylphthalate	71.0	160	52.6 U	55.6 U	55.8 U	51.5 U	52.8 U	47.1 U	57.6 U	55.4 U
Di-N-Butylphthalate	1400	5100	23.9 U	25.3 U	25.4 U	23.4 U	24.0 U	21.4 U	26.2 U	25.2 U
Di-N-Octylphthalate	6200	---	38.2 U	40.5 U	40.6 U	37.4 U	38.4 U	34.2 U	41.9 U	40.3 U
Miscellaneous (mg/kg dw)										
Dibenzofuran	540	700	66.9 U	70.8 U	71.1 U	65.5 U	67.1 U	59.9 U	73.4 U	70.5 U
Hexachlorobutadiene	11.00	120	3.58 U	3.79 U	3.81 U	3.51 U	3.60 U	3.21 U	3.93 U	3.78 U
N-Nitroso-di-phenylamine	28.00	40	95.6 U	101 U	102 U	93.6 U	95.9 U	85.6 U	105 U	101 U

Appendix D2-2. Long Term Monitoring Chemistry Comparison to AETs - 2005 Cap Area A, Post-ENR Area, and Perimeter Area

			Cap Area A			Post ENR Area			
ANALYTE	LAET	2LAET	DUD_1A	DUD_4A	Average DUD_5A	DUD_3C	Average DUD_4C	DUD_5C	DUD_6C
PCBs (mg/kg dw)									
Total PCBs	130	1000	**295**	**40.8**	**7.36**	2.89 U	**2.86**	3.00	**2.04**
LPAH (mg/kg dw)									
2-Methylnaphthalene	670	1400	**623 J**	18.3 U	17.1 U	16.2 U	16.7 U	16.0 U	15.9 U
Acenaphthylene	1300	1300	**34.9 J**	19.6 U	18.3 U	17.4 U	17.9 U	17.1 U	17.0 U
Acenaphthene	500	730	**58.8**	9.13 U	8.53 U	8.10 U	8.35 U	7.98 U	7.93 U
Anthracene	960	4400	**399**	**32.1**	**6.65 J**	4.63 UJ	4.77 UJ	**4.79 J**	4.53 UJ
Fluorene	540	1000	**133**	16.9 U	15.8 U	15.0 U	15.5 U	14.8 U	14.7 U
Naphthalene	2100	2400	**99.1**	18.3 U	17.1 U	16.2 U	16.7 U	16.0 U	15.9 U
Phenanthrene	1500	5400	**1357 J**	**72.6**	**10.0**	4.63 U	4.77 U	**6.50 J**	4.53 U
Total LPAHs	5200	13000	**2082**	**105**	**20.9**	17.4 U	17.9 U	**11.3**	17.0 U
HPAH (mg/kg dw)									
Benzo(a)anthracene	1300	1600	**695 J**	**66.6 J**	**8.00 J**	**3.24 J**	**3.63 J**	**6.17**	**3.51 J**
Benzo(a)pyrene	1600	3000	**427 J**	**61.0 J**	**9.07 J**	3.47 U	**3.99 J**	**4.90 J**	**3.85 J**
Benzo(g,h,i)perylene	670	720	**333**	**42.4**	9.74 U	9.26 U	9.54 U	9.12 U	9.06 U
Chrysene	1400	2800	**684 J**	**102 J**	**11.3 J**	4.63 U	**5.36 J**	**8.10 J**	**5.66 J**
Dibenzo(a,h)anthracene	230	540	**113**	**14.3 J**	8.53 U	8.10 U	8.35 U	7.98 U	7.93 U
Fluoranthene	1700	2500	**1913 J**	**154**	**16.3**	9.26 U	9.54 U	**11.4 J**	9.06 U
Indeno(1,2,3-Cd)Pyrene	600	690	**253**	**38.2**	11.0 U	10.4 U	10.7 U	10.3 U	10.2 U
Total Benzofluoranthenes	3200	---	**939**	**146**	**18.0**	3.47 U	**6.61**	**12.8**	**8.83**
Pyrene	2600	3300	**1399 J**	**133**	**15.1**	**5.21 J**	**6.44 J**	**11.6**	**6.34 J**
Total HPAHs	---	17000	**6756**	**758**	**77.7**	**8.45**	**20.1**	**55.0**	**28.2**
Chlorobenzenes (mg/kg dw)									
1,2-Dichlorobenzene	35	50	0.57 U	0.34 U	0.32 U	0.30 U	0.31 U	0.30 U	0.29 U
1,2,4-Trichlorobenzene	31	51	0.57 U	0.34 U	0.32 U	0.30 U	0.31 U	0.30 U	0.29 U
1,4-Dichlorobenzene	110	120	**65.1**	**3.61**	0.16 U	0.15 U	0.16 U	0.15 U	0.15 U
Hexachlorobenzene	22	70	1.44 U	0.86 U	0.80 U	0.76 U	0.79 U	0.75 U	0.75 U
Phthalates (mg/kg dw)									
Bis(2-Ethylhexyl)Phthalate	1300	1900	**5490 J**	**272**	**23.6 J**	**9.14 J**	**12.6 J**	**14.8 J**	**12.5 J**
Benzyl Butyl Phthalate	63.0	900	13.1 U	**20.1**	**7.86 J**	**12.7 J**	**7.22 J**	6.84 U	6.80 U
Diethylphthalate	200	1200	13.1 U	7.82 U	7.31 U	6.94 U	7.16 U	6.84 U	**7.81 J**
Dimethylphthalate	71.0	160	**81.7**	14.3 U	13.4 U	12.7 U	13.1 U	12.5 U	12.5 U
Di-N-Butylphthalate	1400	5100	99.3 U	51.9 U	17.8 U	14.4 U	15.1 U	13.6 U	13.0 U
Di-N-Octylphthalate	6200	---	17.4 U	10.4 U	9.74 U	9.26 U	9.54 U	9.12 U	9.06 U
Miscellaneous (mg/kg dw)									
Dibenzofuran	540	700	**56.6 J**	18.3 U	17.1 U	16.2 U	16.7 U	16.0 U	15.9 U
Hexachlorobutadiene	11.0	120	1.63 U	0.98 U	0.91 U	0.87 U	0.89 U	0.86 U	0.85 U
N-Nitroso-di-phenylamine	28.0	40.0	43.6 U	26.1 U	24.4 U	23.1 U	23.9 U	22.8 U	22.7 U

Appendix D2-2. Long Term Monitoring Chemistry Comparison to AETs - 2005 Cap Area A, Post-ENR Area, and Perimeter Area

			Post ENR Area, Continued			Perimeter Area		
ANALYTE	**LAET**	**2LAET**	**DUD_7C**	**DUD_14C**	**DUD_15C**	**DUD_11C**	**DUD_19C**	**DUD_31C**
PCBs (mg/kg dw)								
Total PCBs	130	1000	2.88 U	**32.4**	2.83 U	**18.8**	**25.2**	**16.5**
LPAH (mg/kg dw)								
2-Methylnaphthalene	670	1400	16.1 U	17.1 U	15.9 U	16.6 U	17.2 U	2.83 U
Acenaphthylene	1300	1300	17.3 U	18.3 U	17.0 U	17.8 U	18.4 U	2.83 U
Acenaphthene	500	730	8.06 U	8.56 U	7.93 U	8.28 U	8.59 U	2.83 U
Anthracene	960	4400	4.61 UJ	**13.3 J**	4.53 UJ	**6.63 J**	**8.47 J**	2.83 U
Fluorene	540	1000	15.0 U	15.9 U	14.7 U	15.4 U	16.0 U	2.83 U
Naphthalene	2100	2400	16.1 U	17.1 U	15.9 U	16.6 U	17.2 U	2.83 U
Phenanthrene	1500	5400	4.61 U	**24.3**	4.53 U	**8.28 J**	**12.9 J**	**8.84**
Total LPAHs	5200	13000	17.3 U	**37.7**	17.0 U	**14.9**	**21.3**	**8.84**
HPAH (mg/kg dw)								
Benzo(a)anthracene	1300	1600	**2.53 J**	**25.1**	2.27 U	**16.6 J**	**22.5 J**	**8.36 J**
Benzo(a)pyrene	1600	3000	3.46 U	**26.3**	3.40 U	**21.4**	**28.6**	**13.7**
Benzo(g,h,i)perylene	670	720	9.22 U	**17.1 J**	9.06 U	**13.0 J**	**17.2 J**	**13.2**
Chrysene	1400	2800	4.61 U	**39.9**	4.53 U	**24.5 J**	**32.1 J**	**14.8 J**
Dibenzo(a,h)anthracene	230	540	8.06 U	8.56 U	7.93 U	8.28 U	8.59 U	**3.25 J**
Fluoranthene	1700	2500	9.22 U	**55.6**	9.06 U	**19.5**	**34.8**	**22.6**
Indeno(1,2,3-Cd)Pyrene	600	690	10.4 U	**17.1 J**	10.2 U	**11.6 J**	**16.0 J**	**10.9**
Total Benzofluoranthenes	3200	---	3.46 U	**62.1**	3.40 U	**44.5**	**66.0**	**29.2**
Pyrene	2600	3300	**4.84 J**	**50.9**	4.53 U	**19.6**	**32.1**	**19.5**
Total HPAHs	---	17000	**7.37**	**294**	10.2 U	**171**	**249**	**136**
Chlorobenzenes (mg/kg dw)								
1,2-Dichlorobenzene	35	50	0.30 U	0.32 U	0.29 U	0.31 U	0.32 U	0.28 U
1,2,4-Trichlorobenzene	31	51	0.30 U	0.32 U	0.29 U	0.31 U	0.32 U	0.28 U
1,4-Dichlorobenzene	110	120	0.15 U	0.16 U	0.15 U	0.15 U	0.16 U	0.28 U
Hexachlorobenzene	22	70	0.76 U	0.81 U	0.75 U	0.78 U	0.81 U	0.56 U
Phthalates (mg/kg dw)								
Bis(2-Ethylhexyl)Phthalate	1300	1900	**8.99 J**	**70.0**	**8.72 J**	**62.2**	**59.9**	**39.3**
Benzyl Butyl Phthalate	63.0	900	6.91 U	**11.2 J**	6.80 U	**8.76 J**	**11.2 J**	**61.1**
Diethylphthalate	200	1200	6.91 U	7.33 U	6.80 U	**7.57 J**	**8.34 J**	5.56 U
Dimethylphthalate	71.0	160	12.7 U	13.4 U	12.5 U	13.0 U	13.5 U	5.56 U
Di-N-Butylphthalate	1400	5100	14.5 U	22.0 U	12.5 U	29.8 U	12.5 U	**9.13 J**
Di-N-Octylphthalate	6200	---	9.22 U	9.78 U	9.06 U	9.47 U	9.82 U	5.56 U
Miscellaneous (mg/kg dw)								
Dibenzofuran	540	700	16.1 U	17.1 U	15.9 U	16.6 U	17.2 U	2.83 U
Hexachlorobutadiene	11.0	120	0.86 U	0.92 U	0.85 U	0.89 U	0.92 U	1.36 U
N-Nitroso-di-phenylamine	28.0	40.0	23.0 U	24.4 U	22.7 U	23.7 U	24.5 U	5.56 U

Appendix D2-3. Long Term Monitoring Chemistry Comparison to AETs - 2006 Cap Area A, ENR Area, and Perimeter Area

