

Data Validation Report

Project:	Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling Portland Harbor Superfund Site Subsurface Sediment – Deep Core Stations	
Laboratory:	TestAmerica Laboratories, Incorporated, Seattle, WA	
Laboratory Group:	580-79203-1	
Analyses/Method:	Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), Total Organic Carbon (TOC), Total Solids, and Grain Size	
Validation Level:	Stage 2A	
AECOM Project Number: 60566335, Task #2.12		
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Reviewed by:	Stacy Louie/AECOM	File Name: 580-79203-1 DVR

SUMMARY

The data quality review of 8 subsurface sediment samples collected on July 27, 2018, has been completed. Samples were analyzed for PAHs by EPA Method 8270D modified by selected ion monitoring (SIM), PCBs by EPA Method 8082A, TOC by EPA Method 9060, total solids by American Society for Testing and Materials (ASTM) Method D-2216, moisture content at 70 degrees centigrade (°C), and grain size by ASTM Method D7928/D6913 by TestAmerica Laboratories, Incorporated (TA) located in Tacoma, Washington. The analyses were performed in general accordance with the methods specified in EPA's *Test Methods for Evaluating Solid Waste (SW-846)* and *Annual Book of ASTM Standards*, American Society for Testing & Materials (ASTM), Philadelphia, Pennsylvania. 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 580-79203-1:

Sample ID	Laboratory ID
PDI-SC-S163-0to2	580-79203-1
PDI-SC-S163-2to4	580-79203-2
PDI-SC-S163-4to6	580-79203-3
PDI-SC-S163-6to8	580-79203-4
PDI-SC-S163-8to10	580-79203-5
PDI-SC-S163-10to12.7	580-79203-6
PDI-SC-S163-12.7to13	580-79203-7
PDI-SC-S251-2to2.5	580-79203-8

Data validation is based on method performance criteria and QC criteria documented in the *Quality Assurance Project Plan (QAPP)*, dated March 23, 2018, as amended. 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*



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Review, January 2017. Data qualifiers assigned to results reported in this sample set are included in Table 1.

SAMPLE RECEIPT

Upon receipt by TA, the sample jar information was compared to the associated chain-of-custody (COC) and the cooler temperatures were recorded. The coolers were received at temperatures within the EPA-recommended limits of greater than 0°C and less than or equal to 6°C.

ORGANIC ANALYSES

Samples were analyzed for PAHs and PCBs by the methods identified in the introduction to this report.

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

PCBs by Method 8082A – The percent difference (%D) for the following analytes were recovered outside the control limits of $\pm 20\%$ for individual peaks in the continuing calibration verifications (CCVs) associated with the analytical batches below:

Analytical Batch	Analyte	Column 1C %D	Column 2C %D
281924	PCB-1016	high	ok
	PCB-1221	high	low/high
	PCB-1232	high	high
	PCB-1242	high	high
	PCB-1248	high	high
	PCB-1254	high	high
	PCB-1260	high	low
	Surr. TMX	high	ok
282231	PCB-1016	high	high
	PCB-1232	high	high
	PCB-1242	high	ok
	PCB-1248	low	ok
	PCB-1260	high	high
282233	PCB-1016	high	high
	PCB-1232	high	low
	PCB-1242	high	high
	PCB-1260	high	high
	Surr. DCB	high	high
	Surr. TMX	high	high

Notes:
ok = acceptable
Surr. DCB = surrogate decachlorobiphenyl
Surr. TMX = surrogate tetrachloro-m-xylene

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The laboratory narrative only noted if the average %D for initial calibration check samples (ICVs) and CCVs did not meet the ±20% criteria. As part of this review, all CCV results were reviewed and the individual peaks were assessed using the ±20% criteria. The analytes listed in the above table and associated batches were not detected in the associated samples, reported from the passing column, or qualified for surrogate exceedances; therefore, data were not qualified based on the CCV %Ds with following exceptions flagged as “c”:

Sample ID	Analyte	Final Result (µg/kg)
PDI-SC-S163-12.7TO13	PCB-1260	ND UJ
PDI-SC-S163-12.7TO13	PCB-1221	ND UJ
PDI-SC-S163-6TO8	PCB-1260	ND UJ
PDI-SC-S163-6TO8	PCB-1221	ND UJ
PDI-SC-S163-8TO10	PCB-1260	ND UJ
PDI-SC-S163-8TO10	PCB-1221	ND UJ
PDI-SC-S251-2TO2.5	PCB-1260	ND UJ
PDI-SC-S251-2TO2.5	PCB-1221	ND UJ
PDI-SC-S163-0TO2	PCB-1232	8.9 J
PDI-SC-S163-10TO12.7	PCB-1232	40 J
PDI-SC-S163-2TO4	PCB-1232	35 J
PDI-SC-S163-4TO6	PCB-1232	15 J
PDI-SC-S251-2to2.5	PCB-1254	5.0 J

Notes:
 µg/kg = micrograms per kilogram
 J = estimated concentration
 ND = not detected
 PCB = polychlorinated biphenyl
 UJ = material analyzed for but not detected and sample quantitation limit estimated.

