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 Surface Sediment – Sediment Management Area
Laboratory:	TestAmerica Laboratories, Incorporated, Seattle, WA
Laboratory Group:	580-77177-1
Analyses:	Petroleum Hydrocarbons, Metals, Total Organic Carbon (TOC), Total Solids, and Grain Size
Validation Level:	Stage 2A
AECOM Project Number:	60566335, Task #2.12

Prepared by:	Chelsey Cook/AECOM	Completed on:	July 26, 2018
Reviewed by:	Jennifer Garner/AECOM	File Name:	580-77177-1 DVR

SUMMARY

The data quality review of 16 surface sediment samples and two rinsate blanks collected on May 7 and May 8, 2018, has been completed. The rinsate blank samples were analyzed for total petroleum hydrocarbons (TPHs, diesel-range and motor oil-range) by Washington State Department of Ecology (Ecology) Method NWTPH-Dx, metals by United States Environmental Protection Agency (EPA) Method 6020B (arsenic, cadmium, copper, lead, and zinc), mercury by EPA Method 7470A, and TOC by Standard Method (SM) 5310B. Sediment samples were analyzed for TOC by EPA Method 9060, total solids by American Society for Testing and Materials (ASTM) Method D-2216, moisture content at 70 degrees centigrade (70°C), and grain size by ASTM Methods D7928/D6913 by TA 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), Ecology's *Analytical Methods for Petroleum Hydrocarbons*, June 1997, Annual Book of ASTM Standards, American Society for Testing & Materials (ASTM), Philadelphia, Pennsylvania, and Standard Methods for the Examination of Water and Wastewater. The laboratory provided level 2 and level 4 data packages containing sample results, 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 580-77177-1:

Sample ID	Laboratory ID
PDI-SG-S073	580-77177-1
PDI-SG-S099	580-77177-2
PDI-SG-S104	580-77177-3
PDI-SG-S104-D (duplicate of PDI-SG-S104)	580-77177-4
PDI-SG-S100	580-77177-5
PDI-SG-S075	580-77177-6
PDI-SG-S076	580-77177-7
PDI-SG-S077	580-77177-8
PDI-SG-S032	580-77177-9
PDI-SG-S031	580-77177-10
PDI-SG-S031-D (duplicate of PDI-SG-S031)	580-77177-11
PDI-SG-S030	580-77177-12

Sample ID	Laboratory ID
PDI-SG-S029	580-77177-13
PDI-SG-S081	580-77177-14
PDI-SG-S083	580-77177-15
PDI-SG-S093	580-77177-16
PDI-RB-VV-180508-1715 (rinsate blank)	580-77177-17
PDI-RB-VV-180508-1700 (rinsate blank)	580-77177-18

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

SAMPLE RECEIPT

Upon receipt by TA, the sample jar information was compared to the 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. The sample date on the COC for sample PDI-SG-S030 was incorrect. With instruction from AECOM, TA corrected the sample date on the COC.

The lids for one or more sample containers submitted for PDI-SG-S032, PDI-SG-S030, PDI-SG-S104, PDI-SG-S076, and PDI-SG-S081 were received broken. The laboratory repaired or replaced the lids, as appropriate, upon receipt.

ORGANIC ANALYSES

Samples were analyzed for TPHs by method NWTPH-Dx.

1. Holding Times – Acceptable

2. Blanks – Acceptable

   Two rinsate blanks were collected on May 8, 2018, and were reported with this laboratory group (laboratory IDs 580-77177-17 and 580-77177-18). TPHs were not detected in these rinsate blanks.

3. Surrogates – Acceptable

4. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) – Acceptable

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

   An MS/MSD was not performed using a sample in this laboratory group. Precision and accuracy were assessed using the LCS/LCSD.

6. Laboratory Duplicate

   A laboratory duplicate was not performed on a sample from this laboratory group. Precision was assessed using the LCS/LCSD.

7. Reporting Limits – Acceptable

   The reporting limits for diesel-range hydrocarbons and/or motor oil-range hydrocarbons in PDI-RB-VV-180508-1715 and PDI-RB-VV-180508-1700 were slightly elevated due to limited sample volume.

METALS ANALYSES

Samples were analyzed for metals by the methods identified in the introduction to this report.

1. Holding Times – Acceptable

2. Blanks – Acceptable except as noted below:

   Metals by Method 6020B – Zinc was detected in the method blank associated with analytical batch 274371 (0.00577 mg/L) at a concentration below the reporting limit but above the method detection limit (MDL). Zinc was detected in PDI-RB-VV-180508-1700 at a concentration below the reporting limit and above the MDL; therefore, the result for zinc was qualified as not detected and flagged 'U' at the reporting limit in PDI-RB-VV-180508-1700 based on this method blank detection.

   General – Two rinsate blanks were collected on May 8, 2018, and were reported with this laboratory group (laboratory IDs 580-77177-17 and 580-77177-18). Arsenic was detected in 580-77177-17 (0.00041 mg/L) and 580-77177-18 (0.00053 mg/L) and copper was detected in 580-77177-17 (0.00067 mg/L) at concentrations below the reporting limits but above the MDLs. Zinc was detected in 580-77177-18 (0.0021 mg/L) but this result was qualified as not detected based on the associated method blank result. Metals were not reported for the sediment samples reported in this laboratory group. No sample results were qualified based on the rinsate blanks.

3. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) – Acceptable

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) and Post-Digestion Spike (PDS, where applicable) – Acceptable except as noted below:

   Metals by Method 6020B – An MS/MSD and PDS were performed using PDI-RB-VV-180508-1715. The percent recovery for cadmium in the PDS (79%) was below the control limits of 80-120%. The percent recoveries in the MS and MSD were acceptable; therefore, data were not qualified based on this PDS result.

   Mercury by Method 7470A – An MS/MSD was not performed using a sample from this laboratory group. Precision and accuracy were assessed using the LCS/LCSD.

5. Laboratory Duplicate – Acceptable

   Metals by Method 6020B – A laboratory duplicate was performed using PDI-RB-VV-180508-1715. Results were comparable.

Mercury by Method 7470A – A laboratory duplicate was not performed using a sample from this laboratory group. Precision was assessed using the LCS/LCSD.

6. Serial Dilution

Metals by Method 6020B – A serial dilution was performed using PDI-RB-VV-180508-1715. Results were comparable.

7. Reporting Limits – Acceptable

General – Analyte concentrations detected between the MDL and the reporting limit are reported by the laboratory with a 'J' flag. One or more results were flagged 'J' by the laboratory. Laboratory 'J'-flagged results are considered estimated results. As the result is between the MDL and the reporting limit, there is a greater level of uncertainty associated with the numerical result.

CONVENTIONAL ANALYSES

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

1. Holding Times – Acceptable except as noted below:

Moisture Content at 70°C – The 7-day holding time indicated for total solids in the QAPP was exceeded for all samples in this laboratory group by 30-36 days due to an oversight by the laboratory. No data qualifiers were assigned based on the holding time exceedances.

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

TOC by Method SM5310B – TOC was detected in the method blank associated with analytical batch 274064 (0.257 mg/L) at a concentration below the reporting limit but above the MDL. TOC was detected in the associated rinsate blank, PDI-RB-VV-180508-1715, at a concentration below the reporting limit but above the MDL; therefore, the result for TOC in PDI-RB-VV-180508-1715 was qualified as not detected and flagged 'U' at the reporting limit.

Two rinsate blanks were collected on May 8, 2018, were reported with this laboratory group (laboratory IDs 580-77177-17 and 580-77177-18), and are applicable to the samples reported in this laboratory group. TOC was detected in 580-77177-17 (0.43 mg/L) and 580-77177-18 (0.44 mg/L). TOC was qualified as not detected in 580-77177-17 based on the associated method blank result. Data were not qualified based on rinsate blank results.

3. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) - Acceptable

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) – Acceptable

TOC by Method 9060 – An MS/MSD was performed using PDI-SG-S032. Results were acceptable.

TOC by SM 5310B – An MS/MSD was performed using PDI-RB-VV-180508-1700. The percent recovery for TOC in the MS (83%) was outside the control limits of 85-115%. The percent recovery for TOC in the MSD and the relative percent difference (RPD) for the MS/MSD were acceptable; therefore, data were not qualified based on the MS result.

5. Field Duplicate – Acceptable

   Field duplicates were submitted for PDI-SG-S104 and PDI-SG-S031, and identified as PDI-SG-S104-D and PDI-SG-S031-D, respectively. Results were comparable.

6. Laboratory Replicate – Acceptable

   TOC by Method 9060 – A laboratory duplicate and triplicate was performed using PDI-SG-S032. Results were comparable.

   TOC by SM 5310B – A laboratory duplicate was performed using PDI-RB-VV-180508-1700. The RPD for TOC (34%) exceeded the control limit of 20%. The concentration for TOC in this sample was less than five times the reporting limit; therefore, data were not qualified based on the elevated laboratory duplicate RPD.

   Total Solids by Method D2216 – A laboratory duplicate was performed using PDI-SG-S032. Results were comparable.

   Moisture Content at 70°C – Laboratory duplicates were performed using PDI-SG-S073 and PDI-SG-S104-D. Results were comparable.

7. Reporting Limits – Acceptable except as noted below:

   TOC by Method 9060 – One or more results in multiple samples were detected below the reporting limit but above the MDL and flagged 'J' by the laboratory. As described above, laboratory 'J'-flagged results are considered estimated results.

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-SG-S073. The result for the gravel fraction was assigned an 'L' qualifier in PDI-SG-S073 to indicate that the grain size fraction was greater than 5 percent of the total combined fractions and the RPD for duplicate analysis on the sample fraction was greater than 20%.

OVERALL ASSESSMENT OF DATA

The data reported in this laboratory group, as qualified, is considered usable for meeting project objectives. The completeness for laboratory group 580-77177-1 is 100%.

Table 1
QA/QC Data Summary Review
Portland Harbor
Surface Sediment - Sediment Management Area
TestAmerica Laboratory Group: 580-77177-1

Sample ID	Laboratory ID	Method	Analyte	Laboratory Result	Units	Final Result	Reason Code
PDI-SG-S073	580-77177-1	D7928/D6913	Gravel	8.4	%	8.4 L	ld
PDI-RB-VV-180508-1715	580-77177-17	SM5310B	Total Organic Carbon	0.43 J	mg/L	1.0 U	bl
PDI-RB-VV-180508-1700	580-77177-18	SW6020B	Zinc	0.0021 J	mg/L	0.0070 U	bl

% - percent
bl - laboratory blank contamination
J - estimated value
L - the grain size fractions were greater than 5 percent of the total combined fractions and the RPD for duplicate analysis on the sample fractions were greater than 20%
ld - laboratory duplicate RPD
mg/L - milligram per liter
U - Compound was analyzed for, but not detected above the value shown.
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.