ANALYTE	LAET	2LAET	Cap Area A Average DUD_5A	ENR Area DUD_3C	Average DUD_4C	DUD_6C	DUD_7C	DUD_14C	DUD_15C	Perimeter Area DUD_9C
PCBs (mg/kg dw)										
Total PCBs	130	1000	**4.02**	**28.8**	**23.3**	**34.96**	6.41	**26.2**	**12.1**	**270**
LPAH (mg/kg dw)										
2-Methylnaphthalene	670	1400	3.29 U	3.11 U	3.31 U	3.40 U	3.15 U	3.11 U	3.13 U	**4.07 J**
Acenaphthylene	1300	1300	3.29 U	3.11 U	3.31 U	3.40 U	3.15 U	3.11 U	3.13 U	**7.57**
Acenaphthene	500	730	3.29 U	3.11 U	3.31 U	3.40 U	3.15 U	3.11 U	3.13 U	3.55 U
Anthracene	960	4400	3.29 U	**17.5 J**	**8.18**	**11.1**	3.15 U	**10.6**	**4.18 J**	**43.8**
Fluorene	540	1000	3.29 U	**4.61 J**	**3.49** J	3.40 U	3.15 U	3.11 U	**8.73**	**8.73**
Naphthalene	2100	2400	3.29 U	3.11 U	3.31 U	3.40 U	3.15 U	3.11 U	**5.12 J**	**5.12 J**
Phenanthrene	1500	5400	**4.08 J**	**28.0 J**	**21.6**	**23.3**	**4.43 J**	**21.1**	**24.8**	**59.5**
Total LPAHs	5200	13000	**4.08 J**	**50.1**	**33.2**	**34.4**	**4.43**	**31.7**	**42.9**	**125**
HPAH (mg/kg dw)										
Benzo(a)anthracene	1300	1600	**5.05 J**	**38.0**	**29.4**	**37.5**	**7.23**	**32.3**	**15.4**	**74.1**
Benzo(a)pyrene	1600	3000	**8.82**	**39.4**	**31.9**	**38.7**	**10.8**	**35.6**	**18.0**	**99.6**
Benzo(g,h,i)perylene	670	720	**5.84 J**	**24.0**	**18.8**	**21.3**	**6.50**	**19.0**	**10.2**	**53.6**
Chrysene	1400	2800	**8.21 J**	**59.8 J**	**40.1**	**43.0**	**11.3**	**54.2**	**21.9**	**127**
Dibenzo(a,h)anthracene	230	540	3.29 U	**7.74**	**6.30**	**6.31 J**	3.15 U	**5.87 J**	**3.60 J**	**10.5**
Fluoranthene	1700	2500	**9.41**	**76.0 J**	**60.1**	**66.8**	**15.2**	**56.4**	**28.0**	**180**
Indeno(1,2,3-Cd)Pyrene	600	690	**4.87 J**	**22.2**	**16.9**	**20.3**	**5.83 J**	**17.0**	**9.51**	**50.1**
Total Benzofluoranthenes	3200	---	**17.9**	**85.5**	**70.4**	**84.1**	**22.7**	**71.1**	**37.6**	**186**
Pyrene	2600	3300	**9.26 J**	**63.1**	**53.5**	**55.5**	**13.8**	**52.9**	**24.8**	**197**
Total HPAHs	---	17000	**69.3**	**416**	**327**	**374**	**93.3**	**344**	**169**	**978**
Chlorobenzenes (mg/kg dw)										
1,2-Dichlorobenzene	35	50	0.33 U	0.31 U	0.33 U	0.34 U	0.31 U	0.31 U	0.31 U	0.35 U
1,2,4-Trichlorobenzene	31	51	0.33 U	0.31 U	0.33 U	0.34 U	0.31 U	0.31 U	0.31 U	0.35 U
1,4-Dichlorobenzene	110	120	0.33 U	0.31 U	0.33 U	0.34 U	0.31 U	0.31 U	0.31 U	0.35 U
Hexachlorobenzene	22	70	0.33 U	0.61 U	0.93 J	0.62 U	0.62 U	0.61 U	0.61 U	0.70 U
Phthalates (mg/kg dw)										
Bis(2-Ethylhexyl)Phthalate	1300	1900	31.5 U	**81.8**	**63.7**	**93.4**	**28.6**	**81.6**	**52.1**	**348**
Benzyl Butyl Phthalate	63	900	10.1 U	**18.9**	**13.7**	**15.0**	**10.3 J**	**17.7**	**11.3 J**	**22.1**
Diethylphthalate	200	1200	6.46 U	6.11 U	6.50 U	6.68 U	6.18 U	6.10 U	6.15 U	7.07 U
Dimethylphthalate	71	160	6.46 U	6.11 U	6.50 U	6.68 U	6.18 U	6.10 U	6.15 U	7.07 U
Di-N-Butylphthalate	1400	5100	9.08 U	16.4 U	13.7 U	28.6 U	18.6 U	9.21 U	27.0 U	15.5 U
Di-N-Octylphthalate	6200	---	6.46 U	6.11 U	6.50 U	6.68 U	6.18 U	6.10 U	6.15 U	7.07 U
Miscellaneous (mg/kg dw)										
Dibenzofuran	540	700	3.29 U	3.11 U	3.31 U	3.40 U	3.15 U	3.11 U	3.1 U	**5.39 J**
Hexachlorobutadiene	11	120	1.58 U	1.50 U	1.59 U	1.64 U	1.52 U	1.50 U	1.51 U	0.70 U
N-Nitroso-di-phenylamine	28	40	6.46 U	6.11 U	6.50 U	6.68 U	6.2 U	6.10 U	6.15 U	6.96 U

Appendix D2-4. Long Term Monitoring Chemistry Comparison to AETs - 2007 Cap Area A

ANALYTE	LAET	2LAET	Cap Area A Average DUD_5A
PCBs (mg/kg dw)			
Total PCBs	130	1000	**16.6**
LPAH (mg/kg dw)			
2-Methylnaphthalene	670	1400	2.45 U
Acenaphthylene	1300	1300	2.45 U
Acenaphthene	500	730	2.45 U
Anthracene	960	4400	**4.21 J**
Fluorene	540	1000	2.45 U
Naphthalene	2100	2400	2.45 U
Phenanthrene	1500	5400	**16.3 J**
Total LPAHs	5200	13000	**20.5**
HPAH (mg/kg dw)			
Benzo(a)anthracene	1300	1600	**16.8 J**
Benzo(a)pyrene	1600	3000	**21.6**
Benzo(g,h,i)perylene	670	720	**13.6**
Chrysene	1400	2800	**23.8 J**
Dibenzo(a,h)anthracene	230	540	**3.75 J**
Fluoranthene	1700	2500	**41.0 J**
Indeno(1,2,3-Cd)Pyrene	600	690	**16.2 J**
Total Benzofluoranthenes	3200	---	**44.2**
Pyrene	2600	3300	**32.9**
Total HPAHs	---	17000	**214**
Chlorobenzenes (mg/kg dw)			
1,2-Dichlorobenzene	35	50	0.25 U
1,2,4-Trichlorobenzene	31	51	0.12 U
1,4-Dichlorobenzene	110	120	**0.30 J**
Hexachlorobenzene	22	70	0.12 U
Phthalates (mg/kg dw)			
Bis(2-Ethylhexyl)Phthalate	1300	1900	69.7 U
Benzyl Butyl Phthalate	63	900	**13.4**
Diethyl Phthalate	200	1200	**4.91 J**
Dimethyl Phthalate	71	160	**4.91 J**
Di-N-Butyl Phthalate	1400	5100	4.91 U
Di-N-Octyl Phthalate	6200	---	4.91 U
Miscellaneous (mg/kg dw)			
Dibenzofuran	540	700	**2.45 J**
Hexachlorobutadiene	11	120	0.61 U
N-Nitrosodiphenylamine	28	40	4.91 U

Appendix D2-5. Long Term Monitoring Chemistry Comparison to AETs - 2008 Cap Area A, ENR Area, and Perimeter Area

ANALYTE	LAET	JLAET	Cap Area A DUD_1A	Cap Area A Average DUD_5A	ENR Area DUD_4C	ENR Area DUD_6C	Perimeter Area Average DUD_8C
PCBs (mg/kg dw)							
Total PCBs	130	1000	**27.4**	**7.1**	**34.6**	**14**	**290**
LPAH (mg/kg dw)							
2-Methylnaphthalene	670	1400	**11.5**	2.45 U	2.44 U	2.42 U	**4.40 J**
Acenaphthylene	1300	1300	2.59 U	2.45 U	**2.69 J**	2.42 U	**2.75 J**
Acenaphthene	500	730	**7.04**	**2.51 J**	2.44 U	2.42 U	**5.96 J**
Anthracene	960	4400	**10.8**	**6.64 J**	**13.2**	**7.79**	**25.1**
Fluorene	540	1000	**9.64**	**5.32 J**	**6.43**	**5.44**	**19.4**
Naphthalene	2100	2400	**3.11 J**	2.45 U	2.44 U	2.42 U	**3.09 J**
Phenanthrene	1500	5400	**65.0**	**24.4**	**23.2**	**15.6**	**57.1**
Total LPAHs	5200	13000	**95.6**	**37.6**	**53.1**	**28.8**	**112**
HPAH (mg/kg dw)							
Benzo(a)anthracene	1300	1600	**37.5**	**17.3**	**33.5**	**15.4**	**51.5**
Benzo(a)pyrene	1600	3000	**44.4**	**20.6**	**41.5**	**20.4**	**56.6**
Benzo(g,h,i)perylene	670	720	**33.9**	**9.09**	**18.3**	**8.31**	**31.4**
Chrysene	1400	2800	**63.0**	**26.7**	**55.4**	**33.5**	**75.6**
Dibenzo(a,h)anthracene	230	540	**14.3**	**2.69 J**	**5.86**	2.42 U	10.2
Fluoranthene	1700	2500	**104**	**37.1**	**57.6**	**39.8**	**92.4**
Indeno(1,2,3-Cd)Pyrene	600	690	**32.2**	**11.2**	**22.0**	**11.1**	**35.6**
Total Benzofluoranthenes	3200	---	**80.2**	**40.7**	**103**	**49.1**	**135**
Pyrene	2600	3300	**108**	**42.0**	**56.0**	**38.1**	**152**
Total HPAHs	---	17000	**518**	**206**	**409**	**216**	**641**
Chlorobenzenes (mg/kg dw)							
1,2-Dichlorobenzene	35	50	0.26 U	0.24 U	0.24 U	0.24 U	**0.37 J**
1,2,4-Trichlorobenzene	31	51	0.13 U	0.12 U	0.12 U	0.12 U	0.13 U
1,4-Dichlorobenzene	110	**120**	**636**	**1.13**	**0.28 J**	0.24 U	0.56 U
Hexachlorobenzene	22	70	0.13 U	0.12 U	0.12 U	0.12 U	0.13 U
Phthalates (mg/kg dw)							
Bis(2-Ethylhexyl)Phthalate	1300	1900	**722**	75.7 U	98.8 U	65.8 U	**399**
Benzyl Butyl Phthalate	63	900	**123**	**13.5**	13.3 U	13.9 U	25.6 U
Diethyl Phthalate	200	1200	5.19 U	**5.38 J**	**5.62 J**	4.84 U	5.36 U
Dimethyl Phthalate	71	160	**293**	12.8 U	**10.2**	4.84 U	10.5 U
Di-N-Butyl Phthalate	1400	5100	**354**	**5.57 J**	7.20 U	5.08 U	13.1 U
Di-N-Octyl Phthalate	6200	---	5.19 U	4.90 U	4.88 U	4.84 U	5.36 U
Miscellaneous (mg/kg dw)							
Dibenzofuran	540	700	**4.41 J**	2.45 U	2.44 U	2.42 U	**5.76 J**
Hexachlorobutadiene	11	120	0.65 U	0.61 U	0.61 U	0.60 U	0.67 U
N-Nitrosodiphenylamine	28	40	5.19 U	4.90 U	4.88 U	4.84 U	5.36 U

Appendix D2-6. Long Term Monitoring Chemistry Comparison to AETs - 2009 Cap Area A

ANALYTE	LAET	2LAET	Cap Area A Average DUD_5A
PCBs (mg/kg dw)			
Total PCBs	130	1000	**10.2**
LPAH (mg/kg dw)			
2-Methylnaphthalene	670	1400	**3.11 J**
Acenaphthylene	1300	1300	2.43 U
Acenaphthene	500	730	8.68 U
Anthracene	960	4400	**23.8 J**
Fluorene	540	1000	**8.73 J**
Naphthalene	2100	2400	2.43 U
Phenanthrene	1500	5400	**78.6**
Total LPAHs	5200	13000	**119**
HPAH (mg/kg dw)			
Benzo(a)anthracene	1300	1600	**48.9**
Benzo(a)pyrene	1600	3000	**41.7**
Benzo(g,h,i)perylene	670	720	**22.7**
Chrysene	1400	2800	**51.3**
Dibenzo(a,h)anthracene	230	540	**10.0 J**
Fluoranthene	1700	2500	**114**
Indeno(1,2,3-Cd)Pyrene	600	690	**23.1**
Total Benzofluoranthenes	3200	---	**87.3**
Pyrene	2600	3300	**108**
Total HPAHs	---	17000	**508**
Chlorobenzenes (mg/kg dw)			
1,2-Dichlorobenzene	35	50	0.24 U
1,2,4-Trichlorobenzene	31	51	0.12 U
1,4-Dichlorobenzene	110	120	0.24 U
Hexachlorobenzene	22	70	0.12 U
Phthalates (mg/kg dw)			
Bis(2-Ethylhexyl)Phthalate	1300	1900	54.8 U
Benzyl Butyl Phthalate	63	900	9.35 U
Diethyl Phthalate	200	1200	4.85 U
Dimethyl Phthalate	71	160	4.85 U
Di-N-Butyl Phthalate	1400	5100	13.1 U
Di-N-Octyl Phthalate	6200	---	4.85 U
Miscellaneous (mg/kg dw)			
Dibenzofuran	540	700	**5.15 J**
Hexachlorobutadiene	11	120	0.61 U
N-Nitrosodiphenylamine	28	40	4.85 U

