AECOM
1111 3rd Ave
Suite 1600
Seattle, WA 98101
www.aecom.com

206 438 2700 tel
866 495 5288 fax

Data Validation Report

Project:	Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling Portland Harbor Superfund Site Sediment Traps
Laboratory:	ALS Environmental, Kelso, WA
Laboratory Group:	K1903990
Analyses/Method:	Chlorinated Pesticides, Tributyltin, Polycyclic Aromatic Hydrocarbons (PAHs), bis(2-Ethylhexyl)phthalate, and Total Solids
Validation Level:	Stage 2A
AECOM Project Number:	60566335 Task #2.12
Prepared by: Lucy Panteleeff/AECOM	Completed on: May 16, 2019
Reviewed by: Jennifer Garner/AECOM	File Name: K1903990 DVR

SUMMARY

The data quality review of 4 sediment trap samples and one rinsate blank collected on May 1, 2019, has been completed. Samples were analyzed for chlorinated pesticides by EPA Method 1699-modified (GC/MS/MS), tributyltin by Krone et al. (sediments) or Unger et al. (water), PAHs by EPA Method 8270D modified by selected ion monitoring (SIM), bis(2-ethylhexyl)phthalate by EPA Method 8270D, and/or total solids by EPA Method 160.3-modified at ALS Environmental (ALS) located in Kelso, Washington. The analyses were performed in general accordance with the methods specified in EPA's *Test Methods for Evaluating Solid Waste (SW-846)*, *Method 1699: Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS*, December 2007 (modified by ALS SOP SVM-PESTMS2), and *Methods for Chemical Analysis of Water and Wastes*, March 1983, and Krone, CA et. al*., A Method for Analysis of Butyltin Species and Measurement of Butyltins in Sediment and English Sole Livers from Puget Sound*, NOAA, November 1988, and/or Unger, MA et al., *Determination of Butyltins in Natural Waters by Flame Photometric Detection of Hexane Derivatives and Mass Spectrometric Confirmation, Chemosphere, 1886,16(4):461-470*. The laboratory provided level 2 and level 4 data packages containing sample results and associated quality assurance (QA) and quality control (QC) data, preparation logs, and raw instrument outputs (where applicable). The following samples are associated with laboratory group K1903990:

Sample ID	Laboratory ID
PDI-ST-T07A-1905	K1903990-001
PDI-ST-T07B-1905	K1903990-002
PDI-ST-T06B-1905	K1903990-003
PDI-ST-T06A-1905	K1903990-004
PDI-RB-ST-190501 (rinsate blank)	K1903990-005

Data validation is based on method performance criteria and QC criteria documented in the *Quality Assurance Project Plan (QAPP),* dated December 19, 2018. If data qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA documents *USEPA National Functional Guidelines for Organic Superfund Methods Data Review*, January 2017, and *USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review,* January 2017. Data qualifiers assigned to results reported in this sample set are included in Table 1.

SAMPLE RECEIPT

Upon receipt by ALS, the sample jar information was compared to the chain-of-custody (COC) and the cooler temperature was recorded. No discrepancies related to sample identification were noted by ALS and the cooler was received at a temperature within the EPA-recommended limits of greater than 0°C and less than or equal to 6°C.

ORGANIC ANALYSES

Samples were analyzed for chlorinated pesticides, tributyltin, PAHs, and bis(2-ethylhexyl)phthalate by the methods identified in the introduction to this report.

1. Holding Times – Acceptable except as noted below:

   PAHs by EPA Method 8270D-SIM –The rinsate blank (PDI-RB-ST-190501) was re-extracted one day outside of the 7-day holding time due to the presence of water in the initial extract. The results for all PAHs in PDI-RB-ST-190501 were qualified as estimated and flagged 'UJ' based on the holding time exceedance.

