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Data Validation Report

Project:	Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling Portland Harbor Superfund Site Subsurface Sediment – Deep/Nearshore Core Stations
Laboratory:	TestAmerica Laboratories, Incorporated, Seattle, WA
Laboratory Group:	580-79444-1
Analyses/Method:	Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), Total Organic Carbon (TOC), Total Solids, and Grain Size
Validation Level:	Stage 2A/Stage 4 on EPA split sample (PDI-SC-S117-4to6)
AECOM Project Number:	60566335, Task #2.12
Prepared by:	Chelsey Cook/AECOM — Completed on: December 26, 2018
Reviewed by:	Stacy Louie/AECOM — File Name: 580-79444-1 DVR

SUMMARY

The data quality review of 41 subsurface sediment samples and three rinsate blanks collected between August 6 and August 8, 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 (subsurface sediments) and Standard Method (SM) 5310B (water), total solids by American Society for Testing and Materials (ASTM) Method D-2216, moisture content at 70 degrees Celsius (°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 580-79444-1:

Sample ID	Laboratory ID
PDI-SC-S226-6to8	580-79444-1
PDI-SC-S226-10to12	580-79444-2
PDI-SC-S226-8to10	580-79444-3
PDI-SC-S226-0to2	580-79444-4
PDI-SC-S226-2to4	580-79444-5
PDI-SC-S226-12to14	580-79444-6
PDI-SC-S226-4to6	580-79444-7
PDI-SC-S226-14to15.8	580-79444-8
PDI-SC-S222-0to2	580-79444-9
PDI-SC-S222-2to4	580-79444-10
PDI-SC-S222-4to5	580-79444-11
PDI-SC-S222-5to7.2	580-79444-12
PDI-SC-S222-5to7.2D (field duplicate of PDI-SC-S222-5to7.2)	580-79444-13
PDI-SC-S222-7.2to9.2	580-79444-14
PDI-SC-S222-9.2to11.2	580-79444-15
PDI-SC-S222-11.2to13.2	580-79444-16

Sample ID	Laboratory ID
PDI-SC-S222-13.2to15.2	580-79444-17
PDI-SC-S248-0to2	580-79444-18
PDI-SC-S248-2to4	580-79444-19
PDI-SC-S248-4to6.2	580-79444-20
PDI-SC-S139-0to2	580-79444-21
PDI-SC-S139-2to4.1	580-79444-22
PDI-SC-S139-4.1to5.9	580-79444-23
PDI-SC-S139-4.1to5.9D (field duplicate of PDI-SC-S139-4.1to5.9)	580-79444-24
PDI-SC-S117-0to2	580-79444-25
PDI-SC-S117-2to4	580-79444-26
PDI-SC-S117-4to6 (EPA split sample)	580-79444-27
PDI-SC-S219-0to2	580-79444-28
PDI-SC-S219-2to4	580-79444-29
PDI-SC-S219-4to5.2	580-79444-30
PDI-SC-S105-0to2	580-79444-31
PDI-SC-S105-2to4	580-79444-32
PDI-SC-S105-4to5.6	580-79444-33
PDI-SC-S105-5.6to6.6	580-79444-34
PDI-SC-S191-0to2	580-79444-35
PDI-SC-S191-2to4	580-79444-36
PDI-SC-S191-4to6	580-79444-37
PDI-SC-S191-6to8.1	580-79444-38
PDI-SC-S192-0to1.5	580-79444-39
PDI-SC-S192-1.5to3	580-79444-40
PDI-SC-S192-3to4.2	580-79444-41
PDI-RB-SS-180807 (rinsate blank)	580-79444-42
PDI-RB-SS-180808 (rinsate blank)	580-79444-43
PDI-RB-SS-180806 (rinsate blank)	580-79444-44

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 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. PDI-RB-SS-180806 did not have a sample time listed on the COC; therefore, the lab logged the sample time using the time listed on the sample containers. There was not a grain size container submitted for

PDI-SC-S139-4.1to5.9 but it was marked on the COC. There was a grain size container submitted for PDI-SC-S139-4.1to5.9D; therefore, AECOM instructed TA to revise the COC to remove the grain size analysis for PDI-SC-S139-4.1to5.9 and just analyze grain size for PDI-SC-S139-4.1to5.9D.

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:

   PAHs by Method 8270D-SIM – The percent differences (%D) for dibenz(a,h)anthracene (23.2%) and benzo(g,h,i)perylene (20.2%) exceeded the control limits of ±20% in the continuing calibration verification (CCV) associated with analytical batch 282505. Dibenz(a,h)anthracene and benzo(g,h,i)perylene were not reported from the samples associated with this CCV; therefore, data were not qualified based on these CCV %Ds.

   PCBs by Method 8082A – The %Ds for one or more peaks for the following analytes were outside the control limits of ±20% in the CCVs associated with the analytical batches listed below:

Analytical Batch	Analyte	Column 1 %D	Column 2 %D
282692	PCB-1232	ok	high
	PCB-1248	ok	high
	PCB-1242	ok	high
	PCB-1254	ok	high
	PCB-1260	ok	high
282796	PCB-1232	high	high
	PCB-1248	ok	high
	PCB-1242	ok	high
	PCB-1221	high	ok
	PCB-1254	ok	high
	PCB-1260	ok	high
282798	PCB-1242	high	low
	PCB-1221	high	ok
282920	PCB-1232	high	high
	PCB-1248	ok	high
	PCB-1242	ok	high
	PCB-1254	ok	high
	PCB-1260	low	high
	PCB-1016	ok	high
282698	PCB-1232	high	high
	PCB-1248	high	high
	PCB-1242	high	ok
	PCB-1221	high/low	high

Analytical Batch	Analyte	Column 1 %D	Column 2 %D
282698	PCB-1254	high	ok
	PCB-1260	high	ok
282709	PCB-1232	high	high
	PCB-1248	high	high
	PCB-1242	high	high
	PCB-1221	high/low	high
	PCB-1254	high	high
	PCB-1260	high	high
	PCB-1016	high	ok

Table notes:
ok - acceptable

The above analytes were either not detected in the associated samples or reported from the passing column; therefore, data were not qualified based on the CCV %Ds with the following exceptions. The results for PCB-1232 in PDI-SC-S222-5to7.2 and PDI-SC-S222-5to7.2D; PCB-1260 in PDI-SC-S226-14to15.8, PDI-SC-S222-0to2, PDI-SC-S222-2to4, PDI-SC-S222-4to5, PDI-SC-S222-9.2to11.2, PDI-SC-S139-4.1to5.9, PDI-SC-S191-2to4, PDI-SC-S191-4to6, PDI-SC-S192-0to1.5, PDI-SC-S192-1.5to3, PDI-SC-S192-3to4.2, PDI-SC-S248-2to4, PDI-SC-S248-4to6.2, PDI-SC-S117-2to4, PDI-SC-S117-4to6, and PDI-SC-S219-0to2; PCB-1221 in PDI-SC-S222-5to7.2, PDI-SC-S222-5to7.2D, PDI-SC-S222-11.2to13.2, PDI-SC-S222-13.2to15.2, PDI-SC-S248-0to2, PDI-SC-S248-2to4, PDI-SC-S248-4to6.2, PDI-SC-S139-0to2, PDI-SC-S139-2to4.1, PDI-SC-S139-4.1to5.9D, PDI-SC-S117-0to2, PDI-SC-S117-2to4, PDI-SC-S117-4to6, PDI-SC-S219-0to2, PDI-SC-S219-2to4, and PDI-SC-S219-4to5.2; and PCB-1254 in PDI-SC-S219-4to5.2 were qualified as estimated and flagged 'J' or 'UJ' based on the CCV %Ds.