Appendix D2-7. Long Term Monitoring Chemistry Comparison to AETs - 2010 Cap Area A, ENR Area, and Perimeter Area

ANALYTE	LAET	2LAET	Cap Area A DUD_5A	ENR Area Average DUD_6C	Perimeter Area DUD_9C
PCBs (mg/kg dw)					
Total PCBs	130	1000	**14.6**	**9.00**	**64**
LPAH (mg/kg dw)					
2-Methylnaphthalene	670	1400	2.46 U	2.31 U	**3.07 J**
Acenaphthylene	1300	1300	2.46 U	2.31 U	2.67 U
Acenaphthene	500	730	2.46 U	2.31 U	**8.95**
Anthracene	960	4400	**8.62**	4.9 U	**40.1**
Fluorene	540	1000	2.46 U	**2.37 J**	**11.5**
Naphthalene	2100	2400	2.46 U	2.31 U	**6.69**
Phenanthrene	1500	5400	**24.6**	**8.6 J**	**83.5**
Total LPAHs	5200	13000	**33.2**	**13.6**	**151**
HPAH (mg/kg dw)					
Benzo(a)anthracene	1300	1600	**32.8**	**14.8**	**65.6**
Benzo(a)pyrene	1600	3000	**29.6**	**13.4**	**63.3**
Benzo(g,h,i)perylene	670	720	**18.5**	**9.78**	**39.5**
Chrysene	1400	2800	**40.2**	**21.9**	**83.2**
Dibenzo(a,h)anthracene	230	540	**6.84**	3.60 U	**15.1**
Fluoranthene	1700	2500	**81.1**	**30.9**	**163**
Indeno(1,2,3-Cd)Pyrene	600	690	**17.7**	**8.7**	**36.0**
Total Benzofluoranthenes	3200	---	**68.3**	**38.5**	**148**
Pyrene	2600	3300	**55.2**	**24.6**	**130**
Total HPAHs	---	17000	**350**	**165**	**743**
Chlorobenzenes (mg/kg dw)					
1,2-Dichlorobenzene	35	50	0.25 U	0.23 U	0.27 U
1,2,4-Trichlorobenzene	31	51	0.12 U	0.12 U	0.13 U
1,4-Dichlorobenzene	110	120	0.25 U	0.23 U	0.27 U
Hexachlorobenzene	22	70	0.12 U	0.12 U	0.13 U
Phthalates (mg/kg dw)					
Bis(2-Ethylhexyl)Phthalate	1300	1900	94.3 U	73.1 U	**201**
Benzyl Butyl Phthalate	63	900	**17.3**	8.3 U	**18.7**
Diethyl Phthalate	200	1200	4.92 U	4.62 U	5.33 U
Dimethyl Phthalate	71	160	4.92 U	4.62 U	5.33 U
Di-N-Butyl Phthalate	1400	5100	17.6 U	15.5 U	19.7 U
Di-N-Octyl Phthalate	6200	---	4.92 U	4.62 U	5.33 U
Miscellaneous (mg/kg dw)					
Dibenzofuran	540	700	2.46 U	2.31 U	**6.13**
Hexachlorobutadiene	11	120	0.62 U	0.58 U	0.67 U
N-Nitrosodiphenylamine	28	40	4.92 U	4.62 U	5.33 U

Appendix E

2006 SPI Survey Memo

GERMANO & ASSOCIATES, INC.
12100 SE 46th Place
Bellevue, WA 98006 **www.remots.com**

Telephone: (425) 865-0199 • **Fax: (425) 865-0699** • **Mobile: (425) 891-2121** • **Email:** *joe@remots.com*

March 29, 2006

Mr. David Gillingham
Mr. Dan Hennessy
Anchor Environmental, LLC
1423 3rd Avenue, Suite 300
Seattle, WA 98101

RE: Duwamish Diagonal SPI Post-Cap Survey Results

Dear David and Dan,

On March 14, 2006, scientists from Germano & Associates, Inc. performed an SPI survey at the 11 stations selected by Anchor Environmental for the second post-cap survey at the Duwamish Diagonal; the purpose of this SPI survey one year after the completion of capping operations was to document current benthic habitat conditions in the Enhanced Natural Recovery (ENR) area adjacent to Area B (Figure 1). Additional goals of this survey included measuring the sediment grain-size major mode and range, the depth of the apparent RPD, and the bioturbation depth of the resident infauna.

Three replicate profile images were taken at each location; the complete results of the image analysis are displayed in Table 1, and a separate CD with digital image files for all sediment profile images collected in the survey is included in this package.

Results:

Prism Penetration Depth:

The SPI prism penetration depth was measured from the bottom of the image to the sediment-water interface. The area of the entire cross-sectional sedimentary portion of the image was digitized, and this number was divided by the calibrated linear width of the image to determine the average penetration depth. The stop collars on the camera (that prevent over-penetration in soft sediments) were removed, and the maximum number of lead weights were added to the camera chassis (Table 1), resulting in an extra 250 lbs of driving force for the prism. Prism penetration ranged from 4.7 – 16.2 cm (Figure 2), with the variation in camera penetration mainly a function of the degree of consolidation in the cap sediment. A comparison is of penetration depths between the previous surveys and the present survey is displayed in Figure 2; camera prism penetration was generally lower in this one-year post-cap survey than it was in the initial post-cap survey, most likely due to continued consolidation of the capped sediments (the bulk of disposed dredged material consolidation takes place within the first 3-6 months

following disposal; Pointdexter, 1979; Brannon and Pointdexter-Rollings, 1990). Three of the 11 stations sampled (Stations 14, 15 and 24) had slightly greater penetration depths (9-30%) than those measured at the last survey.

Presence of Cap Sands:

While cap sands extending beyond the depth of the prism penetration were still found at every station sampled, the notable characteristic of this year's survey was the dramatic increase in fine-grained sediments at all the stations from natural depositional processes as compared to last year. Last year, the predominant sediment grain-size major mode was 2-1 phi (medium sand), with a frequent occurrence of -1 to -2 phi granules mixed in with the medium sand.

This year, about half the stations had a sediment grain-size major mode of 4-3 phi (very fine sand) and the other half had a sediment grain-size major mode of 3-2 phi (fine sand), and all stations had poorly sorted sediments due to the high fraction of fine-grained sediments mixed in with coarser granules (Table 1). The dramatic shift in sediment grain-size can be seen in this comparison of images from Stations 5, 15, and 26 in 2005 and 2006:

STATION 5

2005

2006

STATION 15

2005 **2006**

STATION 26

RPD Depth

The average station values for mean apparent RPD ranged from 1.3 – 4.4 cm (Figure 3), a dramatic increase from the post-cap disposal survey last year when RPD values could not be measured because of the lack of fine-grained sediments in the newly-placed cap. The relatively deep RPD values are a result of infaunal bioturbation from the invertebrates that have recolonized the ENR cap.

Bioturbation Depth

Evidence of deposit-feeding or burrowing infauna was found at every station (Figure 4; Table 1), with bioturbation depths ranging from 80-100% of prism penetration depths (infauna were burrowing as deep or deeper than the camera prism was able to penetrate; see Table 1). Again, this is a dramatic shift from the previous survey when evidence of infaunal bioturbation could only be detected at one of the stations surveyed; as predicted, there was a substantial increase in this parameter as a result of benthic community recovery on the capped area.

If you have any questions or need additional information, please do not hesitate to get in touch.

Sincerely,

Joseph D. Germano, Ph.D.
President

References Cited:

Brannon, J.M.; Poindexter-Rollings, M.E. 1990. Consolidation and contaminant migration in a capped dredged material deposit. *The Science of Total Environment* 91:115-126.

Poindexter, M.E. 1979. Consolidation of confined dredged material. Proceedings of the Eleventh Dredging Seminar. Center for Dredging Studies, Texas A&M University, College Station, TX. Pages 231-250.

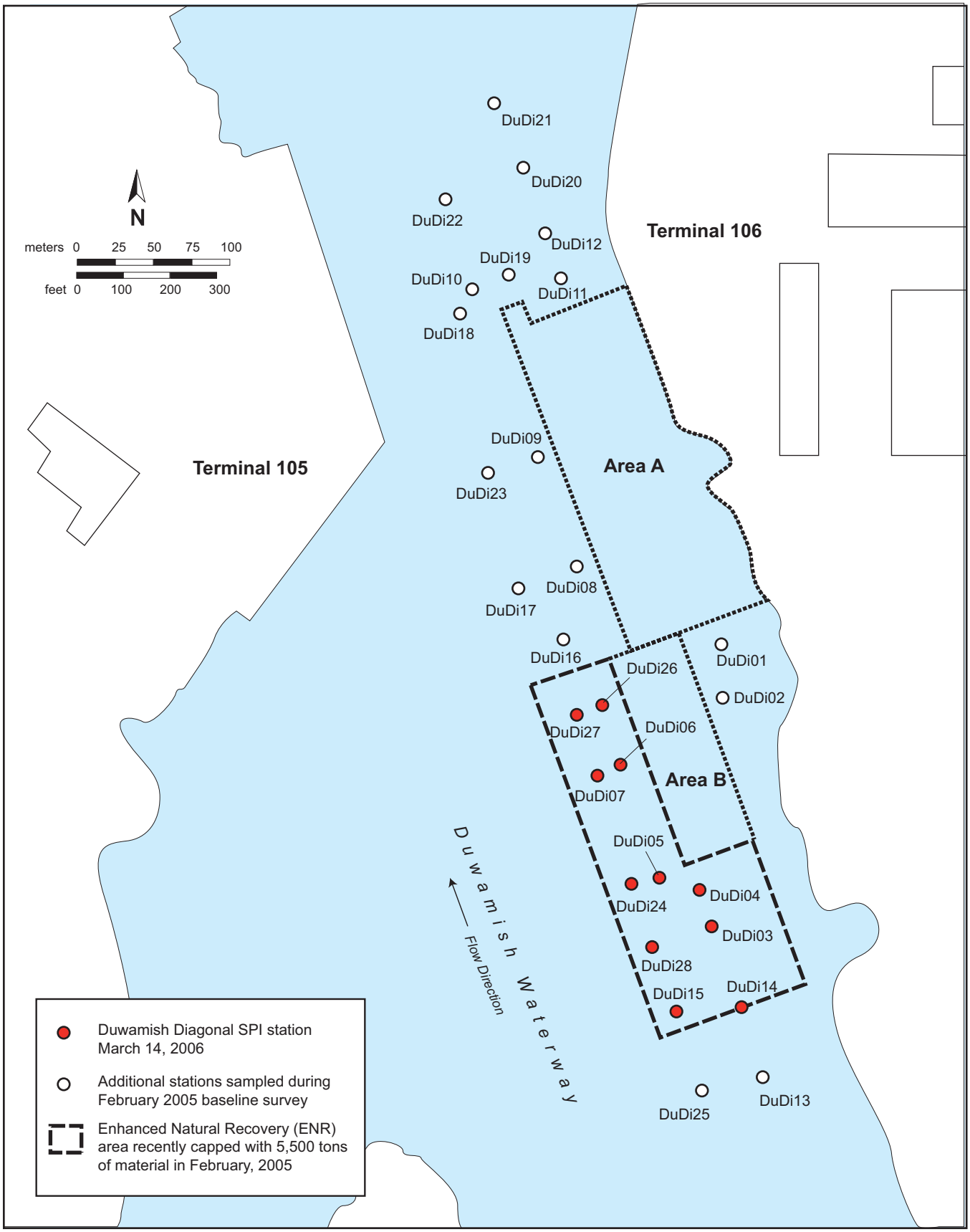

Figure 1. Map showing location of SPI stations sampled on March 14, 2006; Areas A and B had been previously dredged and capped.