3. Blanks – Acceptable except as noted below:

PAHs by Method 8270D-SIM – The following analytes were detected at concentrations between the method detection limits (MDLs) and the reporting limits:

Extraction Date	Analyte	Result (µg/kg)
8/2/2018	Benzo[a]anthracene	0.168
	Naphthalene	0.200
	Phenanthrene	0.161

Notes:
 µg/kg = micrograms per kilogram

Benzo[a]anthracene, naphthalene, and phenanthrene were detected in the associated samples at concentrations greater than the reporting limits and greater than two times the method blank detections; therefore, data were not qualified based on these method blank results.

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- 4. Surrogates – Acceptable for both PCBs and PAHs.
- 5. Laboratory Control Sample – Acceptable for both PCBs and PAHs.
- 6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) – Acceptable except as noted below:

PAHs by Method 8270D-SIM – An MS/MSD was performed using PDI-SC-S163-4to6. The percent recoveries and RPDs for the following analytes were outside of the control limits:

Analyte	MS	MSD	RPD	Control Limits (Matrix Spike / RPD)
Acenaphthylene	ok	ok	14%	68–120% / 12%
Benzo[a]pyrene	70%	ok	ok	72–124% / 12%
Benzo[b]fluoranthene	62%	ok	ok	63–121% / 10%
Benzo[g,h,i]perylene	62%	ok	ok	63–120% / 14%
Dibenz(a,h)anthracene	69%	ok	17%	70–125% / 13%
Fluoranthene	ok	67%	ok	74–125% / 13%
Phenanthrene	72%	67%	ok	73–120% / 11%

Notes:
 MS = Matrix Spike
 MSD = Matrix Spike Duplicate
 ok = acceptable
 RPD = relative percent difference

As two of the three quality control parameters (LCS, LCSD, and RPD) were acceptable for acenaphthylene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene and fluoranthene, these data were not qualified. The results for dibenz(a,h)anthracene and phenanthrene were qualified as estimated and flagged 'J' in PDI-SC-S163-4to6 based on the MS/MSD results.

PCBs by EPA Method 8082A – An MS/MSD was performed using PDI-SC-S163-4to6. The percent recoveries for the following analytes were outside of the control limits:

Analyte	MS	MSD	RPD	Control Limits (Matrix Spike / RPD)
PCB-1016	144%	126%	ok	64–120% / 21%
PCB-1260	193%	151%	ok	63–130% / 25%

Notes:
 MS = Matrix Spike
 MSD = Matrix Spike Duplicate
 ok = acceptable
 RPD = relative percent difference

No data were qualified because the sample results for PCB-1016 and PCB-1260 were non detect and the MS/MSD recoveries were high.

- 7. Field Duplicate – Field duplicate not included with this data set.

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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.

PCBs by EPA Method 8082A – Chromatograms were reviewed to confirm target analytes were properly identified. The review confirmed target analytes were properly identified and reported by the laboratory.

Samples PDI-SC-S163-2to4 (580-79203-2)[10X], PDI-SC-S163-6to8 (580-79203-4)[10X], PDI-SC-S163-8to10 (580-79203-5)[10X] and PDI-SC-S163-10to12.7 (580-79203-6)[10X] required dilution prior to analysis to bring the concentration of target analytes within the calibration range. The reporting limits have been adjusted accordingly.

PAHs by Method 8270D-SIM – All samples required dilution prior to analysis due to the nature of the sample matrix. All PAHs were detected in every sample with the exception of benzo[k]fluoranthene and dibenz(a,h)anthracene in sample PDI-SC-S163-0to2.

9. Other Items of Note:

PCBs by EPA Method 8082A – The %RPD between the primary and secondary column exceeded 40%. In accordance with the laboratory’s standard operating procedure, the lower result was reported. The following sample results are qualified ‘J’ as estimated and flagged “r”.

Sample ID	Analyte	Final Result (µg/kg)
PDI-SC-S163-10to12.7	PCB-1232	40 J
PDI-SC-S251-2to2.5	PCB-1254	5.0 J

Notes:

- µg/kg = micrograms per kilogram
- ID = identification
- J = estimated concentration

The laboratory noted that PDI-SC-S163-0to2 (580-79203-1), PDI-SC-S163-2to4 (580-79203-2), PDI-SC-S163-4to6 (580-79203-3), PDI-SC-S163-4to6 (580-79203-3[MS]), PDI-SC-S163-4to6 (580-79203-3[MSD]) and PDI-SC-S163-10to12.7 (580-79203-6) appeared to contain PCBs; however, due to weathering or other environmental processes, the PCBs in the samples do not closely match any of the laboratory’s Aroclor standards used for instrument calibration. Due to the poor match with the Aroclor standard, there is increased qualitative and quantitative uncertainty associated with these results. The samples have been quantified and reported as PCB-1232 and PCB-1254. The results for PCB-1232 and PCB-1254 were qualified as estimated and flagged ‘J’ based on this identification issue.