3. Blanks – Acceptable except as noted below:

General – Three rinsate blanks were submitted with this laboratory group. PAHs and PCBs were not detected in these rinsate blanks.

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

Prep Batch	Analyte	Result
281503	Benzo[a]anthracene	0.231 ug/kg
	Chrysene	0.406 ug/kg
	Benzo[b]fluoranthene	0.352 ug/kg
	Benzo[k]fluoranthene	0.313 ug/kg
	Benzo[a]pyrene	0.329 ug/kg
	Naphthalene	0.205 ug/kg
	Indeno[1,2,3-cd]pyrene	0.512 ug/kg
	Phenanthrene	0.194 ug/kg
	Dibenz(a,h)anthracene	0.303 ug/kg
	Pyrene	0.337 ug/kg
	Benzo[g,h,i]perylene	0.326 ug/kg
281889	Naphthalene	0.285 ug/kg
	Phenanthrene	0.145 ug/kg
281984	2-Methylnaphthalene	0.174 ug/kg
	Naphthalene	0.358 ug/kg

Benzo[a]pyrene in the samples associated with prep batch 281503 and naphthalene and phenanthrene in the samples associated with prep batch 281889 were either not detected or detected 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.

The results for benzo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, indeno[1,2,3-cd]pyrene, and benzo[g,h,i]perylene in PDI-SC-S219-2to4 were detected at concentrations between the reporting limits and MDLs and less than two times the method blank detections; therefore, these results were qualified as not detected and flagged 'U' at the reporting limits.

The following analytes were detected in the following diluted samples at concentrations between the MDLs and reporting limits:

Sample	Analyte
PDI-SC-S222-7.2to9.2	Benzo[a]anthracene
	Chrysene
	Benzo[b]fluoranthene
	Benzo[k]fluoranthene
	Naphthalene
	Indeno[1,2,3-cd]pyrene
	Phenanthrene
	Pyrene
	Benzo[g,h,i]perylene
PDI-SC-S219-4to5.2	Benzo[a]anthracene
	Chrysene
	Benzo[b]fluoranthene
	Benzo[k]fluoranthene
	Naphthalene
	Indeno[1,2,3-cd]pyrene
	Pyrene
	Benzo[g,h,i]perylene
PDI-SC-S248-0to2	Benzo[k]fluoranthene
	Dibenz(a,h)anthracene
	Benzo[g,h,i]perylene
PDI-SC-S248-2to4	Dibenz(a,h)anthracene
PDI-SC-S219-0to2	Dibenz(a,h)anthracene
PDI-SC-S226-2TO4	2-Methylnaphthalene
PDI-SC-S226-6to8	2-Methylnaphthalene
PDI-SC-S226-10to12	2-Methylnaphthalene
PDI-SC-S226-8to10	2-Methylnaphthalene
PDI-SC-S226-12to14	2-Methylnaphthalene
PDI-SC-S226-4to6	2-Methylnaphthalene
PDI-SC-S226-14to15.8	2-Methylnaphthalene
PDI-SC-S222-9.2to11.2	2-Methylnaphthalene
PDI-SC-S222-11.2to13.2	2-Methylnaphthalene
PDI-SC-S226-6to8	Naphthalene
PDI-SC-S226-0to2	Naphthalene
PDI-SC-S226-12to14	Naphthalene
PDI-SC-S226-2to4	Naphthalene
PDI-SC-S226-4to6	Naphthalene
PDI-SC-S222-9.2to11.2	Naphthalene

Sample	Analyte
PDI-SC-S222-11.2to13.2	Naphthalene
PDI-SC-S222-13.2to15.2	Naphthalene

The results noted in the table above were qualified as estimated and flagged 'J' based on the method blank results.

4. Surrogates – Acceptable except as noted below:

PCBs by EPA Method 8082A – The percent recoveries for decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TMX) in the following samples were outside of the control limits of 54-142% and 58-122%, respectively, as follows:

Sample	DCB %Recovery	TMX %Recovery
PDI-SC-S226-6to8	51%	ok
PDI-SC-S226-10to12	48%	57%
PDI-SC-S226-8to10	32%	39%
PDI-SC-S226-0to2	33%	37%
PDI-SC-S226-2to4	29%	33%
PDI-SC-S226-12to14	34%	38%
PDI-SC-S226-4to6	40%	48%
PDI-SC-S222-0to2-DL	2,643%	0%
PDI-SC-S222-2to4-DL	1,270%	0%
PDI-SC-S222-4to5-DL	3,705%	0%
PDI-SC-S222-7.2to9.2	38%	44%
MS (PDI-SC-S222-7.2to9.2)	43%	48%
MSD (PDI-SC-S222-7.2to9.2)	42%	44%
PDI-SC-S222-11.2to13.2	ok	21%
PDI-SC-S248-2to4	36%	ok
MS (PDI-SC-S248-2to4)	53%	ok
PDI-SC-S139-0to2	ok	54%
PDI-SC-S139-4.1to5.9D	ok	57%
PDI-SC-S117-0to2	ok	523%
PDI-SC-S117-2to4	35%	576%
PDI-SC-S117-4to6	244%	ok
PDI-SC-S219-0to2	ok	52%
PDI-SC-S219-2to4	43%	39%
PDI-SC-S219-4to5.2	44%	48%
PDI-SC-S105-0to2	ok	174%
PDI-SC-S191-0to2	37%	31%
PDI-SC-S191-4to6	ok	50%
PDI-SC-S191-6to8.1	ok	50%
PDI-SC-S192-0to1.5	53%	ok
PDI-SC-S192-1.5to3	47%	31%
PDI-SC-S192-3to4.2	ok	51%
LCS (580-281382/2-A)	ok	56%

Sample	DCB %Recovery	TMX %Recovery
LCS (580-281621/2-A)	ok	54%
MB (580-281621/1-A)	ok	51%
PDI-SC-S222-5to7.2	ok	30%
PDI-SC-S222-5to7.2D-RA	ok	43%
PDI-SC-S222-9.2to11.2-RA	ok	54%
PDI-SC-S139-4.1to5.9	ok	21%
PDI-SC-S191-2to4-DL	ok	17%
PDI-SC-S191-4to6-DL	447%	9%
PDI-SC-S191-6to8.1-DL	ok	54%
PDI-SC-S192-0to1.5-DL	0%	0%
PDI-SC-S192-1.5to3-DL	860%	13%
PDI-SC-S192-3to4.2-DL	237%	40%
PDI-RB-SS-180807	31%	ok
PDI-RB-SS-180808	35%	ok

DL – dilution
LCS – laboratory control sample
MB – method blank
MS – matrix spike
MSD – matrix spike duplicate
ok - acceptable
RA – reanalysis

Data were not qualified based on surrogate recoveries in QC samples (MS, MSD, LCS, and MB). As one of the surrogate recoveries was acceptable, data were not qualified in the samples noted above where only one surrogate recovered outside of the control limits. The samples that were diluted were analyzed at dilutions equal to or greater than 10x; therefore, data were not qualified based on the surrogate recoveries in the diluted samples. The PCB results that were not qualified based on the CCV results in PDI-SC-S226-10to12, PDI-SC-S226-8to10, PDI-SC-S226-0to2, PDI-SC-S226-2to4, PDI-SC-S226-12to14, PDI-SC-S226-4to6, PDI-SC-S222-7.2to9.2, PDI-SC-S117-2to4, PDI-SC-S219-2to4, PDI-SC-S219-4to5.2, PDI-SC-S191-0to2, and PDI-SC-S192-1.5to3 were qualified as estimated and flagged 'J' or 'UJ' based on the surrogate recoveries.

5. Internal Standards – Acceptable except as noted below:

   PCBs by EPA Method 8082A – The internal standard response in PDI-SC-S226-14to15.8 was outside of the acceptance limits on one column. The results were reported from the passing column; therefore, no data were qualified based on this internal standard response.