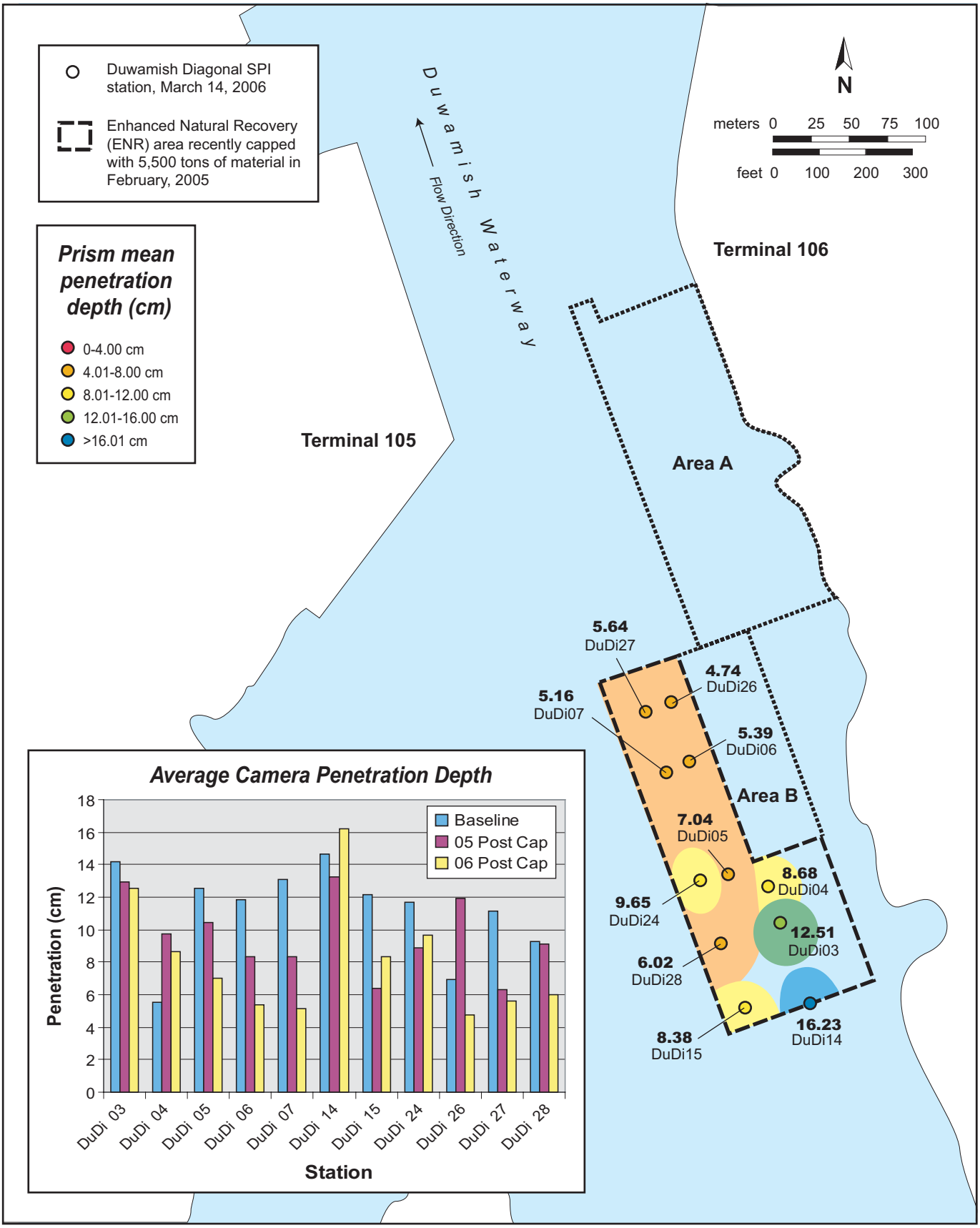

Figure 2. Mean prism penetration depth (cm); Duwamish Diagonal Second Post-Cap Survey.

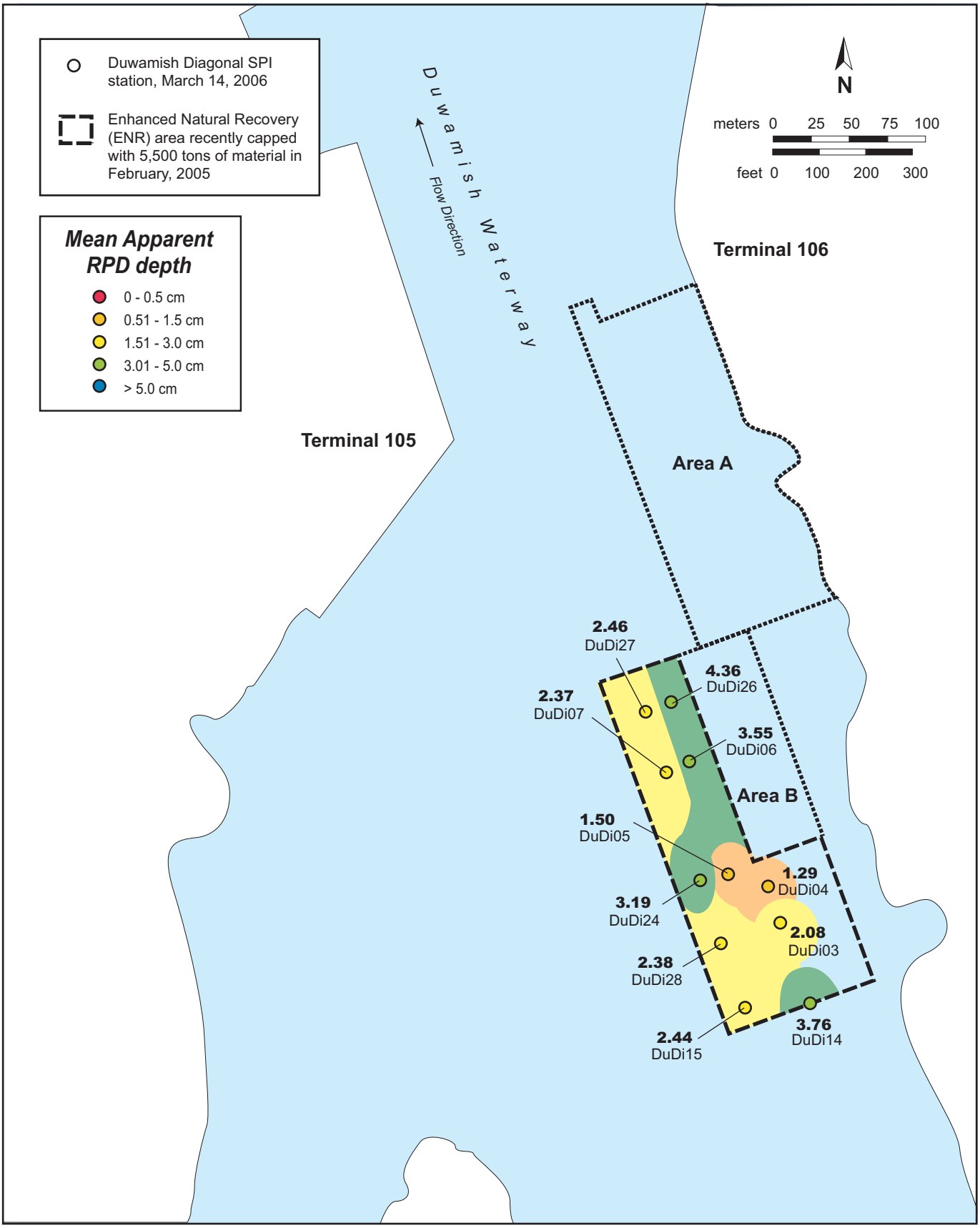

Figure 3. Mean apparent RPD depth (cm); Duwamish Diagonal Second Post-Cap Survey.

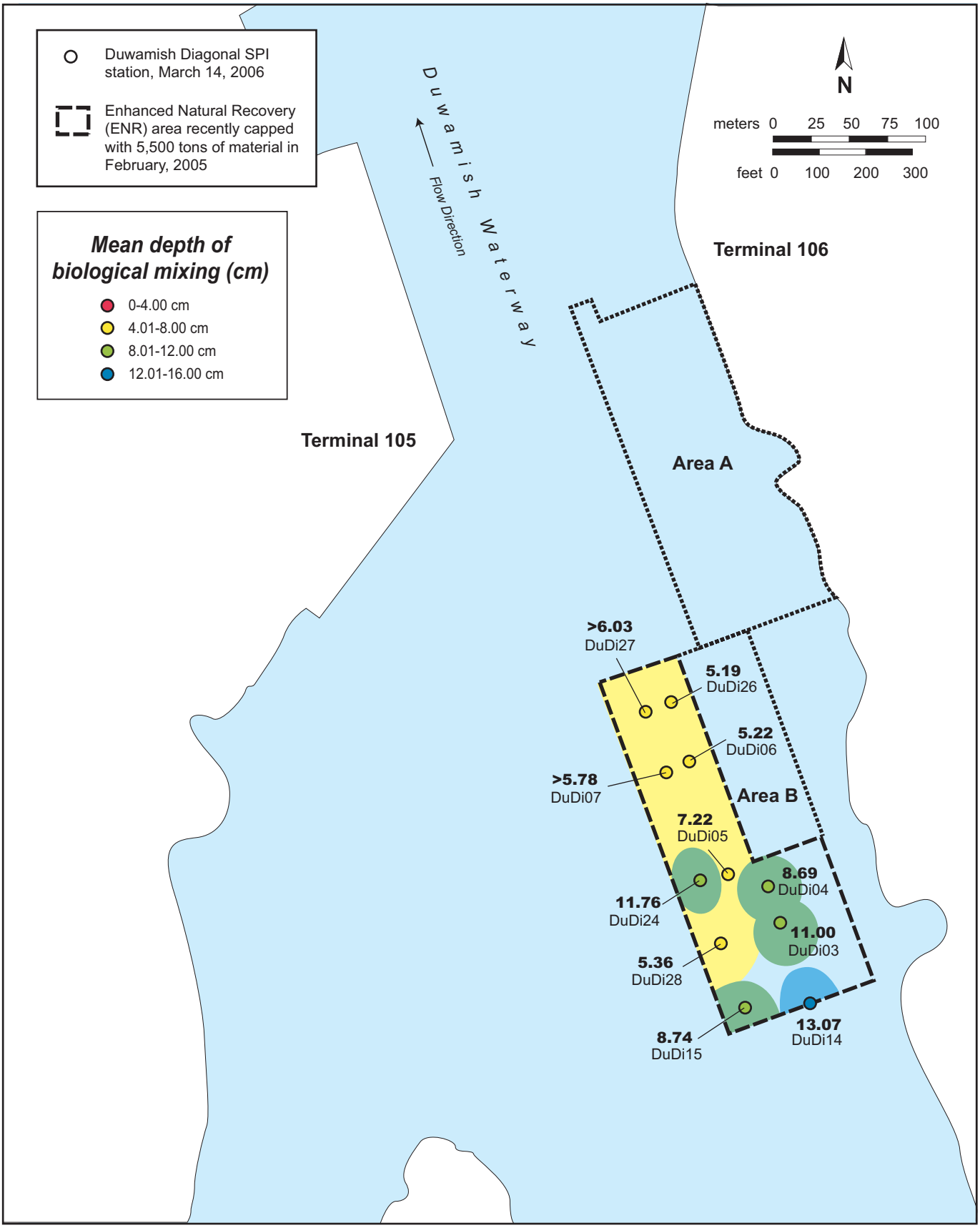

Figure 4. Mean depth of biological mixing (cm); Duwamish Diagonal Second Post-Cap Survey.