2. Initial and Continuing Calibration Verifications – Acceptable except as noted below:

   Chlorinated Pesticides by EPA Method 1699-modified – The percent difference (%D) for 4,4'-DDE (-28.1%) was below the method limit of ±20% in the continuing calibration verification (CCV) analyzed on May 10, 2019. The results for 4,4'-DDE in all sediment samples reported in this laboratory group were qualified as estimated and flagged 'J' based on this CCV result.

   Tributyltin by Krone et al. – The %Ds for the surrogate tri-n-propyltin exceeded the method limit of ±25% in two CCVs analyzed on May 10, 2019 (32.5%) and May 11, 2019 (31.1%). Data were not qualified based on surrogate %Ds in CCVs.

   PAHs by EPA Method 8270D-SIM – The %D for indeno(1,2,3-cd)pyrene (22.0%) exceeded the method limit of ±20% in the CCV analyzed on May 8, 2019. The results for indeno(1,2,3-cd)pyrene in all sediment samples reported in this laboratory group were qualified as estimated and flagged 'J' based on this CCV result.

3. Blanks – Acceptable except as noted below:

   General – One rinsate blank (PDI-RB-ST-190501) was submitted with this laboratory group. Multiple analytes were detected in this rinsate blank. One or more of the results reported as detected in the rinsate blank were qualified as not detected based on the associated method blank results as described in the following paragraphs. Sediment data were not qualified based on rinsate blank detections.

   PAHs by EPA Method 8270D-SIM – The following PAHs were detected at concentrations between the method detection limits (MDLs) and the reporting limits in the method blank extracted on May 9, 2019:

Analyte	Result (ug/L)
2-Methylnaphthalene	0.0036
Benz(a)anthracene	0.0030
Benzo(a)pyrene	0.0013

Analyte	Result (ug/L)
Benzo(b)fluoranthene	0.0021
Benzo(g,h,i)perylene	0.0037
Benzo(k)fluoranthene	0.0019
Chrysene	0.0020
Dibenz(a,h)anthracene	0.0014
Fluoranthene	0.0017
Fluorene	0.0014
Indeno(1,2,3-cd)pyrene	0.0018
Naphthalene	0.0038
Phenanthrene	0.0044
Pyrene	0.0020

The PAHs listed in the above table were also reported at concentrations between the MDLs and reporting limits in PDI-RB-ST-190501; therefore, these results were qualified as not detected and flagged 'U' at the reporting limits based on these method blank results.

bis(2-Ethylhexyl)phthalate by EPA Method 8270D – bis(2-Ethylhexyl)phthalate (0.21 ug/L) was detected in the method blank extracted on May 6, 2019, at a concentration between the MDL and the reporting limit. The result for bis(2-ethylhexyl)phthalate was reported at a concentration between the MDL and reporting limit in PDI-RB-ST-190501; therefore, this result was qualified as not detected and flagged 'U' at the reporting limit based on this method blank result.

4. Surrogates – Acceptable

Tributyltin by Krone et al. – The surrogate tri-n-propyltin exceeded the control limit of 10-120% in the following samples.

Sample ID	Surrogate	Recovery
PDI-ST-T06B-1905	Tri-n-propyltin	131%
PDI-ST-T06A-1905	Tri-n-propyltin	121%
PDI-ST-T06B-1905 MSD	Tri-n-propyltin	130%

MSD – matrix spike duplicate

Data was not qualified based on surrogate outliers in QC samples (MSD). Tributyltin was not detected in PDI-ST-T06B-1905 and PDI-ST-T06A-1905; therefore, data were not qualified based on these elevated surrogate results.

5. Internal Standards – Acceptable

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) – Acceptable except as noted below:

Chlorinated Pesticides by EPA Method 1699-modified – The percent recovery for 2,4'-DDT (76%) was below the control limits of 77-118% in the LCS associated with the sediment samples and extracted on May 7, 2019. The results for 2,4'-DDT in all sediment samples reported in this laboratory group were qualified as estimated and flagged 'J' or 'UJ' based on this LCS recovery.