6. Laboratory Control Sample – Acceptable except as noted below:

   PAHs by Method 8270D-SIM – The percent recovery for benzo[b]fluoranthene in the LCS (132%) extracted on August 17, 2018 exceeded the control limits of 63-121%. The results for benzo[b]fluoranthene in PDI-SC-S105-4to5.6, PDI-SC-S105-5.6to6.6, PDI-SC-S191-0to2, PDI-SC-S191-2to4, PDI-SC-S191-4to6, PDI-SC-S191-6to8.1, PDI-SC-S192-0to1.5, PDI-SC-S192-1.5to3, and PDI-SC-S192-3to4.2 were qualified as estimated and flagged 'J' based on the LCS result.

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

PAHs by Method 8270D-SIM – MS/MSDs were performed using PDI-SC-S222-7.2to9.2, PDI-SC-S248-2to4, and PDI-SC-S105-2to4. The percent recoveries for the following analytes were outside of the control limits:

Sample	Analyte	MS	MSD	RPD	Control Limits (Matrix Spike / RPD)
PDI-SC-S222-7.2to9.2	Naphthalene	62%	61%	ok	70-120% / 12%
PDI-SC-S248-2to4	2-Methylnaphthalene	58%	63%	ok	68-120% / 12%
	Benzo[a]pyrene	70%	ok	ok	72-124% / 12%
	Naphthalene	24%	27%	ok	70-120% / 12%
	Phenanthrene	47%	72%	ok	73-120% / 11%
PDI-SC-S105-2to4	2-Methylnaphthalene	ok	ok	15%	68-120% / 12%
	Acenaphthylene	35%	42%	ok	68-120% / 12%
	Anthracene	54%	61%	ok	73-125% / 12%
	Benzo[a]anthracene	-73%	4%	30%	66-120% / 14%
	Benzo[a]pyrene	-92%	-53%	19%	72-124% / 12%
	Benzo[b]fluoranthene	-139%	-47%	38%	63-121% / 10%
	Benzo[g,h,i]perylene	-95%	-34%	27%	63-120% / 14%
	Benzo[k]fluoranthene	30%	ok	30%	63-123% / 15%
	Chrysene	-154%	-54%	38%	69-120% / 10%
	Dibenz(a,h)anthracene	64%	ok	19%	70-125% / 13%
	Fluoranthene	-173%	-173%	ok	74-125% / 13%
	Indeno[1,2,3-cd]pyrene	-101%	-36%	29%	65-121% / 15%
	Naphthalene	43%	61%	17%	70-120% / 12%
	Phenanthrene	39%	51%	ok	73-120% / 11%
	Pyrene	-369%	-346%	ok	70-120% / 12%

ok - acceptable

As two of the three quality control parameters (MS, MSD, and relative percent different [RPD]) were acceptable, data were not qualified for benzo[a]pyrene in PDI-SC-S248-2to4 and 2-methylnaphthalene in PDI-SC-S105-2to4. The concentrations of fluoranthene and pyrene in PDI-SC-S105-2to4 were greater than four times the spike added; therefore, data were not qualified based on the MS/MSD results. The result for naphthalene in PDI-SC-S222-7.2to9.2 was qualified as estimated and flagged 'J' based on the method blank result, no further qualification was necessary based on the MS/MSD results. The results for 2-methylnaphthalene, naphthalene, and phenanthrene in PDI-SC-S248-2to4; and acenaphthylene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenz(a,h)anthracene, indeno[1,2,3-cd]pyrene, naphthalene, and phenanthrene in PDI-SC-S105-2to4 were qualified as estimated and flagged 'J' based on the MS/MSD results.

PCBs by EPA Method 8082A – MS/MSDs were performed using PDI-SC-S222-7.2to9.2, PDI-SC-S248-2to4, and PDI-SC-S105-2to4. The percent recoveries for the following analytes were outside of the control limits:

Sample	Analyte	MS	MSD	RPD	Control Limits (Matrix Spike / RPD)
PDI-SC-S222-7.2to9.2	PCB-1016	ok	54%	25%	64-120% / 21%
	PCB-1260	44%	43%	ok	63-130% / 25%
PDI-SC-S248-2to4	PCB-1016	ok	128%	39%	64-120% / 21%
	PCB-1260	35%	260%	99%	63-120% / 25%
PDI-SC-S105-2to4	PCB-1016	63%	ok	ok	64-120% / 21%
	PCB-1260	60%	ok	ok	63-120% / 25%

ok - acceptable

As two of the three quality control parameters (MS, MSD, and RPD) were acceptable, data were not qualified for PCB-1016 and PCB-1260 in PDI-SC-S105-2to4. PCB-1016 was not detected in PDI-SC-S248-2to4; therefore data were not qualified based on the elevated MS/MSD results. PCB-1016 in PDI-SC-S222-7.2to9.2 and PCB-1260 in PDI-SC-S222-7.2to9.2 and PDI-SC-S248-2to4 were qualified as estimated and flagged 'J' based on the CCV %Ds or surrogate recoveries and no further qualification was necessary based on the MS/MSD results.

8. Field Duplicate – Acceptable except as noted below:

General – Field duplicates were submitted for PDI-SC-S222-5to7.2 and PDI-SC-S139-4.1to5.9 and identified as PDI-SC-S222-5to7.2D and PDI-SC-S139-4.1to5.9D, respectively. Results were comparable with the following exceptions.

PAHs by Method 8270D-SIM – The RPD for the following analytes exceeded 50%:

Field Duplicate Pair	Analyte	RPD
PDI-SC-S222-5to7.2 / PDI-SC-S222-5to7.2D	Anthracene	54%
	Benzo[a]anthracene	69%
	Benzo[a]pyrene	68%
	Benzo[b]fluoranthene	73%
	Benzo[g,h,i]perylene	63%
	Benzo[k]fluoranthene	55%
	Chrysene	78%
	Fluoranthene	60%
	Indeno[1,2,3-cd]pyrene	66%
	Pyrene	67%
PDI-SC-S139-4.1to5.9 / PDI-SC-S139-4.1to5.9D	Acenaphthene	51%
	Anthracene	100%
	Benzo[a]anthracene	98%
	Benzo[a]pyrene	112%
	Benzo[b]fluoranthene	94%
	Benzo[g,h,i]perylene	99%
	Benzo[k]fluoranthene	114%
	Chrysene	98%
	Dibenz(a,h)anthracene	116%
	Fluoranthene	103%

Field Duplicate Pair	Analyte	RPD
PDI-SC-S139-4.1to5.9 / PDI-SC-S139-4.1to5.9D	Indeno[1,2,3-cd]pyrene	111%
	Naphthalene	69%
	Phenanthrene	96%
	Pyrene	96%

The sample results for anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, and indeno[1,2,3-cd]pyrene in PDI-SC-S222-5to7.2 and PDI-SC-S222-5to7.2D were less than five times the reporting limits; therefore, data were not qualified based on the field duplicates RPDs. The results for chrysene, fluoranthene, and pyrene in PDI-SC-S222-5to7.2 and PDI-SC-S222-5to7.2D and all analytes listed above in PDI-SC-S139-4.1to5.9 and PDI-SC-S139-4.1to5.9D were qualified as estimated and flagged 'J' based on the elevated field duplicate RPDs.

9. Calculation Checks – Acceptable

A calculation check was performed for PDI-SC-S117-4to6. The review confirmed the final results were correct as reported.

10. Reporting Limits and Chromatographic Review – Acceptable except as noted below:

General – Chromatograms/spectra were reviewed to confirm target analytes were properly identified. The review confirmed target analytes were properly identified and reported by the laboratory.