Table 1.		DUWAMISH DIAGONAL SPI SURVEY - Anchor Environmental, March 2006																
STATION	REP	Date	Time	Water Depth (m)	# of weights	Stop Collar settings (in.)	CAL	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	RPD AREA	RPD Mean (cm)	Grain Size Major Mode	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Bioturbation Depth (cm)	Cap Area (sq. cm)
DD-03	A	3/14/2006	12:43:26	10.8	5	NONE	14.27	210.30	14.74	14.16	15.22	30.15	2.11	4-3/0--1	-2	>4	9.83	210.30
DD-03	B	3/14/2006	12:44:38	10.9	5	NONE	14.27	163.43	11.45	11.23	11.95	31.03	2.17	4-3/1-0	0	>4	9.30	163.43
DD-03	C	3/14/2006	12:45:48	11.1	5	NONE	14.27	161.98	11.35	11.09	11.65	27.83	1.95	1-0/4-3/2-1	-2	>4	11.00	161.98
DD-04	A	3/14/2006	13:02:29	11.0	5	NONE	14.27	122.09	8.56	7.96	8.88	14.17	0.99	3-2/2-1	0	>4	8.41	122.09
DD-04	B	3/14/2006	13:03:17	10.9	5	NONE	14.27	149.25	10.46	10.25	10.53	20.21	1.42	3-2/2-1	0	>4	8.69	149.25
DD-04	C	3/14/2006	13:03:56	11.1	5	NONE	14.27	100.10	7.01	6.59	7.34	20.77	1.46	3-2/2-1	0	>4	>7.01	100.10
DD-05	A	3/14/2006	13:10:52	12.6	5	NONE	14.27	80.70	5.65	4.61	6.79	20.91	1.47	3-2	0	>4	5.17	80.70
DD-05	B	3/14/2006	13:12:02	12.7	5	NONE	14.27	109.63	7.68	6.90	8.74	17.86	1.25	3-2	-2	>4	7.22	109.63
DD-05	C	3/14/2006	13:12:47	12.6	5	NONE	14.27	110.90	7.77	7.34	7.96	25.26	1.77	3-2	-1	>4	6.54	110.90
DD-06	A	3/14/2006	13:18:09	12.3	5	NONE	14.27	76.41	5.35	4.92	5.56	55.31	3.88	2-1	0	>4	3.55	76.41
DD-06	B	3/14/2006	13:18:48	12.2	5	NONE	14.27	71.52	5.01	4.61	5.42	71.52	5.01	-1 - -2	-3	>4	2.88	71.52
DD-06	C	3/14/2006	13:19:24	12.2	5	NONE	14.27	82.71	5.80	4.89	6.81	25.21	1.77	3-2	-2	>4	5.22	82.71
DD-07	A	3/14/2006	12:13:53	12.2	5	NONE	14.27	66.76	4.68	4.22	5.39	38.84	2.72	4-3	-1	>4	>5.33	66.76
DD-07	B	3/14/2006	12:14:29	12.2	5	NONE	14.27	82.48	5.78	5.08	6.51	24.62	1.72	4-3	-2	>4	>5.78	82.48
DD-07	C	3/14/2006	12:15:06	12.2	5	NONE	14.27	71.47	5.01	4.50	5.64	37.93	2.66	2-1	-1	>4	4.36	71.47
DD-14	A	3/14/2006	12:31:17	10.9	5	NONE	14.27	241.74	16.94	16.59	17.15	52.25	3.66	4-3/2-1	-1	>4	13.07	241.74

Table 1.		DUWAMISH DIAGONAL SPI SURVEY - Anchor Environmental, March 2006																
STATION	REP	Date	Time	Water Depth (m)	# of weights	Stop Collar settings (in.)	CAL	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	RPD AREA	RPD Mean (cm)	Grain Size Major Mode	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Bioturbation Depth (cm)	Cap Area (sq. cm)
DD-14	B	3/14/2006	12:31:59	11.0	5	NONE	14.27	236.03	16.54	16.34	16.87	63.86	4.47	4-3/2-1	-1	>4	13.04	236.03
DD-14	C	3/14/2006	12:33:26	10.9	5	NONE	14.27	216.88	15.20	15.00	15.47	44.79	3.14	4-3/2-1	-1	>4	11.67	216.88
DD-15	A	3/14/2006	11:45:43	11.6	5	NONE	14.27	128.29	8.99	8.57	9.30	33.31	2.33	4-3/2-1	0	>4	8.74	128.29
DD-15	B	3/14/2006	11:46:23	11.7	5	NONE	14.27	121.89	8.54	8.21	8.91	34.15	2.39	4-3/2-1	-2	>4	8.48	121.89
DD-15	C	3/14/2006	11:46:57	11.6	5	NONE	14.27	108.39	7.59	7.12	8.04	36.96	2.59	4-3/2-1	0	>4	6.73	108.39
DD-24	A	3/14/2006	12:06:36	12.5	5	NONE	14.27	127.98	8.97	8.69	9.41	39.97	2.80	4-3/2-1	0	>4	8.38	127.98
DD-24	B	3/14/2006	12:07:30	12.6	5	NONE	14.27	169.65	11.89	11.23	12.15	51.18	3.59	4-3	-1	>4	11.76	169.65
DD-24	C	3/14/2006	12:08:08	12.6	5	NONE	14.27	115.52	8.09	5.86	9.58	Ind	Ind	4-3/2-1	0	>4	Ind	115.52
DD-26	A	3/14/2006	13:25:30	12.2	5	NONE	14.27	71.62	5.02	4.05	5.81	71.62	5.02	2-1	0	>4	3.27	71.62
DD-26	B	3/14/2006	13:26:18	12.3	5	NONE	14.27	55.60	3.90	3.57	4.05	55.60	3.90	2-1	-1	>4	3.49	55.60
DD-26	C	3/14/2006	13:26:55	12.3	5	NONE	14.27	75.91	5.32	4.94	5.86	59.40	4.16	3-2	-1	>4	5.19	75.91
DD-27	A	3/14/2006	12:21:02	12.2	5	NONE	14.27	91.58	6.42	6.14	6.67	48.25	3.38	3-2	0	>4	>6.03	91.58
DD-27	B	3/14/2006	12:21:48	12.1	5	NONE	14.27	80.96	5.67	5.28	6.09	33.62	2.36	4-3	0	>4	5.61	80.96
DD-27	C	3/14/2006	12:22:22	12.2	5	NONE	14.27	68.77	4.82	4.50	5.05	23.63	1.66	3-2	0	>4	4.44	68.77
DD-28	A	3/14/2006	11:56:45	12.2	5	NONE	14.27	89.06	6.24	5.56	6.59	27.38	1.92	3-2	0	>4	4.55	89.06
DD-28	B	3/14/2006	11:57:26	12.2	5	NONE	14.27	75.89	5.32	5.05	5.70	31.27	2.19	3-2	0	>4	4.80	75.89
DD-28	C	3/14/2006	11:58:40	12.3	5	NONE	14.27	92.83	6.51	6.09	6.73	43.18	3.03	3-2	0	>4	5.36	92.83

Table 1.								DUWAMISH DIAGONAL SPI SURVEY - Anchor Environmental, March 2006
STATION	REP		Mean Cap Thickness (cm)		Minimum Cap Thickness (cm)		Maximum Cap Thickness (cm)	Comments
DD-03	A	>	14.74	>	14.16	>	15.22	Cap + native >penetration. Poorly sorted very silty fine to medium sand over gravelly sand. The vertical position of the gravelly sand is similar to that observed in the first post-cap survey. Gravelly sand is 10.9 cm below SWI. Numerous mud and proteinaceous tubes at SWI, Several oxidized burrow traces extending from SWI to 5-6 cm below the SWI. Infaunalization occurring top-down. Abundant fines incorporated into the sediment column via depositional and bitourbational processes. Interesting.
DD-03	B	>	11.45	>	11.23	>	11.95	Cap +native>penetration. Tan very silty fine to medium sand over gray coarse sand. Infaunalization from top down with several oxidized burrow traces extending from SWI to depth. Organism in upper center. Numerous mud and proteinaceous tubes at SWI. Thin band of sorted medium sand at SWI from physical disturbance and winnowing, most likely related to prop wash. Mudclasts at SWI are also expression of physical disturbance. Abundant fines have been incorporated into sediment column since first post-cap survey.
DD-03	C	>	11.35	>	11.09	>	11.65	Coarse gravelly sand over poorly sorted very silty fine to medium sand over poorly sorted medium to coarse sand. RPD disturbed and recent physical disturbance based on moderately sorted sand band at SWI. A few small tube at SWI background and Numerous deep oxidized burrow traces in sediment column. No voids present. Abundant fines have been incorporated into the sediment column since the first port-cap survey.
DD-04	A	>	8.56	>	7.96	>	8.88	Poorly sorted very silty fine to medium sand over medium to coarse sand. Numerous well formed mud and proteinaceous tubes at SWI. Several oxidized burrow traces to depth and organism in lower left-center. Similar to first post-cap survey images but a much higher proportion of fines are assimilated into the sediment column. SWI shows evidence of winnowing and hydrodynamic physical disturbance.
DD-04	B	>	10.46	>	10.25	>	10.53	Poorly sorted very silty fine to medium sand over medium to coarse sand. Numerous well formed mud and proteinaceous tubes at SWI. Several oxidized burrow traces to depth and several small polychaetes in sediment column. Similar to first post-cap survey images but a much higher proportion of fines are assimilated into the sediment column. Similar to rep A in terms of stratigraphy.
DD-04	C	>	7.01	>	6.59	>	7.34	Poorly sorted very silty fine to medium sand over medium to coarse sand. Several oxidized burrow traces to depth, large organism in lower right and polychaete at right. A couple of sand/protein tubes at SWI. Similar to first post-cap survey images but a much higher proportion of fines are assimilated into the sediment column. Similar to reps A and B in terms of stratigraphy.
DD-05	A	>	5.65	>	4.61	>	6.79	Poorly sorted very silty fine to medium sand. Much more fine grained sediment in sediment column than in first post-cap survey. Bedform/ripple at SWI. Dense tubes at SWI and polychaete in upper center. Oxidized burrow to depth. Fines have been admixed into the sediment column since cap placement.
DD-05	B	>	7.68	>	6.90	>	8.74	Poorly sorted, very silty fine to medium sand. Some grave at SWI and bedform present. RPD is variable due to physical reworking. Dense tubes at SWI and polychaete in lower left. Silt proportion in sediment column has increased since the first post-cap survey. Gravel at depth in post-cap but not seen in this survey.
DD-05	C	>	7.77	>	7.34	>	7.96	Poorly sorted, very silty fine to medium sand. RPD is variable due to physical reworking. Dense tubes at SWI. Silt proportion in sediment column has increased since the first post-cap survey. Gravel at depth in post-cap but not seen in this survey. Three reps this station generally similar and appear much more fine grained than first post-cap survey. Colonization top-down.
DD-06	A	>	5.35	>	4.92	>	5.56	Sorted medium to coarse sand over poorly sorted medium to coarse sand. RPD physically controlled and upper sediment column looks to be recently resuspended. Dense fine tubes at SWI. Sorted material at SWI looks like cap material in first post-cap survey although the amount of fines in subsurface has increased relative to the first post-cap survey.
DD-06	B	>	5.01	>	4.61	>	5.42	Hard, tan, coarse sandy gravel. Similar to one rep of first post-cap survey but with a higher proportion of fines admixed into the sediment column. Abundant fine tubes at SWI and SWI appears periodically physically disturbed.
DD-06	C	>	5.80	>	4.89	>	6.81	Hard, tan to gray silty medium to coarse sand. Prominent bedforms at SWI. RPD physically influenced with deep RPD in ripple trough. Sediment column has much higher proportion of silt than in first post-cap survey. Recent resuspension at ripple apex. Sparse tubes on ripple and dense tube away from ripple.
DD-07	A	>	4.68	>	4.22	>	5.39	Hard, tan to gray poorly sorted very fine sand with a fraction of coarse sand/gravel. Bedform at SWI and abundant sand and proteinaceous tubes at SWI. RPD physically dominated. Much harder and much finer than first post-cap survey.
DD-07	B	>	5.78	>	5.08	>	6.51	Hard, tan to gray poorly sorted very fine sand with a fraction of coarse sand/gravel. Bedform at SWI and scattered gravels. Sand and proteinaceous tubes at SWI. RPD physically influenced. Much harder and much finer than first post-cap survey.
DD-07	C	>	5.01	>	4.50	>	5.64	Hard, tan to gray poorly sorted medium to coarse sand with a fraction of gravel. Bedform at SWI and scattered gravels. Sand and proteinaceous tubes at SWI. RPD physically influenced and highly variable. Twig/leaf litter at far right. Much harder and much finer than first post-cap survey. This rep most like first post-cap survey but still exhibits a higher proportion of fines.
DD-14	A	>	16.94	>	16.59	>	17.15	Soft, poorly sorted silty fine sand over medium to coarse sand. Upper portion of the sediment column is a mixture of recent deposition and cap sands. Distinct cap material similar to that seen in the first post-cap survey at bottom of frame. Very interesting. RPD physically influenced and based on the higher degree of sorting at the SWI, there is periodic resuspension. Dense tubes at SWI and several deep oxidized burrows.