The percent recovery for 4,4'-DDE (75%) was below the control limits of 76-115% in the LCSD associated with the rinsate blank and extracted on May 7, 2019. As the percent recovery in the LCS and the relative percent difference (RPD) for the LCS/LCSD pair were acceptable, data were not qualified for 4,4'-DDT based on the LCSD recovery.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) – Acceptable except as noted below:

General – MS/MSDs were not performed in association with the rinsate blank sample. Precision and accuracy were assessed using the associated LCS/LCSD results.

An MS/MSD was performed using PDI-ST-T06B-1905 for all sediment analyses. Results were acceptable except as noted below.

PAHs by EPA Method 8270D-SIM – The percent recoveries for the following analytes in the MS/MSD were outside the control limits of 70-130%:

Analyte	MS	MSD
2-Methylnaphthalene	43%	56%
Acenaphthene	47%	62%
Acenaphthylene	48%	64%
Anthracene	53%	ok
Benz(a)anthracene	61%	ok
Benzo(b)fluoranthene	67%	ok
Benzo(g,h,i)perylene	66%	ok
Benzo(k)fluoranthene	69%	ok
Chrysene	56%	ok
Dibenzofuran	48%	63%
Fluoranthene	56%	ok
Fluorene	49%	65%
Naphthalene	42%	52%
Phenanthrene	49%	ok
Pyrene	55%	68%

ok – acceptable

The percent recoveries in the MSD and the RPDs for the MS/MSD pair were acceptable for anthracene, benz(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, and phenanthrene; therefore, data were not qualified for these analytes based on the MS recoveries. The results for all other PAHs listed in the above table were qualified as estimated and flagged 'J' in PDI-ST-T06B-1905 based on these MS/MSD recoveries.

8. Reporting Limits – Acceptable except as noted below:

General – One or more results were flagged 'J' by the laboratory to indicate the reported concentrations were above the MDLs but below the reporting limits. Laboratory 'J'-flagged results are considered estimated. As the result is between the MDL and the reporting limit, there is a greater level of uncertainty associated with the numerical result.

Chlorinated Pesticides by EPA Method 1699-modified – The reporting limits for one or more pesticides reported as not detected in multiple samples were elevated due to the moisture content and/or dilution due to matrix interference.

CONVENTIONAL ANALYSIS

Sediment samples were analyzed for total solids by EPA Method 160.3-modified.

1. Holding Times – Acceptable

2. Laboratory Duplicate – Acceptable

   A laboratory duplicate was performed using PDI-ST-T06B-1905. Results were comparable.

3. Reporting Limits – Acceptable

OVERALL ASSESSMENT OF DATA

The data reported in this laboratory group is considered usable for meeting project objectives. The completeness for laboratory group K1903990 is 100%.

Table 1
QA/QC Data Summary Review
Portland Harbor
Sediment Traps
ALS Kelso Laboratory Group: K1903990