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 – The reporting limits for several PCBs reported as not detected in multiple samples were elevated due to the dilution necessary to quantitate the high concentrations of target analytes.

PAHs by Method 8270D-SIM – All samples except PDI-SC-S219-2to4 required dilution due to the nature of the sample matrix or to bring target analytes within the calibration range of the instrument. The elevated RLs did not exceed the cleanup levels.

11. Other Items of Note:

PCBs by EPA Method 8082A – The laboratory noted that PDI-SC-S191-0to2, PDI-SC-S191-6to8.1, PDI-SC-S192-1.5to3, PDI-SC-S226-6to8, PDI-SC-S226-8to10, PDI-SC-S191-2to4, PDI-SC-S191-4to6, PDI-SC-S192-0to1.5, and PDI-SC-S192-3to4.2 contained more than one Aroclor with insufficient separation and signs of weathering or other environmental processes and/or contributions to be able to quantify individually. The PCBs present are quantified as the predominant Aroclor. The results for PCB-1248 and PCB-1260 in PDI-SC-S226-8to10 were qualified as estimated and flagged 'J' based on other QC exceedances and no further qualification was necessary based on this identification issue. The results for PCB-1254 in PDI-SC-S191-0to2 and PDI-SC-S192-1.5to3 were qualified as estimated and flagged 'J' based on the surrogate recoveries and no further qualification was necessary based on this identification issue. The results for PCB-1254 in PDI-SC-S191-6to8.1, PDI-SC-S191-2to4,

PDI-SC-S191-4to6, PDI-SC-S192-0to1.5, and PDI-SC-S192-3to4.2; and PCB-1260 and PCB-1248 in PDI-SC-S226-6to8 were qualified as estimated and flagged 'J' based on this identification issue.

The RPD between the primary and confirmation column exceeded 40% for Aroclor 1242, 1260, and/or 1254 in PDI-SC-S226-12to14, PDI-SC-S226-4to6, PDI-SC-S226-14to15.8, PDI-SC-S248-0to2, PDI-SC-S219-4to5.2, PDI-SC-S105-0to2, and PDI-SC-S191-2to4. Aroclor 1242, Aroclor 1260, and/or Aroclor 1254 in PDI-SC-S226-12to14, PDI-SC-S226-4to6, PDI-SC-S226-14to15.8, PDI-SC-S219-4to5.2, and PDI-SC-S191-2to4 were qualified for CCV, surrogate recoveries, or identification issues and were not qualified for confirmation column RPD. Aroclor 1242 and Aroclor 1254 in PDI-SC-S248-0to2 and Aroclor 1260 in PDI-SC-S105-0to2 were qualified 'J' based on the confirmation column RPD.

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 PDI-SC-S226-6to8, PDI-SC-S226-10to12, PDI-SC-S226-8to10, PDI-SC-S226-0to2, PDI-SC-S226-2to4, PDI-SC-S226-12to14, PDI-SC-S226-4to6, PDI-SC-S226-14to15.8, PDI-SC-S222-5to7.2D, PDI-SC-S222-13.2to15.2, PDI-SC-S248-0to2, PDI-SC-S248-2to4, PDI-SC-S248-4to6.2, PDI-SC-S139-0to2, PDI-SC-S139-2to4.1, PDI-SC-S139-4.1to5.9, PDI-SC-S139-4.1to5.9D, PDI-SC-S117-0to2, PDI-SC-S117-2to4, PDI-SC-S117-4to6, PDI-SC-S219-0to2, PDI-SC-S219-2to4, PDI-SC-S219-4to5.2, PDI-SC-S191-2to4, PDI-SC-S191-4to6, PDI-SC-S191-6to8.1, PDI-SC-S192-0to1.5, PDI-SC-S192-1.5to3, and PDI-SC-S192-3to4.2 by 1-16 days due to an oversight by the laboratory. No data qualifiers were assigned based on the holding time exceedance.

2. Initial and Continuing Calibrations – Acceptable

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

   TOC by EPA Method 9060 – Laboratory method blanks and continuing calibration blanks were analyzed with the samples, as appropriate. TOC was detected in the method blank analyzed on August 17, 2018 (59.3 mg/kg) at a concentration between the reporting limit and MDL. The results for TOC in the associated samples were reported at concentrations above the reporting limits and greater than 10 times the method blank detection; therefore, data were not qualified based on this method blank result.

   There were three rinsate blanks submitted with this laboratory group. TOC was detected in PDI-RB-SS-180807 (0.28 mg/L), PDI-RB-SS-180808 (0.27 mg/L), and PDI-RB-SS-180806 (0.25 mg/L) at concentrations between the reporting limits and MDLs. Data were not qualified based on rinsate blank results.

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

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

   TOC by Method 9060 – An MS/MSD was performed using PDI-SC-S222-7.2to9.2. Results were acceptable.

   MS/MSDs were performed using PDI-SC-S248-2to4 and PDI-SC-S105-2to4. The percent recoveries in the MS (59%) and MSD (65%) for PDI-SC-S248-2to4 and the MSD (56%) and RPD for the MS/MSD pair (51%) in PDI-SC-S105-2to4 were outside of the control limits of 68-149% and 32%, respectively. The results for TOC in PDI-SC-S248-2to4 and PDI-SC-S105-2to4 were qualified as estimated and flagged 'J' based on the MS/MSD results.

6. Field Duplicate – Acceptable

   Field duplicates were submitted for PDI-SC-S222-5to7.2 and PDI-SC-S139-4.1to5.9 and identified as PDI-SC-S222-5to7.2D and PDI-SC-S139-4.1to5.9D, respectively. Results were comparable.

7. Laboratory Replicate – Acceptable

   TOC by Method 9060 – Laboratory duplicates and triplicates were performed using PDI-SC-S222-7.2to9.2, PDI-SC-S248-2to4, and PDI-SC-S105-2to4. Results were comparable.

   Total Solids by Method D2216 – Laboratory duplicates were performed using PDI-SC-S226-6to8, PDI-SC-S248-4to6.2, PDI-SC-S192-3to4.2. Results were comparable.

   Moisture Content at 70°C – Laboratory duplicates were performed using PDI-SC-S226-10to12 and PDI-SC-S222-13.2to15.2. Results were comparable.

8. Calculation Checks – Acceptable

   A calculation check was performed for PDI-SC-S117-4to6. The review confirmed the final results were correct as reported.

9. Reporting Limits – Acceptable

   TOC by Method 9060 – One or more results in multiple samples were reported at concentrations between the reporting limits and the MDLs and were 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. Laboratory duplicates were performed on PDI-SC-S226-10to12 and PDI-SC-S222-13.2to15.2. 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 580-79444-1 is 100%.