Table 1.								DUWAMISH DIAGONAL SPI SURVEY - Anchor Environmental, March 2006
STATION	REP		Mean Cap Thickness (cm)		Minimum Cap Thickness (cm)		Maximum Cap Thickness (cm)	Comments
DD-14	B	>	16.54	>	16.34	>	16.87	Soft, poorly sorted silty fine sand over medium to coarse sand. Upper portion of the sediment column is a mixture of recent deposition and cap sands. Distinct cap material similar to that seen in the first post-cap survey at bottom of frame. Very interesting. RPD physically influenced and based on the higher degree of sorting at the SWI, there is periodic resuspension. Several mud tubes at SWI and deep oxidized burrow in lower center. Similar to rep A.
DD-14	C	>	15.20	>	15.00	>	15.47	Soft, poorly sorted silty fine sand over medium to coarse sand. Upper portion of the sediment column is a mixture of recent deposition and cap sands. Distinct cap material similar to that seen in the first post-cap survey at bottom of frame. Very interesting. RPD physically influenced and based on the higher degree of sorting at the SWI, there is periodic resuspension. A few tubes at SWI and three active feeding voids in lower left. Three reps are very similar.
DD-15	A	>	8.99	>	8.57	>	9.30	Firm, poorly sorted silty fine sand over medium sand. Proportion of fines in the sediment column has increased since the first post-cap survey. Numerous small tubes at SWI and several oxidized burrow traces extending 3-4 cm down from the SWI. Worm in lower center. Sediment in first post cap survey was dominantly gravel.
DD-15	B	>	8.54	>	8.21	>	8.91	Firm, poorly sorted silty fine sand over medium sand with some gravels. Proportion of fines in the sediment column has increased since the first post-cap survey. Numerous small tubes of at least four types at SWI and several oxidized burrow traces extending 3-4 cm down from the SWI. Abundant fecal material at SWI. Sediment in first post cap survey was dominantly gravel.
DD-15	C	>	7.59	>	7.12	>	8.04	Firm, poorly sorted silty fine sand over medium sand. Proportion of fines in the sediment column has increased since the first post-cap survey. Numerous small tubes at SWI and several oxidized burrow traces extending to depth. Mudclast at center SWI is an artifact. Sediment in first post cap survey was dominantly gravel. Three reps are similar and there is a distinct shift since last survey.
DD-24	A	>	8.97	>	8.69	>	9.41	Firm, tan to light gray poorly sorted silty fine to medium sand over medium to coarse sand. Appears much finer grained or higher proportion of silt within the sediment column compared to first post-cap survey. Numerous mudclasts at SWI from natural processes. RPD physically influenced. Several deep oxidized burrow traces and several tubes at SWI. First post-cap survey showed some gravels. Polychaete in lower left corner.
DD-24	B	>	11.89	>	11.23	>	12.15	Tan to light gray poorly sorted fine to medium sand with coarsest material at the bottom of the frame. Three small voids in upper sediment column. Dense tubes at SWI. RPD influenced by both physical and biological processes. Several deep oxidized burrow traced. Much finer grained in appearance than post cap survey with fines admixed into cap material. Material at bottom of frame is clearly cap material and upper portion of the sediment column is mostly cap material with fines admixed - similar to other stations from this survey.
DD-24	C	>	8.09	>	5.86	>	9.58	SWI disturbed with large mudclasts that are sampling artifacts. Cap sediment clearly visible at bottom of frame and upper portion of sediment column is a mix of recently incorporated fines and cap material. Reps a and B are similar, and C is likely similar but disturbed.
DD-26	A	>	5.02	>	4.05	>	5.81	Hard medium to coarse sand. Oxidized sediment to depth. Ripples at SWI and RPD physically influenced. Dense thin tubes at SWI. Similar to precap but with a much higher proportion of fines in the interstices between sand grains.
DD-26	B	>	3.90	>	3.57	>	4.05	Hard medium to coarse sand with some gravel. Oxidized sediment to depth that is physically controlled. Some tubes and fecal material at SWI. Similar to rep A.
DD-26	C	>	5.32	>	4.94	>	5.86	Hard tan to gray fine to medium sand. Dense tubes at SWI and a few pieces of gravel. RPD physically influenced and greater than penetration at right. Three reps are similar and appear finer grained than the first post-cap survey mostly due to sequestering/admixing fines into cap material.
DD-27	A	>	6.42	>	6.14	>	6.67	Hard, tan to light gray poorly sorted medium sand. Mudclasts at SWI that are not related to sampling. RPD physically influenced. A few small tubes at SWI and oxidized burrow trace at lower right. This station was devoid of fines in first port-cap survey. Fines have been incorporated and sequestered in sediment column. Bedform at SWI.
DD-27	B	>	5.67	>	5.28	>	6.09	Hard, tan to gray poorly sorted fine to medium sand. SWI appears to have been recently disturbed. Admixed fines and cap material. Very different from first post-cap survey. Shallow burrows.
DD-27	C	>	4.82	>	4.50	>	5.05	Hard tan to gray, poorly sorted medium sand. Broken tubes at SWI and a few shallow burrows. Almost identical to rep B.
DD-28	A	>	6.24	>	5.56	>	6.59	Hard tan to gray, poorly sorted medium sand. Numerous tubes of at least three types at SWI and several shallow burrows. Appears finer grained and harder than first-post cap survey. Gravels absent from this picture and present in first post-cap survey. RPD both physically and biologically influenced.
DD-28	B	>	5.32	>	5.05	>	5.70	Hard tan to gray, poorly sorted medium sand. A few tubes at SWI and several shallow burrows. Appears finer grained and harder than first-post cap survey. Gravels absent from this picture and present in first post-cap survey. RPD highly physically influenced. Similar to rep A.
DD-28	C	>	6.51	>	6.09	>	6.73	Hard tan to gray, poorly sorted medium sand. Dense tubes at SWI and several shallow burrows. Appears finer grained and harder than first-post cap survey. Gravels absent from this picture and present in first post-cap survey. RPD highly physically influenced. Similar to reps A and B.

Appendix F

Additional Long-term Data Analysis and Modeling

Introduction

This appendix describes modeling and data analyses completed to examine temporal trends in total PCB surface sediment concentrations of the different monitoring areas and to estimate the equilibrium total PCB concentration for all the remediated areas of the Duwamish Diagonal site. Simple 2-dimensional models were used to estimate the 10-year average surface sediment PCB concentrations as well as the recovery rate in the Perimeter Area and time to equilibrium in the enhanced natural recovery (ENR) area.

The Perimeter Area is functionally a Monitored Natural Recovery (MNR) area in this exercise because it has been undergoing natural recovery over the monitoring period. This allows a direct comparison of MNR to ENR in areas under similar river current, sedimentation, and vessel traffic conditions.

As part of work done for the Lower Duwamish Waterway (LDW) Feasibility Study, modeling was conducted to predict when the sediment concentrations would reach equilibrium and predict the resulting surface sediment PCB equilibrium surface area-weighted concentration (AECOM 2012). These same models were applied at the Duwamish Diagonal site to estimate the 10-year average PCB concentration in the ENR and Perimeter (referred to as MNR when evaluated using models) Areas. In addition, a different model using output from the LDW modeling work was used to estimate annual changes in PCB concentrations with time. These modeling estimates in combination with the empirical monitoring data describe how recovery is progressing at Duwamish Diagonal. Comparison of modeled and empirical PCB concentrations also aids in assessing function and stability of the ENR thin layer.

This appendix builds on previous work, which compared empirical and model-predicted response, and demonstrated that PCB concentrations in Duwamish Diagonal ENR and MNR areas are responding faster than predicted but average concentrations in these areas are in the range of model predictions (Stern et. al. 2009).

Methods

This section describes how empirical data were analyzed to generate average PCB concentrations for each monitored area as well as a remediated area average concentration. The models and modeling assumptions used for predicting a 10-year average PCB concentration and annual average concentrations for the MNR and ENR areas are also summarized.

Empirical Data Analysis

To examine change over time, the average concentration of PCBs was calculated using empirical data for each year in the each of the following areas: Cap A, Cap B, ENR and Perimeter. This calculation was straightforward for Cap Areas A and B (i.e., all five Area A stations or all three Area B stations were included); however, the stations included in the ENR Area and the Perimeter Area varied according to site and sampling events. The ENR Area average includes stations 3C-7C, 14C and 15C and these stations were sampled in the

pre-ENR sampling event in 2005. The Perimeter Area average included stations 1C - 12C from 2003 through 2004, and in 2005 the average also included 13C because this station was added for the 2005 pre-ENR sampling event. From 2006 to 2010, the Perimeter Area was defined as stations 1C, 2C, 8C-13C. The missing stations from 2006 to 2010 (i.e., 3C-7C) were those covered by the thin-layer sand placement of the ENR. The 2006-2010 station set in the Perimeter Area is sampled to monitor natural recovery at the site.

A second type of average was calculated as an average of PCB concentrations in the entire remediated area (i.e., cap and ENR stations) in 2010. This average is intended to represent the approximate PCB concentration to which the site is equilibrating, considering that the remediated area PCB concentrations have been relatively stable since 2007. In contrast, the Perimeter Area PCB concentrations are consistently decreasing but are still higher on average than the remediated areas. Annual mean PCB concentrations from each individual area over years 2005-2010 are compared to the cap and ENR remediated area mean based on 2010 data. This provides an alternative method to assess the relative response of each area over time.

Modeling Year 10 Average PCB Concentrations

The LDW Sediment Transport Model (STM) (QEA 2008) was used in the LDW Feasibility Study to predict the net sedimentation rate and bed composition[1] for grid cells (approximately 100 x 300 foot) across the Lower Duwamish Waterway over a defined time period. Another model called the Bed Composition Model (BCM) used the output from the STM and best estimates of component concentrations to predict surface sediment chemical concentrations for the LDW in five year intervals (AECOM 2012, Appendix C Part 1). The BCM assigns chemical concentrations to each bed fraction (generated by the STM) from the best estimate of multiple lines of evidence for the original bed, lateral, and upstream components (Table 5-2a in AECOM 2012) and calculates surface sediment chemical concentrations using a 10-by-10 foot grid. The Feasibility Study used the BCM to predict total PCB surface sediment concentrations in the LDW for each remedial alternative.

The BCM model was applied to the Duwamish Diagonal site using Duwamish Diagonal area-specific output from the LDW STM in combination with empirical monitoring data as described here. This model is herein referred to as the Duwamish Diagonal BCM. The Duwamish Diagonal BCM was used to predict the mean total PCB concentration in the MNR Area after 10 years and the mean total PCB concentration in the ENR after 10 years under two scenarios: one where ENR placement never occurred and natural recovery was evaluated in absence of ENR; and one where ENR placement occurred and time to equilibrium was evaluated.

For the Duwamish Diagonal BCM, the bed fractions used were those predicted by the LDW

[1] Bed composition is based on three different types of solids: suspended solids from the upstream inflow; suspended solids from lateral inflows; and bed sediments which include original bed and any resuspended bed sediments that have been deposited.

STM[2] at each monitoring station located in the MNR and ENR areas (Table F-1). The PCB concentrations assigned to the original bed component were assumed to be 2005 post-ENR empirical data in the ENR area, and 2005 pre-ENR empirical data for the MNR area. 2005 pre-ENR empirical data was also used for modeling time to equilibrium in the ENR area. Resuspended bed sediment was added as another input to the Duwamish Diagonal BCM since the STM also tracked this component. Resuspended bed PCB concentrations were assumed to reflect the LDW Feasibility Study baseline surface-area weighted average for the LDW (350 µg/kg dw). Lastly, the PCB concentrations assigned to the upstream and lateral components were the same as the best estimates assigned in the LDW BCM input (Tables 5-1a and 5-1b in AECOM 2012). The Year 10 individual MNR and ENR sampling station surface sediment PCB concentrations predicted by the Duwamish Diagonal BCM were averaged for their respective areas to calculate the Year 10 estimated PCB concentration for each area.

Table F-1. Inputs to the Duwamish Diagonal BCM Model to Predict Year 10 PCB Concentrations by Area.

<table>
<tr><td rowspan="3">Area</td><td>Input</td><td colspan="4">Input</td></tr>
<tr><td>Bed Fraction</td><td colspan="4">Source of PCB Concentrations for Bed Components</td></tr>
<tr><td></td><td>Original Bed</td><td>Resuspended Bed</td><td>Upstream</td><td>Lateral</td></tr>
<tr><td>ENR</td><td rowspan="3">Year 10 LDW STM output (AECOM 2012)</td><td>2005 Post-ENR monitoring data</td><td rowspan="3">Surface-area weighted average concentration from LDW[2]</td><td rowspan="3">LDW best estimate[3]</td><td rowspan="3">LDW best estimate[3]</td></tr>
<tr><td>ENR Area Natural Recovery</td><td>2005 Pre-ENR monitoring data</td></tr>
<tr><td>MNR</td><td>2005 Pre-ENR monitoring data[1]</td></tr>
</table>

[1] No post-ENR sampling was conducted at the perimeter MNR stations
[2] From LDW Feasibility Study Section 2.3.2.1 (AECOM 2012)
[3] From LDW Feasibility Study Tables 5-1a and 5-1b (AECOM 2012)

Modeling Annual Response in ENR and MNR Areas

A simple sediment recovery model (SEDCAM) was used to compare annual modeled responses in sediment chemistry to the empirical monitoring results. The previous modeling efforts did not allow annual estimates because the LDW BCM generated outputs on 5-year intervals. The SEDCAM model (Jacobs et al. 1988) considers the following variables that can be important to recovery in some aquatic systems:

- Initial chemical concentrations in surface sediments (the mixed layer)
- Sedimentation rate
- Chemical concentration of the settling sediments (i.e., lateral, upstream and resuspended)
- Sediment physical characteristics (grain size, water content, specific gravity)
- Mixed layer depth

[2] These fractions were extracted from the input files to the LDW BCM for ease of identifying the STM output that corresponds to each monitoring station location in the ENR and MNR areas.