Sample ID	Laboratory ID	Method	Analyte	Laboratory Result	Units	Final Result	Reason Code
PDI-ST-T07A-1905	K1903990-001	CWA1699M	2,4-DDT	0.11 U	ug/kg	0.11 UJ	l
PDI-ST-T07A-1905	K1903990-001	CWA1699M	4,4'-DDE	1.2	ug/kg	1.2 J	c
PDI-ST-T07A-1905	K1903990-001	SW8270D	Indeno(1,2,3-cd)pyrene	3.4	ug/kg	3.4 J	c
PDI-ST-T07B-1905	K1903990-002	CWA1699M	2,4-DDT	0.28	ug/kg	0.28 J	l
PDI-ST-T07B-1905	K1903990-002	CWA1699M	4,4'-DDE	1.3	ug/kg	1.3 J	c
PDI-ST-T07B-1905	K1903990-002	SW8270D	Indeno(1,2,3-cd)pyrene	4.7	ug/kg	4.7 J	c
PDI-ST-T06B-1905	K1903990-003	CWA1699M	2,4-DDT	0.13 U	ug/kg	0.13 UJ	l
PDI-ST-T06B-1905	K1903990-003	SW8270D	2-Methylnaphthalene	0.99 J	ug/kg	0.99 J	m
PDI-ST-T06B-1905	K1903990-003	CWA1699M	4,4'-DDE	1.0	ug/kg	1.0 J	c
PDI-ST-T06B-1905	K1903990-003	SW8270D	Acenaphthene	2.8	ug/kg	2.8 J	m
PDI-ST-T06B-1905	K1903990-003	SW8270D	Acenaphthylene	0.99	ug/kg	0.99 J	m
PDI-ST-T06B-1905	K1903990-003	SW8270D	Dibenzofuran	0.82	ug/kg	0.82 J	m
PDI-ST-T06B-1905	K1903990-003	SW8270D	Fluorene	1.2	ug/kg	1.2 J	m
PDI-ST-T06B-1905	K1903990-003	SW8270D	Indeno(1,2,3-cd)pyrene	6.6	ug/kg	6.6 J	c
PDI-ST-T06B-1905	K1903990-003	SW8270D	Naphthalene	2.2	ug/kg	2.2 J	m
PDI-ST-T06B-1905	K1903990-003	SW8270D	Pyrene	11	ug/kg	11 J	m
PDI-ST-T06A-1905	K1903990-004	CWA1699M	2,4-DDT	0.11 U	ug/kg	0.11 UJ	l
PDI-ST-T06A-1905	K1903990-004	CWA1699M	4,4'-DDE	1.1	ug/kg	1.1 J	c
PDI-ST-T06A-1905	K1903990-004	SW8270D	Indeno(1,2,3-cd)pyrene	3.9	ug/kg	3.9 J	c
PDI-RB-ST-190501	K1903990-005	SW8270D	2-Methylnaphthalene	0.0052 J	ug/L	0.020 UJ	h,bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Acenaphthene	0.020 U	ug/L	0.020 UJ	h
PDI-RB-ST-190501	K1903990-005	SW8270D	Acenaphthylene	0.020 U	ug/L	0.020 UJ	h
PDI-RB-ST-190501	K1903990-005	SW8270D	Anthracene	0.020 U	ug/L	0.020 UJ	h
PDI-RB-ST-190501	K1903990-005	SW8270D	Benz(a)anthracene	0.0040 J	ug/L	0.020 UJ	h,bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Benzo(a)pyrene	0.0029 J	ug/L	0.020 UJ	h,bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Benzo(b)fluoranthene	0.0047 J	ug/L	0.020 UJ	h,bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Benzo(g,h,i)perylene	0.0084 J	ug/L	0.020 UJ	h,bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Benzo(k)fluoranthene	0.0033 J	ug/L	0.020 UJ	h,bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Bis(2-ethylhexyl)phthalate	0.47 J	ug/L	0.97 U	bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Chrysene	0.0029 J	ug/L	0.020 UJ	h,bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Dibenz(a,h)anthracene	0.0029 J	ug/L	0.020 UJ	h,bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Fluoranthene	0.0021 J	ug/L	0.020 UJ	h,bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Fluorene	0.0017 J	ug/L	0.020 UJ	h,bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Indeno(1,2,3-cd)pyrene	0.0041 J	ug/L	0.020 UJ	h,bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Naphthalene	0.0070 J	ug/L	0.020 UJ	h,bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Phenanthrene	0.0066 J	ug/L	0.020 UJ	h,bl
PDI-RB-ST-190501	K1903990-005	SW8270D	Pyrene	0.0023 J	ug/L	0.020 UJ	h,bl

Notes:
bl - laboratory blank contamination
c - calibration issue
h - holding time exceedance
J - estimated value
l - LCS recovery
m - matrix spike recovery
U - Compound was analyzed for, but not detected above the value shown.
ug/kg - microgram per kilogram
ug/L - microgram per liter

Note: Line items where the laboratory result contains a "J" and the final result contains a “U” with a data validation reason code "bl" indicate that the final result is reported as not detected (“U” flag) at the reporting limit.