Table 1
QA/QC Data Summary Review
Portland Harbor
Subsurface Sediment - Deep/Nearshore Core Stations
TestAmerica Laboratory Group: 580-79444-1

Sample ID	Laboratory ID	Method	Analyte	Laoratory Result	Units	Final Result	Reason Code
PDI-SC-S226-6TO8	580-79444-1	SW8270DSIM	2-Methylnaphthalene	36 J	ug/kg	36 J	bl
PDI-SC-S226-6TO8	580-79444-1	SW8082A	Aroclor 1248	35	ug/kg	35 J	q
PDI-SC-S226-6TO8	580-79444-1	SW8082A	Aroclor 1260	6.7	ug/kg	6.7 J	q
PDI-SC-S226-6TO8	580-79444-1	SW8270DSIM	Naphthalene	68 J	ug/kg	68 J	bl
PDI-SC-S226-10TO12	580-79444-2	SW8270DSIM	2-Methylnaphthalene	26 J	ug/kg	26 J	bl
PDI-SC-S226-10TO12	580-79444-2	SW8082A	Aroclor 1016	3.5 U	ug/kg	3.5 UJ	s
PDI-SC-S226-10TO12	580-79444-2	SW8082A	Aroclor 1221	3.5 U	ug/kg	3.5 UJ	s
PDI-SC-S226-10TO12	580-79444-2	SW8082A	Aroclor 1232	3.5 U	ug/kg	3.5 UJ	s
PDI-SC-S226-10TO12	580-79444-2	SW8082A	Aroclor 1242	3.5 U	ug/kg	3.5 UJ	s
PDI-SC-S226-10TO12	580-79444-2	SW8082A	Aroclor 1248	3.5 U	ug/kg	3.5 UJ	s
PDI-SC-S226-10TO12	580-79444-2	SW8082A	Aroclor 1254	3.5 U	ug/kg	3.5 UJ	s
PDI-SC-S226-10TO12	580-79444-2	SW8082A	Aroclor 1260	3.8	ug/kg	3.8 J	s
PDI-SC-S226-8TO10	580-79444-3	SW8270DSIM	2-Methylnaphthalene	49 J	ug/kg	49 J	bl
PDI-SC-S226-8TO10	580-79444-3	SW8082A	Aroclor 1016	3.7 U	ug/kg	3.7 UJ	s
PDI-SC-S226-8TO10	580-79444-3	SW8082A	Aroclor 1221	3.7 U	ug/kg	3.7 UJ	s
PDI-SC-S226-8TO10	580-79444-3	SW8082A	Aroclor 1232	3.7 U	ug/kg	3.7 UJ	s
PDI-SC-S226-8TO10	580-79444-3	SW8082A	Aroclor 1242	3.7 U	ug/kg	3.7 UJ	s
PDI-SC-S226-8TO10	580-79444-3	SW8082A	Aroclor 1248	6.9	ug/kg	6.9 J	s
PDI-SC-S226-8TO10	580-79444-3	SW8082A	Aroclor 1254	3.7 U	ug/kg	3.7 UJ	s
PDI-SC-S226-8TO10	580-79444-3	SW8082A	Aroclor 1260	3.9	ug/kg	3.9 J	s
PDI-SC-S226-0TO2	580-79444-4	SW8082A	Aroclor 1016	4.4 U	ug/kg	4.4 UJ	s
PDI-SC-S226-0TO2	580-79444-4	SW8082A	Aroclor 1221	4.4 U	ug/kg	4.4 UJ	s
PDI-SC-S226-0TO2	580-79444-4	SW8082A	Aroclor 1232	4.4 U	ug/kg	4.4 UJ	s
PDI-SC-S226-0TO2	580-79444-4	SW8082A	Aroclor 1242	4.4 U	ug/kg	4.4 UJ	s
PDI-SC-S226-0TO2	580-79444-4	SW8082A	Aroclor 1248	4.4 U	ug/kg	4.4 UJ	s
PDI-SC-S226-0TO2	580-79444-4	SW8082A	Aroclor 1254	4.4 U	ug/kg	4.4 UJ	s
PDI-SC-S226-0TO2	580-79444-4	SW8082A	Aroclor 1260	4.4 U	ug/kg	4.4 UJ	s
PDI-SC-S226-0TO2	580-79444-4	SW8270DSIM	Naphthalene	35 J	ug/kg	35 J	bl
PDI-SC-S226-2TO4	580-79444-5	SW8270DSIM	2-Methylnaphthalene	12 J	ug/kg	12 J	bl
PDI-SC-S226-2TO4	580-79444-5	SW8082A	Aroclor 1016	3.9 U	ug/kg	3.9 UJ	s
PDI-SC-S226-2TO4	580-79444-5	SW8082A	Aroclor 1221	3.9 U	ug/kg	3.9 UJ	s
PDI-SC-S226-2TO4	580-79444-5	SW8082A	Aroclor 1232	3.9 U	ug/kg	3.9 UJ	s
PDI-SC-S226-2TO4	580-79444-5	SW8082A	Aroclor 1242	10	ug/kg	10 J	s
PDI-SC-S226-2TO4	580-79444-5	SW8082A	Aroclor 1248	3.9 U	ug/kg	3.9 UJ	s
PDI-SC-S226-2TO4	580-79444-5	SW8082A	Aroclor 1254	3.9 U	ug/kg	3.9 UJ	s
PDI-SC-S226-2TO4	580-79444-5	SW8082A	Aroclor 1260	3.9	ug/kg	3.9 J	s
PDI-SC-S226-2TO4	580-79444-5	SW8270DSIM	Naphthalene	42 J	ug/kg	42 J	bl
PDI-SC-S226-12TO14	580-79444-6	SW8270DSIM	2-Methylnaphthalene	26 J	ug/kg	26 J	bl
PDI-SC-S226-12TO14	580-79444-6	SW8082A	Aroclor 1016	3.5 U	ug/kg	3.5 UJ	s
PDI-SC-S226-12TO14	580-79444-6	SW8082A	Aroclor 1221	3.5 U	ug/kg	3.5 UJ	s
PDI-SC-S226-12TO14	580-79444-6	SW8082A	Aroclor 1232	3.5 U	ug/kg	3.5 UJ	s
PDI-SC-S226-12TO14	580-79444-6	SW8082A	Aroclor 1242	5.6	ug/kg	5.6 J	s
PDI-SC-S226-12TO14	580-79444-6	SW8082A	Aroclor 1248	3.5 U	ug/kg	3.5 UJ	s
PDI-SC-S226-12TO14	580-79444-6	SW8082A	Aroclor 1254	3.5 U	ug/kg	3.5 UJ	s
PDI-SC-S226-12TO14	580-79444-6	SW8082A	Aroclor 1260	6.3	ug/kg	6.3 J	s
PDI-SC-S226-12TO14	580-79444-6	SW8270DSIM	Naphthalene	79 J	ug/kg	79 J	bl
PDI-SC-S226-4TO6	580-79444-7	SW8270DSIM	2-Methylnaphthalene	8.5 J	ug/kg	8.5 J	bl
PDI-SC-S226-4TO6	580-79444-7	SW8082A	Aroclor 1016	3.3 U	ug/kg	3.3 UJ	s
PDI-SC-S226-4TO6	580-79444-7	SW8082A	Aroclor 1221	3.3 U	ug/kg	3.3 UJ	s
PDI-SC-S226-4TO6	580-79444-7	SW8082A	Aroclor 1232	3.3 U	ug/kg	3.3 UJ	s
PDI-SC-S226-4TO6	580-79444-7	SW8082A	Aroclor 1242	2.3 J	ug/kg	2.3 J	s
PDI-SC-S226-4TO6	580-79444-7	SW8082A	Aroclor 1248	3.3 U	ug/kg	3.3 UJ	s
PDI-SC-S226-4TO6	580-79444-7	SW8082A	Aroclor 1254	3.3 U	ug/kg	3.3 UJ	s
PDI-SC-S226-4TO6	580-79444-7	SW8082A	Aroclor 1260	2.3 J	ug/kg	2.3 J	s
PDI-SC-S226-4TO6	580-79444-7	SW8270DSIM	Naphthalene	32 J	ug/kg	32 J	bl
PDI-SC-S226-14TO15.8	580-79444-8	SW8270DSIM	2-Methylnaphthalene	47 J	ug/kg	47 J	bl
PDI-SC-S226-14TO15.8	580-79444-8	SW8082A	Aroclor 1260	13	ug/kg	13 J	c
PDI-SC-S222-0TO2	580-79444-9	SW8082A	Aroclor 1260	430	ug/kg	430 J	c
PDI-SC-S222-2TO4	580-79444-10	SW8082A	Aroclor 1260	300 J	ug/kg	300 J	c
PDI-SC-S222-4TO5	580-79444-11	SW8082A	Aroclor 1260	180 J	ug/kg	180 J	c