- Biodegradation rates.

The algorithm applied in SEDCAM follows (Equation F-1).

$$c(t) = c_i\left[1-\exp\left(-\frac{m}{S}\right)t\right] + c_o \exp\left[-\frac{m}{S}\right]t \qquad \text{Equation F-1}$$

where:

c(t) = concentration at time t

m = mass accumulation or sedimentation rate (mg/m2/s)

c_i = chemical concentration falling into sediment bed (µg/kg dry wt)

c_o = sediment chemical concentration (µg/kg dry wt)

S = sediment density (solids concentration and specific gravity) per mixed layer depth (mg/m2)

t = time (s)

A biodegradation rate is not in this simplified variation of the SEDCAM algorithm because biodegradation was assumed to be insignificant for this short forecasting time. SEDCAM was run using average concentrations across stations in an area. Chemical concentration inputs were the same as those discussed for the Duwamish Diagonal BCM (Table F-2). However, the concentration used for the resuspended sediment settling on the bed was estimated by the surface area-weighted average concentration (SWAC) of the surrounding sediments (within 1000 m of Diagonal Duwamish CSO/SD)(Stern et al. 2009), because LDW Feasibility Study (AECOM 2012; Appendix C) demonstrated that most of the bed material resuspended in a reach, deposited within the same reach. The parameter C_i is a weighted PCB concentration based on fractions of lateral, upstream and resuspended bed sediment predicted to be in the active surface sediment layer by the LDW STM at Year 10. The Duwamish Diagonal net sedimentation rate was assumed to be the average of LDW STM-predicted Year 10 rates for any grid cell that overlapped by more than 50 percent with the Diagonal MNR or ENR areas (1.03 cm/yr). The average mixed layer depth was assumed to be the same as that used in the LDW Feasibility Study (10 cm) and compares favorably with sediment profile imaging-based estimates (see Appendix E).

Table F-2. Data Sources for SEDCAM terms

Parameter Name	Symbol	Source
Sedimentation Rate	m	Average of Year 10 STM sedimentation rates of all grid cells overlapping the study area by more than 50 percent (1.03 cm/yr)
PCB concentration falling on sediment bed[1]	c_i	PCB concentrations same as Duwamish Diagonal BCM for lateral and upstream (see Table F-1) and 1000m SWAC for resuspended bed (Stern et al. 2009); Fraction of each based on LDW STM Year 10 output
PCB concentration in original bed	c_o	Same as original bed used in Duwamish Diagonal BCM; see Table F-1
Sediment density	S	Same as LDW (QEA 2008)
Time	t	User-defined (Year)

[1] This term represents the weighted sum of the three components settling on the original bed: resuspended bed, upstream and lateral sediments.

SEDCAM was also run using a higher sedimentation rate (3.0 cm/yr) than the LDW STM predicted rate to see if this would account for lower sediment concentrations observed in the monitoring data. Looking at the model terms that can be varied, sedimentation rate has the most influence on the model output.

Results

Based on 2005-2010 empirical data, Figure F-1 shows the average PCB concentrations in each of the remediated areas (Cap Areas A and B and the ENR Area) are stabilizing and approaching approximately the same value. The average PCB concentration of these remediated areas combined in 2010 is 60.8 µg/kg dw. Figure F-1 displays how different the average PCB concentration in each individual area over time is from this 2010 estimate of equilibrium.

Contamination events that occurred and were discussed in the main document can be seen in Figure F-1. The PCB residuals effect from dredging Areas A and B is reflected in the 2005 pre-ENR average PCB concentration in the ENR Area. Also, the recontamination in front of the CSO/SD outfall (Main Report, Section 4.1.2.1), is apparent in the Cap Area A average for 2005 and 2006. Other than these events, average PCB concentrations in the cap and ENR areas are generally changing little year-to-year and appear to be receiving sediment input of relatively similar PCB concentration. This finding is consistent with the LDW conceptual site model that most deposition throughout the site is from upstream input, even close to large lateral inputs (AECOM 2012).

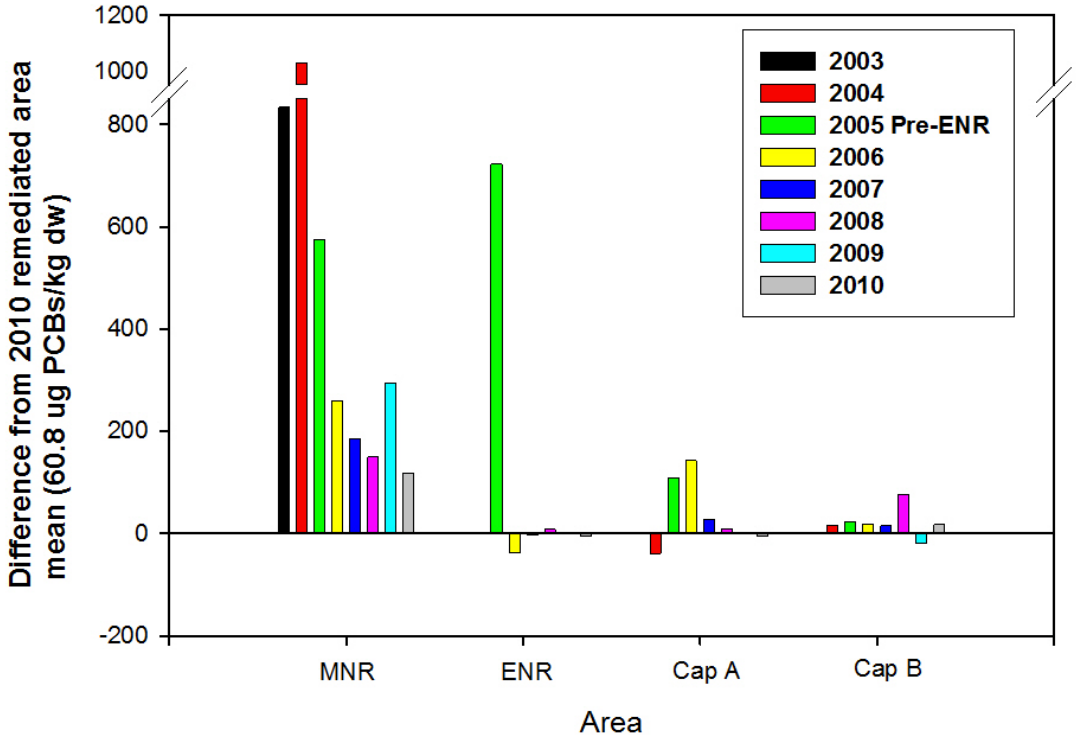

Figure F-1. Surface Sediment Mean Total PCBs by Area Compared to the 2010 Mean of All Remediated Areas Combined (Cap and ENR Areas)

Regardless of remedy, all the remediated Diagonal areas, except perhaps the MNR Area, appear to be equilibrating to a PCB concentration (Figure F-2) that is within the site-wide range predicted for the LDW at Year 10 in the Feasibility Study modeling (46-120 µg/kg dw), as well as close to that predicted more locally for Reach 1[3] at Year 10 (84 µg/kg dw) (AECOM2012). Figure F-1 also demonstrates that annual variability of deposition, source inputs, and disturbances can have fairly significant short-term deviations from the mean. The MNR Area may also eventually reach the same or a different equilibrium as the Cap and ENR areas depending on the frequency and magnitude of disturbance experienced at individual stations. Disturbance in a portion of the MNR area will result in short-term increases in the area mean and the frequency of disturbance events will control the long-term average concentration.

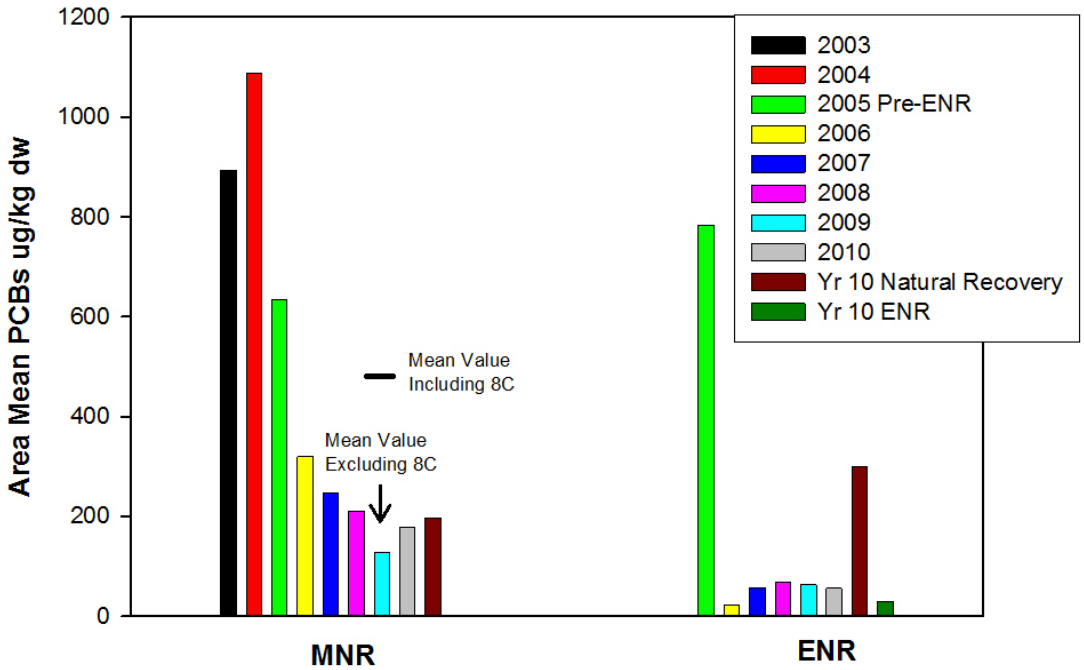

Figure F-2. Measured MNR and ENR Area Surface Sediment Total PCB Mean Concentrations Over Time and Year 10 Model Predicted Means.

Figure F-2 presents the empirical MNR and ENR area average PCB concentrations over time following remedial action and compares these averages with the Duwamish Diagonal BCM Year 10 model prediction for each area. The PCB residuals effects from dredging Areas A and B are reflected in the elevated MNR 2004 average PCB concentration which thereafter consistently decreased over time. The exception is in 2009 due to the high PCB concentrations measured at station 8C. As described in the main report (Section 4.1.2.3), the high number of replicate sediment grab samples collected over multiple years at this

[3] Reach 1 in the LDW Feasability Study is defined as the reach between river mile 0 and 2.2. River mile 0 starts at the south end of Harbor Island.

site resulted in suspected removal of overlying silt and exposure of underlying sediments with elevated PCB concentrations. The mean calculated without Station 8C is more consistent with the trend. The 2005 pre-ENR empirical means for the MNR and ENR areas demonstrate that dredge residuals were higher in the area designated for ENR. The ENR Area concentration fell steeply following thin layer placement of sand and then exhibited a slow upward trend before stabilizing.

These empirical trends were compared to Duwamish Diagonal BCM Year 10 model-predicted means for the same areas (Figure F-2). As noted in Table F-1, the 2005 pre-ENR remedy concentrations in the ENR area were set as the base condition for modeling the 10-year Natural Recovery estimate whereas the 2005 post-ENR remedy concentrations were the base condition for the 10-year ENR estimate. Modeling of the MNR area started with 2005 pre-ENR concentrations. The 2010 (Year 7) empirical area mean PCB concentrations in the MNR and ENR Areas (179 and 68 µg/kg dw respectively) are lower than the Year 10 model-predicted area mean PCBs concentrations for natural recovery (197 and 299 µg/kg dw respectively). In the MNR Area, the 2010 (Year 7) mean concentration suggests that recovery as of 2010 is occurring faster than predicted by the modeling. In the ENR Area, empirical concentrations are much lower than predicted to result from natural recovery alone at Year 10; demonstrating the benefit of ENR in this situation. The ENR Area appears to have increased faster than predicted; the ENR empirical mean concentration in 2010 (Year 7) has already surpassed the concentration predicted in Year 10 under the ENR scenario (68 versus 30 µg/kg dw). However, this assumes that the predicted Year 10 mean concentration is not yet at equilibrium. Because the Duwamish Diagonal BCM model results only provide a single mean concentration at Year 10, it is uncertain when the model predicts equilibrium would be achieved. Results of the SEDCAM modeling discussed below explore this issue further.