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CONVENTIONAL ANALYSES

Samples were analyzed for TOC and total solids by the methods identified in the introduction to this report.

1. Holding Times – Acceptable
2. Blanks – Acceptable where applicable, except as noted below:

TOC by Method SW9060 – Laboratory method blanks and continuing calibration blanks were analyzed with the samples, as appropriate.
3. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) – Acceptable
4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) – Acceptable

TOC by Method 9060 – MS/MSDs was performed using PDI-SC-S163-4to6. Results were acceptable.
5. Field Duplicate – Field duplicate not included with this data set.
6. Laboratory Replicate – Acceptable

TOC by Method 9060 – Laboratory duplicate and triplicate were performed using PDI-SC-S163-4to6. Results were comparable.

Total Solids by Method D2216 – Laboratory duplicate was not provided in this laboratory group.

Moisture Content at 70°C – Laboratory duplicate was performed using PDI-SC-S163-0to2. Results were comparable.
7. Reporting Limits – Acceptable

GRAIN SIZE ANALYSES

Samples were analyzed for grain size by the methods identified in the introduction to this report. The data were reviewed to confirm that the required grain size fractions identified in the QAPP were reported for each sample.

1. Laboratory Duplicate – Acceptable

The laboratory performed duplicate analysis at a rate of 1 per 20 samples per their internal requirements. A laboratory duplicate was performed on PDI-SC-S163-0to2. Results were comparable.

OVERALL ASSESSMENT OF DATA

The data reported in this laboratory group is considered usable for meeting project objectives. The completeness for laboratory group 580-79203-1 is 100%.

Table 1
QA/QC Data Summary Review
Portland Harbor
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Sample ID	Laboratory ID	Method	Analyte	Laboratory Result	Units	Final Result	Reason Code
PDI-SC-S163-0TO2	580-79203-1	SW8082A	Aroclor 1232	8.9	µg/kg	8.9 J	c,q
PDI-SC-S163-0TO2	580-79203-1	SW8082A	Aroclor 1254	8.6	µg/kg	8.6 J	q
PDI-SC-S163-2TO4	580-79203-2	SW8082A	Aroclor 1232	35	µg/kg	35 J	c,q
PDI-SC-S163-2TO4	580-79203-2	SW8082A	Aroclor 1254	54	µg/kg	54 J	q
PDI-SC-S163-4TO6	580-79203-3	SW8270DSIM	Dibenz(a,h)anthracene	16	µg/kg	16 J	m,md
PDI-SC-S163-4TO6	580-79203-3	SW8270DSIM	Phenanthrene	610	µg/kg	610 J	m
PDI-SC-S163-4TO6	580-79203-3	SW8082A	Aroclor 1232	15	µg/kg	15 J	c,q
PDI-SC-S163-4TO6	580-79203-3	SW8082A	Aroclor 1254	36	µg/kg	36 J	q
PDI-SC-S163-6TO8	580-79203-4	SW8082A	Aroclor 1260	3.4 U	µg/kg	3.4 UJ	c
PDI-SC-S163-6TO8	580-79203-4	SW8082A	Aroclor 1221	3.4 U	µg/kg	3.4 UJ	c
PDI-SC-S163-8TO10	580-79203-5	SW8082A	Aroclor 1260	3.6 U	µg/kg	3.6 UJ	c
PDI-SC-S163-8TO10	580-79203-5	SW8082A	Aroclor 1221	3.6 U	µg/kg	3.6 UJ	c
PDI-SC-S163-10TO12.7	580-79203-6	SW8082A	Aroclor 1232	40	µg/kg	40 J	r,c,q
PDI-SC-S163-10TO12.7	580-79203-6	SW8082A	Aroclor 1254	160	µg/kg	160 J	q
PDI-SC-S163-12.7TO13	580-79203-7	SW8082A	Aroclor 1260	2.7 U	µg/kg	2.7 UJ	c
PDI-SC-S163-12.7TO13	580-79203-7	SW8082A	Aroclor 1221	2.7 U	µg/kg	2.7 UJ	c
PDI-SC-S251-2TO2.5	580-79203-8	SW8082A	Aroclor 1254	5.0	µg/kg	5.0 J	r,c
PDI-SC-S251-2TO2.5	580-79203-8	SW8082A	Aroclor 1260	2.7 U	µg/kg	2.7 UJ	c
PDI-SC-S251-2TO2.5	580-79203-8	SW8082A	Aroclor 1221	2.7 U	µg/kg	2.7 UJ	c

µg/kg = micrograms per kilogram

c = calibration issue

ID = identification

J = estimated concentration

m = matrix spike recovery

md = matrix spike/matrix spike duplicate relative percent difference

q = quantitation issue

r = dual column relative percent difference

U = not detected

UJ = estimated reporting limit