Table 1
QA/QC Data Summary Review
Portland Harbor
Subsurface Sediment - Deep/Nearshore Core Stations
TestAmerica Laboratory Group: 580-79444-1

Sample ID	Laboratory ID	Method	Analyte	Laoratory Result	Units	Final Result	Reason Code
PDI-SC-S222-5TO7.2	580-79444-12	SW8082A	Aroclor 1221	2.5 U	ug/kg	2.5 UJ	c
PDI-SC-S222-5TO7.2	580-79444-12	SW8082A	Aroclor 1232	37	ug/kg	37 J	c
PDI-SC-S222-5TO7.2	580-79444-12	SW8270DSIM	Chrysene	18	ug/kg	18 J	fd
PDI-SC-S222-5TO7.2	580-79444-12	SW8270DSIM	Fluoranthene	26	ug/kg	26 J	fd
PDI-SC-S222-5TO7.2	580-79444-12	SW8270DSIM	Pyrene	44	ug/kg	44 J	fd
PDI-SC-S222-5TO7.2D	580-79444-13	SW8082A	Aroclor 1232	26	ug/kg	26 J	c
PDI-SC-S222-5TO7.2D	580-79444-13	SW8270DSIM	Chrysene	7.9	ug/kg	7.9 J	fd
PDI-SC-S222-5TO7.2D	580-79444-13	SW8270DSIM	Fluoranthene	14	ug/kg	14 J	fd
PDI-SC-S222-5TO7.2D	580-79444-13	SW8270DSIM	Pyrene	22	ug/kg	22 J	fd
PDI-SC-S222-5TO7.2D	580-79444-13	SW8082A	Aroclor 1221	2.4 U	ug/kg	2.4 UJ	c
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8082A	Aroclor 1016	3.4 U	ug/kg	3.4 UJ	s
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8082A	Aroclor 1221	3.4 U	ug/kg	3.4 UJ	s
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8082A	Aroclor 1232	3.4 U	ug/kg	3.4 UJ	s
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8082A	Aroclor 1242	3.4 U	ug/kg	3.4 UJ	s
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8082A	Aroclor 1248	3.4 U	ug/kg	3.4 UJ	s
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8082A	Aroclor 1254	3.4 U	ug/kg	3.4 UJ	s
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8082A	Aroclor 1260	3.4 U	ug/kg	3.4 UJ	s
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8270DSIM	Benz(a)anthracene	2.7 J	ug/kg	2.7 J	bl
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8270DSIM	Benzo(b)fluoranthene	3.7 J	ug/kg	3.7 J	bl
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8270DSIM	Benzo(g,h,i)perylene	1.6 J	ug/kg	1.6 J	bl
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8270DSIM	Benzo(k)fluoranthene	1.3 J	ug/kg	1.3 J	bl
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8270DSIM	Chrysene	2.9 J	ug/kg	2.9 J	bl
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8270DSIM	Indeno(1,2,3-cd)pyrene	2.1 J	ug/kg	2.1 J	bl
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8270DSIM	Naphthalene	3.0 J	ug/kg	3.0 J	bl
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8270DSIM	Phenanthrene	6.3 J	ug/kg	6.3 J	bl
PDI-SC-S222-7.2TO9.2	580-79444-14	SW8270DSIM	Pyrene	7.2 J	ug/kg	7.2 J	bl
PDI-SC-S222-9.2TO11.2	580-79444-15	SW8270DSIM	2-Methylnaphthalene	1.5 J	ug/kg	1.5 J	bl
PDI-SC-S222-9.2TO11.2	580-79444-15	SW8082A	Aroclor 1260	3.0 U	ug/kg	3.0 UJ	c
PDI-SC-S222-9.2TO11.2	580-79444-15	SW8270DSIM	Naphthalene	4.2 J	ug/kg	4.2 J	bl
PDI-SC-S222-11.2TO13.2	580-79444-16	SW8270DSIM	2-Methylnaphthalene	1.7 J	ug/kg	1.7 J	bl
PDI-SC-S222-11.2TO13.2	580-79444-16	SW8270DSIM	Naphthalene	3.6 J	ug/kg	3.6 J	bl
PDI-SC-S222-11.2TO13.2	580-79444-16	SW8082A	Aroclor 1221	3.0 U	ug/kg	3.0 UJ	c
PDI-SC-S222-13.2TO15.2	580-79444-17	SW8270DSIM	Naphthalene	3.2 J	ug/kg	3.2 J	bl
PDI-SC-S222-13.2TO15.2	580-79444-17	SW8082A	Aroclor 1221	3.2 U	ug/kg	3.2 UJ	c
PDI-SC-S248-0TO2	580-79444-18	SW8082A	Aroclor 1242	2.2 J	ug/kg	2.2 J	r
PDI-SC-S248-0TO2	580-79444-18	SW8082A	Aroclor 1254	3.3 J	ug/kg	3.3 J	r
PDI-SC-S248-0TO2	580-79444-18	SW8270DSIM	Benzo(g,h,i)perylene	21 J	ug/kg	21 J	bl
PDI-SC-S248-0TO2	580-79444-18	SW8270DSIM	Benzo(k)fluoranthene	17 J	ug/kg	17 J	bl
PDI-SC-S248-0TO2	580-79444-18	SW8270DSIM	Dibenz(a,h)anthracene	4.7 J	ug/kg	4.7 J	bl
PDI-SC-S248-0TO2	580-79444-18	SW8082A	Aroclor 1221	4.8 U	ug/kg	4.8 UJ	c
PDI-SC-S248-2TO4	580-79444-19	SW8270DSIM	2-Methylnaphthalene	70	ug/kg	70 J	m
PDI-SC-S248-2TO4	580-79444-19	SW8082A	Aroclor 1260	13	ug/kg	13 J	c
PDI-SC-S248-2TO4	580-79444-19	SW8270DSIM	Dibenz(a,h)anthracene	6.6 J	ug/kg	6.6 J	bl
PDI-SC-S248-2TO4	580-79444-19	SW8270DSIM	Naphthalene	180	ug/kg	180 J	m
PDI-SC-S248-2TO4	580-79444-19	SW8270DSIM	Phenanthrene	450	ug/kg	450 J	m
PDI-SC-S248-2TO4	580-79444-19	SW9060	Total Organic Carbon	31,000	mg/kg	31,000 J	m
PDI-SC-S248-2TO4	580-79444-19	SW8082A	Aroclor 1221	3.5 U	ug/kg	3.5 UJ	c
PDI-SC-S248-4TO6.2	580-79444-20	SW8082A	Aroclor 1260	1.9 J	ug/kg	1.9 J	c
PDI-SC-S248-4TO6.2	580-79444-20	SW8082A	Aroclor 1221	3.5 U	ug/kg	3.5 UJ	c
PDI-SC-S139-0TO2	580-79444-21	SW8082A	Aroclor 1221	4.5 U	ug/kg	4.5 UJ	c
PDI-SC-S139-2TO4.1	580-79444-22	SW8082A	Aroclor 1221	2.8 U	ug/kg	2.8 UJ	c
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Acenaphthene	54	ug/kg	54 J	fd
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Anthracene	77	ug/kg	77 J	fd
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8082A	Aroclor 1260	2.6 U	ug/kg	2.6 UJ	c
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Benz(a)anthracene	140	ug/kg	140 J	fd
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Benzo(a)pyrene	110	ug/kg	110 J	fd
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Benzo(b)fluoranthene	130	ug/kg	130 J	fd
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Benzo(g,h,i)perylene	95	ug/kg	95 J	fd
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Benzo(k)fluoranthene	33	ug/kg	33 J	fd
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Chrysene	120	ug/kg	120 J	fd

Table 1
QA/QC Data Summary Review
Portland Harbor
Subsurface Sediment - Deep/Nearshore Core Stations
TestAmerica Laboratory Group: 580-79444-1