Figure F-3 presents the SEDCAM-predicted surface sediment PCB concentrations over time for the MNR and ENR Areas plotted against each area's empirical mean PCB concentrations. The predicted concentrations of SEDCAM at Year 10 match well those of the Duwamish Diagonal BCM: 211 compared to 197 µg/kg dw in the MNR area and 30 compared to 30 µg/kg in the ENR area. The SEDCAM results suggest that both models are under-predicting the recovery rate in the MNR area and the time to equilibrium in the ENR area. These models do not incorporate the effects of local anthropogenic disturbances (e.g., spudding, vessel maneuvering) which may cause sediment resuspension and redistribution in the Diagonal site. However, this would not explain quicker recovery of the MNR area.

Lower or higher PCB concentrations of incoming particles than predicted in the model could explain faster recovery of contaminated areas or reaching equilibrium faster in clean areas but cannot explain both these effects occurring simultaneously. One hypothesis that would explain co-occurrence of these effects is if there is more sediment from upstream (i.e., the fraction of lowest mean concentration) depositing than assumed in the model. The faster observed recovery in MNR area and faster time to equilibrium in the ENR area compared to predicted may be due to three large flow events which occurred during the period from 2005 to 2008 that were over 11,000 CFS equating to roughly >20-year-return-

frequency to >50-year-return-frequency flow events[4] (USGS 2014). The occurrence of these low frequency, high flow events over a small time scale may have resulted in higher deposition than predicted using a 10 or 30 year average deposition rate. Higher deposition rates are typically associated with high flow events. This relationship is consistent with the LDW STM which demonstrated most of the total 30-year deposition coincided with high flow events (QEA 2008). The LDW-predicted sedimentation rates for the Duwamish Diagonal area ranged from 0.2 to 5.7 cm/yr depending on the yearly flow events. In other words, annual sedimentation rates vary substantially and years with high flow events will have deposition rates higher than the long-term average. Higher than average sediment rates during a short time period could explain why the annual responses predicted by SEDCAM do not match annual empirical means well.

To test this hypothesis, the assumed sedimentation rate was increased in the SEDCAM model, until it provided the best fit to empirical mean ENR and MNR Area PCB concentrations (Figure F-4). With one exception, best fit was seen when increasing the sedimentation rate from 1.03 to 3.0 cm/yr. The exception is in 2009 due to the high PCB concentrations measured at station 8C in the MNR area. As described above and in the main report (see Section 4.1.2.3), the suspected increased removal of overlying silt and exposure of underlying sediments from replicate sampling could have caused the observed elevated PCB concentrations. If the concentration from 8C is removed from the 2009 average, the average drops to 128 µg/kg dw, much closer to the predicted best-fit value. In the long term, the average sedimentation rate in the area is expected to approach the average predicted rate of 1.03 cm/year. That would delay the time predicted to reach equilibrium by several years compared to the SEDCAM prediction but not necessarily change the final equilibrium level. Using a higher net sedimentation rate of 3.0 cm/yr yields a sooner SEDCAM-predicted equilibrium of approximately 45-52 µg/kg dw, close to the 2010 empirical remediated area mean concentration (about 60 µg/kg).

[4] The return frequency is the calculated flow rate predicted to occur with a frequency of once during those specified years for the Lower Duwamish River based on the historical measured flows.

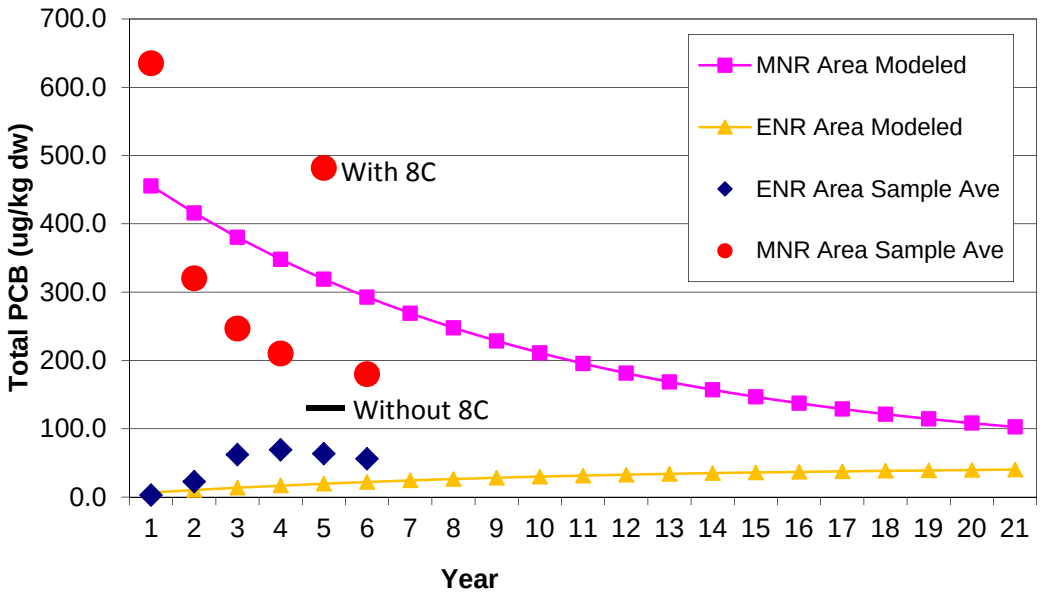

Figure F-3. Measured Surface Sediment Mean PCB Concentrations in ENR and MNR Areas Compared to SEDCAM Model Estimates Over Time Using a Net Sedimentation Rate of 1.03 cm/yr (Year 1 is 2005)

Comparing empirical sediment concentrations to those predicted by SEDCAM aids in assessing if mixing of underlying sediment into the surface layer may be occurring. If mixing of the contaminated original sediment with the ENR layer was occurring due to bioturbation or physical mixing, the surface sediment monitoring data would be expected to show higher PCB concentrations than if this mixing was not occurring. The SEDCAM model assumes bioturbation to 10cm, thus, its output would approximately reflect complete mixing of sediment concentrations within the bioturbation zone. Since the bioturbation zone is shallower than the thin-layer sand, the SEDCAM model currently does not predict any original bed sediment input into the thin-layer. Because the bed sediments underlying the ENR sand layer have over 1 order of magnitude higher PCB concentrations than other incoming sediment fraction concentrations (738 µg/kg average compared to 45 µg/kg average), only a relatively small component would need to be mixed in to see significant increases above the empirical concentrations. Since empirical average concentrations in the ENR Area are just slightly higher than predicted, this is a line of evidence suggesting mixing of the original bed sediments with the ENR sediments is not occurring, at least not to a significant degree.

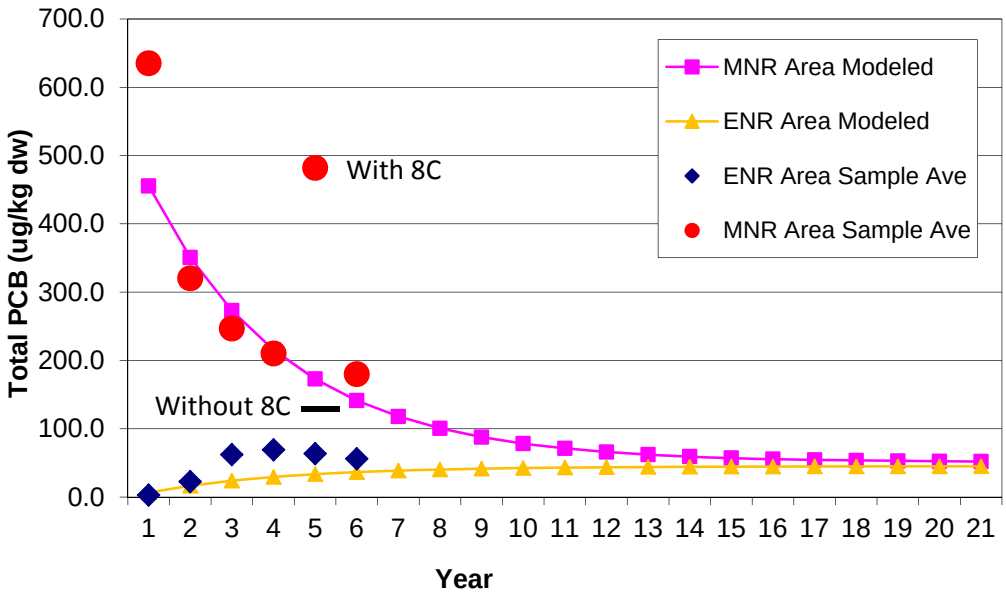

Figure F-4. Measured Surface Sediment Mean PCB Concentrations in ENR and MNR Areas Compared to Best Fit SEDCAM Model Estimates Over Time Using a Net Sedimentation Rate of 3.0 cm/yr (Year 1 is 2005)

The modeling results also allow a second assessment of mixing of underlying sediment into the surface layer, providing another line of evidence on stability of the ENR area. If the initial ENR layer is subject to enough erosive forces, it could thin to the point that underlying, original bed sediment with higher PCB concentrations would begin mixing by bioturbation or physical mixing into the surface layer and increase sampled surface concentrations. Because the bed sediments underlying the ENR sand layer have over 1 order of magnitude higher PCB concentrations than other incoming sediment fraction concentrations (738 µg/kg average compared to 45 µg/kg average), only a relatively small component would need to be mixed in to see significant increases above the measured concentrations. Given (1) empirical mean concentrations in the ENR Area have shown small changes and most recently, decreases, and (2) 2010 ENR average concentration is only slightly higher than that predicted by the Duwamish Diagonal BCM , suggests that ENR layer integrity has not been substantially compromised throughout the monitoring period.

As MNR relies on the same processes as ENR to achieve remedial objectives, a similar assessment of the MNR stations can be used to assess the performance of natural recovery in the MNR areas. As natural recovery is slowly burying the higher concentration sediments, areas experiencing scour could expose those sediments or bring them into the bioturbation zone. Because those older and now deeper sediments are up to approximately 1 order of magnitude higher in PCB concentration than more recent surface sediments, the average MNR concentration would be expected to increase if scouring was occurring. However, a downward trend can be seen at MNR stations with the exception of station 8C. As discussed above, there is another potential explanation for the increase seen

at station 8C. This evaluation suggests that overall the MNR Area has likely been relatively stable throughout the monitoring period.

Conclusions

The SEDCAM best-fit model predicts both MNR and ENR areas will equilibrate at a long-term PCB concentration of around 45-52 µg/kg dw. This is close to the 61 µg/kg dw to which all areas appear to be equilibrating based on 2010 empirical data (see Figure F-1). While the annual variability demonstrated in the monitoring data suggests the area means will vary depending on factors such as weather patterns which affect local discharges and upstream deposition or localized scour, both MNR and ENR equilibrium estimates are within the range predicted for the Lower Duwamish and Reach 1 by LDW Feasibility Study BCM (AECOM2012).

The comparison of empirical to modeled annual responses suggest modeling can predict the recovery rate for MNR and time to equilibrium for ENR relatively accurately but that the inherent variability in flow rates with their resulting deposition can be a confounding factor, particularly over shorter time frames. The SEDCAM best-fit model results also suggest that under-prediction of recovery rate and time to equilibrium may be due to a higher than predicted mass of sediment entering from upstream (i.e., higher sedimentation rate than predicted) and less likely due to inaccuracy in their associated PCB input concentrations. Regardless of model performance, the monitoring data support the LDW Conceptual Site Model that this area is undergoing recovery (AECOM 2012). The BCM 10 Year concentration estimates appear slightly conservative in estimating recovery and time to equilibrium but additional chemistry monitoring over a sustained low-flow, low deposition period would help validate this conclusion.

Both MNR and ENR remediation methods rely on relatively stable sediments for recovery to be successful. Absence of chemical signals from underlying sediments suggests both the MNR and ENR Areas have been stable throughout the monitoring period. The single exception is station 8C which was subject to excessive sediment removal by replicate composite sampling. Both MNR and ENR are functioning as intended to reduce concentrations below remedial action levels in areas with surface PCB concentrations higher than the upper concentration limits (two times the SQS) proposed by EPA (EPA 2013).

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