Sample ID	Laboratory ID	Method	Analyte	Laoratory Result	Units	Final Result	Reason Code
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Dibenz(a,h)anthracene	13	ug/kg	13 J	fd
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Fluoranthene	290	ug/kg	290 J	fd
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Indeno(1,2,3-cd)pyrene	83	ug/kg	83 J	fd
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Naphthalene	170	ug/kg	170 J	fd
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Phenanthrene	240	ug/kg	240 J	fd
PDI-SC-S139-4.1TO5.9	580-79444-23	SW8270DSIM	Pyrene	420	ug/kg	420 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Acenaphthene	91	ug/kg	91 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Anthracene	230	ug/kg	230 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Benz(a)anthracene	410	ug/kg	410 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Benzo(a)pyrene	390	ug/kg	390 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Benzo(b)fluoranthene	360	ug/kg	360 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Benzo(g,h,i)perylene	280	ug/kg	280 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Benzo(k)fluoranthene	120	ug/kg	120 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Chrysene	350	ug/kg	350 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Dibenz(a,h)anthracene	49	ug/kg	49 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Fluoranthene	900	ug/kg	900 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Indeno(1,2,3-cd)pyrene	290	ug/kg	290 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Naphthalene	83	ug/kg	83 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Phenanthrene	680	ug/kg	680 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8270DSIM	Pyrene	1200	ug/kg	1,200 J	fd
PDI-SC-S139-4.1TO5.9D	580-79444-24	SW8082A	Aroclor 1221	2.4 U	ug/kg	2.4 UJ	c
PDI-SC-S117-0TO2	580-79444-25	SW8082A	Aroclor 1221	3.2 U	ug/kg	3.2 UJ	c
PDI-SC-S117-2TO4	580-79444-26	SW8082A	Aroclor 1016	3.3 U	ug/kg	3.3 UJ	s
PDI-SC-S117-2TO4	580-79444-26	SW8082A	Aroclor 1221	3.3 U	ug/kg	3.3 UJ	c
PDI-SC-S117-2TO4	580-79444-26	SW8082A	Aroclor 1232	3.3 U	ug/kg	3.3 UJ	s
PDI-SC-S117-2TO4	580-79444-26	SW8082A	Aroclor 1242	3.3 U	ug/kg	3.3 UJ	s
PDI-SC-S117-2TO4	580-79444-26	SW8082A	Aroclor 1248	3.3 U	ug/kg	3.3 UJ	s
PDI-SC-S117-2TO4	580-79444-26	SW8082A	Aroclor 1254	3.3 U	ug/kg	3.3 UJ	s
PDI-SC-S117-2TO4	580-79444-26	SW8082A	Aroclor 1260	35	ug/kg	35 J	c
PDI-SC-S117-4TO6	580-79444-27	SW8082A	Aroclor 1221	3.3 U	ug/kg	3.3 UJ	c
PDI-SC-S117-4TO6	580-79444-27	SW8082A	Aroclor 1260	38	ug/kg	38 J	c
PDI-SC-S219-0TO2	580-79444-28	SW8082A	Aroclor 1221	3.2 U	ug/kg	3.2 UJ	c
PDI-SC-S219-0TO2	580-79444-28	SW8082A	Aroclor 1260	35	ug/kg	35 J	c
PDI-SC-S219-0TO2	580-79444-28	SW8270DSIM	Dibenz(a,h)anthracene	41 J	ug/kg	41 J	bl
PDI-SC-S219-2TO4	580-79444-29	SW8082A	Aroclor 1016	2.7 U	ug/kg	2.7 UJ	s
PDI-SC-S219-2TO4	580-79444-29	SW8082A	Aroclor 1221	2.7 U	ug/kg	2.7 UJ	c
PDI-SC-S219-2TO4	580-79444-29	SW8082A	Aroclor 1232	2.7 U	ug/kg	2.7 UJ	s
PDI-SC-S219-2TO4	580-79444-29	SW8082A	Aroclor 1242	2.7 U	ug/kg	2.7 UJ	s
PDI-SC-S219-2TO4	580-79444-29	SW8082A	Aroclor 1248	2.7 U	ug/kg	2.7 UJ	s
PDI-SC-S219-2TO4	580-79444-29	SW8082A	Aroclor 1254	2.7 U	ug/kg	2.7 UJ	s
PDI-SC-S219-2TO4	580-79444-29	SW8082A	Aroclor 1260	2.7 U	ug/kg	2.7 UJ	s
PDI-SC-S219-2TO4	580-79444-29	SW8270DSIM	Benz(a)anthracene	0.55 J	ug/kg	1.2 U	bl
PDI-SC-S219-2TO4	580-79444-29	SW8270DSIM	Benzo(b)fluoranthene	0.44 J	ug/kg	1.2 U	bl
PDI-SC-S219-2TO4	580-79444-29	SW8270DSIM	Benzo(g,h,i)perylene	0.37 J	ug/kg	1.2 U	bl
PDI-SC-S219-2TO4	580-79444-29	SW8270DSIM	Benzo(k)fluoranthene	0.22 J	ug/kg	1.2 U	bl
PDI-SC-S219-2TO4	580-79444-29	SW8270DSIM	Chrysene	0.47 J	ug/kg	1.2 U	bl
PDI-SC-S219-2TO4	580-79444-29	SW8270DSIM	Indeno(1,2,3-cd)pyrene	0.44 J	ug/kg	1.2 U	bl
PDI-SC-S219-4TO5.2	580-79444-30	SW8082A	Aroclor 1016	2.7 U	ug/kg	2.7 UJ	s
PDI-SC-S219-4TO5.2	580-79444-30	SW8082A	Aroclor 1221	2.7 U	ug/kg	2.7 UJ	c
PDI-SC-S219-4TO5.2	580-79444-30	SW8082A	Aroclor 1232	2.7 U	ug/kg	2.7 UJ	s
PDI-SC-S219-4TO5.2	580-79444-30	SW8082A	Aroclor 1242	2.7 U	ug/kg	2.7 UJ	s
PDI-SC-S219-4TO5.2	580-79444-30	SW8082A	Aroclor 1248	2.7 U	ug/kg	2.7 UJ	s
PDI-SC-S219-4TO5.2	580-79444-30	SW8082A	Aroclor 1254	1.6 J	ug/kg	1.6 J	c
PDI-SC-S219-4TO5.2	580-79444-30	SW8082A	Aroclor 1260	2.7 U	ug/kg	2.7 UJ	s
PDI-SC-S219-4TO5.2	580-79444-30	SW8270DSIM	Benz(a)anthracene	2.1 J	ug/kg	2.1 J	bl
PDI-SC-S219-4TO5.2	580-79444-30	SW8270DSIM	Benzo(b)fluoranthene	2.8 J	ug/kg	2.8 J	bl
PDI-SC-S219-4TO5.2	580-79444-30	SW8270DSIM	Benzo(g,h,i)perylene	1.3 J	ug/kg	1.3 J	bl
PDI-SC-S219-4TO5.2	580-79444-30	SW8270DSIM	Benzo(k)fluoranthene	0.77 J	ug/kg	0.77 J	bl
PDI-SC-S219-4TO5.2	580-79444-30	SW8270DSIM	Chrysene	2.0 J	ug/kg	2.0 J	bl
PDI-SC-S219-4TO5.2	580-79444-30	SW8270DSIM	Indeno(1,2,3-cd)pyrene	1.6 J	ug/kg	1.6 J	bl

Table 1
QA/QC Data Summary Review
Portland Harbor
Subsurface Sediment - Deep/Nearshore Core Stations
TestAmerica Laboratory Group: 580-79444-1

Sample ID	Laboratory ID	Method	Analyte	Laoratory Result	Units	Final Result	Reason Code
PDI-SC-S219-4TO5.2	580-79444-30	SW8270DSIM	Naphthalene	3.1 J	ug/kg	3.1 J	bl
PDI-SC-S219-4TO5.2	580-79444-30	SW8270DSIM	Pyrene	3.2 J	ug/kg	3.2 J	bl
PDI-SC-S105-0TO2	580-79444-31	SW8082A	Aroclor 1260	2.8 J	ug/kg	2.8 J	r
PDI-SC-S105-2TO4	580-79444-32	SW8270DSIM	Acenaphthylene	150	ug/kg	150 J	m
PDI-SC-S105-2TO4	580-79444-32	SW8270DSIM	Anthracene	320	ug/kg	320 J	m
PDI-SC-S105-2TO4	580-79444-32	SW8270DSIM	Benz(a)anthracene	780	ug/kg	780 J	m,md
PDI-SC-S105-2TO4	580-79444-32	SW8270DSIM	Benzo(a)pyrene	720	ug/kg	720 J	m,md
PDI-SC-S105-2TO4	580-79444-32	SW8270DSIM	Benzo(b)fluoranthene	890	ug/kg	890 J	m,md
PDI-SC-S105-2TO4	580-79444-32	SW8270DSIM	Benzo(g,h,i)perylene	770	ug/kg	770 J	m,md
PDI-SC-S105-2TO4	580-79444-32	SW8270DSIM	Benzo(k)fluoranthene	240	ug/kg	240 J	m,md
PDI-SC-S105-2TO4	580-79444-32	SW8270DSIM	Chrysene	970	ug/kg	970 J	m,md
PDI-SC-S105-2TO4	580-79444-32	SW8270DSIM	Dibenz(a,h)anthracene	120	ug/kg	120 J	m,md
PDI-SC-S105-2TO4	580-79444-32	SW8270DSIM	Indeno(1,2,3-cd)pyrene	770	ug/kg	770 J	m,md
PDI-SC-S105-2TO4	580-79444-32	SW8270DSIM	Naphthalene	170	ug/kg	170 J	m,md
PDI-SC-S105-2TO4	580-79444-32	SW8270DSIM	Phenanthrene	260	ug/kg	260 J	m
PDI-SC-S105-2TO4	580-79444-32	SW9060	Total Organic Carbon	15,000	mg/kg	15,000 J	m,md
PDI-SC-S105-4TO5.6	580-79444-33	SW8270DSIM	Benzo(b)fluoranthene	6,400	ug/kg	6,400 J	l
PDI-SC-S105-5.6TO6.6	580-79444-34	SW8270DSIM	Benzo(b)fluoranthene	61,000	ug/kg	61,000 J	l
PDI-SC-S191-0TO2	580-79444-35	SW8082A	Aroclor 1016	4.8 U	ug/kg	4.8 UJ	s
PDI-SC-S191-0TO2	580-79444-35	SW8082A	Aroclor 1221	4.8 U	ug/kg	4.8 UJ	s
PDI-SC-S191-0TO2	580-79444-35	SW8082A	Aroclor 1232	4.8 U	ug/kg	4.8 UJ	s
PDI-SC-S191-0TO2	580-79444-35	SW8082A	Aroclor 1242	4.8 U	ug/kg	4.8 UJ	s
PDI-SC-S191-0TO2	580-79444-35	SW8082A	Aroclor 1248	4.8 U	ug/kg	4.8 UJ	s
PDI-SC-S191-0TO2	580-79444-35	SW8082A	Aroclor 1254	290	ug/kg	290 J	s
PDI-SC-S191-0TO2	580-79444-35	SW8082A	Aroclor 1260	4.8 U	ug/kg	4.8 UJ	s
PDI-SC-S191-0TO2	580-79444-35	SW8270DSIM	Benzo(b)fluoranthene	1,500	ug/kg	1,500 J	l
PDI-SC-S191-2TO4	580-79444-36	SW8082A	Aroclor 1254	1,300	ug/kg	1,300 J	q
PDI-SC-S191-2TO4	580-79444-36	SW8082A	Aroclor 1260	170 U	ug/kg	170 UJ	c
PDI-SC-S191-2TO4	580-79444-36	SW8270DSIM	Benzo(b)fluoranthene	1,800	ug/kg	1,800 J	l
PDI-SC-S191-4TO6	580-79444-37	SW8082A	Aroclor 1254	720	ug/kg	720 J	q
PDI-SC-S191-4TO6	580-79444-37	SW8082A	Aroclor 1260	180 U	ug/kg	180 UJ	c
PDI-SC-S191-4TO6	580-79444-37	SW8270DSIM	Benzo(b)fluoranthene	1,800	ug/kg	1,800 J	l
PDI-SC-S191-6TO8.1	580-79444-38	SW8082A	Aroclor 1254	280	ug/kg	280 J	q
PDI-SC-S191-6TO8.1	580-79444-38	SW8270DSIM	Benzo(b)fluoranthene	470	ug/kg	470 J	l
PDI-SC-S192-0TO1.5	580-79444-39	SW8082A	Aroclor 1254	1,800	ug/kg	1,800 J	q
PDI-SC-S192-0TO1.5	580-79444-39	SW8082A	Aroclor 1260	360 U	ug/kg	360 UJ	c
PDI-SC-S192-0TO1.5	580-79444-39	SW8270DSIM	Benzo(b)fluoranthene	12,000	ug/kg	12,000 J	l
PDI-SC-S192-1.5TO3	580-79444-40	SW8082A	Aroclor 1016	5.2 U	ug/kg	5.2 UJ	s
PDI-SC-S192-1.5TO3	580-79444-40	SW8082A	Aroclor 1221	5.2 U	ug/kg	5.2 UJ	s
PDI-SC-S192-1.5TO3	580-79444-40	SW8082A	Aroclor 1232	5.2 U	ug/kg	5.2 UJ	s
PDI-SC-S192-1.5TO3	580-79444-40	SW8082A	Aroclor 1242	5.2 U	ug/kg	5.2 UJ	s
PDI-SC-S192-1.5TO3	580-79444-40	SW8082A	Aroclor 1248	5.2 U	ug/kg	5.2 UJ	s
PDI-SC-S192-1.5TO3	580-79444-40	SW8082A	Aroclor 1254	1,500	ug/kg	1,500 J	s
PDI-SC-S192-1.5TO3	580-79444-40	SW8082A	Aroclor 1260	260 U	ug/kg	260 UJ	c
PDI-SC-S192-1.5TO3	580-79444-40	SW8270DSIM	Benzo(b)fluoranthene	8,500	ug/kg	8,500 J	l
PDI-SC-S192-3TO4.2	580-79444-41	SW8082A	Aroclor 1254	180	ug/kg	180 J	q
PDI-SC-S192-3TO4.2	580-79444-41	SW8082A	Aroclor 1260	24 U	ug/kg	24 UJ	c
PDI-SC-S192-3TO4.2	580-79444-41	SW8270DSIM	Benzo(b)fluoranthene	900	ug/kg	900 J	l

Notes:
bl - laboratory blank contamination
c - calibration issue
fd - field duplicate RPD
J - estimated value
l - laboratory control sample
m - matrix spike recovery
md - matrix spike/matrix spike duplicate RPD
mg/kg - milligram per kilogram
s - surrogate recovery

Table 1
QA/QC Data Summary Review
Portland Harbor
Subsurface Sediment - Deep/Nearshore Core Stations
TestAmerica Laboratory Group: 580-79444-1

Sample ID	Laboratory ID	Method	Analyte	Laoratory Result	Units	Final Result	Reason Code

ug/kg - microgram per kilogram
q - quantitation issue
r - dual column RPD
RPD - relative percent difference
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.