TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

TestAmerica Job ID: 580-77608-1
Client Project/Site: Portland Harbor Pre-Remedial Design
Revision: 1

For:
AECOM
1111 Third Ave
Suite 1600
Seattle, Washington 98101

Attn: Amy Dahl

M. Elaine Walker

Authorized for release by:
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Elaine Walker, Project Manager II
(253)248-4972
elaine.walker@testamericainc.com

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Laboratory: TestAmerica Seattle

Narrative

CASE NARRATIVE
Client: AECOM
Project: Portland Harbor Pre-Remedial Design
Report Number: 580-77608-1

REVISION 1: AUGUST 9, 2018

This revision was required because the NWTPH-Dx and 6020A_LL analyses were calculated using the Total Solids @110C, rather than Total Solids @70C. This note is incorrect. The results were calculated using Total Solids @70C, rather than Total Solids @110C. The results in this revised laboratory report correctly use the Total Solids @110C. CRC 8/13/418

This narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues.

It should be noted that samples with elevated Reporting Limits (RLs) resulting from a dilution may not be able to satisfy customer reporting limits in some cases. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes within the calibration range of the instrument or that reduces the interferences thereby enabling the quantification of target analytes.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 5/25/2018 12:40 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.3º C and 2.7º C.

A sample container was provided to be archived frozen at the TestAmerica Sacramento laboratory pending potential additional analyses.

This report contains results of all analyses performed by TestAmerica Seattle.

The Client requested 3 samples to be split from the rest and this report contains results of these 3 samples only.

The samples were received on hold and activated for analysis on 06/07/2018.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

DIESEL AND EXTENDED RANGE ORGANICS

Samples PDI-SG-B405-BL1 (580-77608-12), PDI-SG-B409-BL1 (580-77608-13) and PDI-SG-B414-BL1 (580-77608-14) were analyzed for diesel and extended range organics in accordance with Method NWTPH-Dx. The samples were prepared on 06/12/2018 and analyzed on 06/14/2018 and 06/24/2018.

o-Terphenyl failed the surrogate recovery criteria low for PDI-SG-B405-BL1 (580-77608-12). o-Terphenyl failed the surrogate recovery criteria low for PDI-SG-B414-BL1DU (580-77608-14DU). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis were not performed.

The following samples contained a hydrocarbon pattern in the diesel range; however, the elution pattern was later than the typical diesel fuel pattern used by the laboratory for quantitative purposes: PDI-SG-B405-BL1 (580-77608-12), PDI-SG-B414-BL1 (580-77608-14) and (580-77608-A-14-B DU).

Job ID: 580-77608-1 (Continued)

Laboratory: TestAmerica Seattle (Continued)

Samples PDI-SG-B405-BL1 (580-77608-12)[10X] and PDI-SG-B414-BL1 (580-77608-14)[10X] required dilution prior to analysis to bring the concentration of target analytes within the calibration range. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS)

Samples PDI-SG-B405-BL1 (580-77608-12), PDI-SG-B409-BL1 (580-77608-13) and PDI-SG-B414-BL1 (580-77608-14) were analyzed for Metals (ICPMS) in accordance with 6020A_LL. The samples were prepared on 06/21/2018 and analyzed on 06/22/2018.

Lead failed the recovery criteria high for the MS of sample PDI-SG-B405-BL1MS (580-77608-12) in batch 580-277223. Copper and Lead failed the recovery criteria high for the MSD of sample PDI-SG-B405-BL1MSD (580-77608-12) in batch 580-277223. Lead exceeded the RPD limit.

Arsenic, Cadmium and Lead exceeded the RPD limit for the duplicate of sample PDI-SG-B405-BL1DU (580-77608-12).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL MERCURY

Samples PDI-SG-B405-BL1 (580-77608-12), PDI-SG-B409-BL1 (580-77608-13) and PDI-SG-B414-BL1 (580-77608-14) were analyzed for total mercury in accordance with EPA SW-846 Method 7471A. The samples were prepared on 06/19/2018 and analyzed on 06/20/2018.

Mercury was detected in method blank MB 580-276720/25-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

The following samples were received outside of holding time: PDI-SG-B405-BL1 (580-77608-12), PDI-SG-B409-BL1 (580-77608-13) and PDI-SG-B414-BL1 (580-77608-14).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON

Samples PDI-SG-B405-BL1 (580-77608-12), PDI-SG-B409-BL1 (580-77608-13) and PDI-SG-B414-BL1 (580-77608-14) were analyzed for total organic carbon in accordance with EPA SW-846 Method 9060. The samples were analyzed on 06/14/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GRAIN SIZE

Samples PDI-SG-B405-BL1 (580-77608-12), PDI-SG-B409-BL1 (580-77608-13) and PDI-SG-B414-BL1 (580-77608-14) were analyzed for grain size in accordance with D422. The samples were analyzed on 06/17/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary e.

PERCENT SOLIDS

Samples PDI-SG-B405-BL1 (580-77608-12), PDI-SG-B409-BL1 (580-77608-13) and PDI-SG-B414-BL1 (580-77608-14) were analyzed for percent solids in accordance with ASTM D2216. The samples were analyzed on 06/01/2018.

Total Solids exceeded the RPD limit for the duplicate of sample PDI-SG-B414-BL1DU (580-77608-14).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL SOLIDS @ 70C

Samples PDI-SG-B405-BL1 (580-77608-12), PDI-SG-B409-BL1 (580-77608-13) and PDI-SG-B414-BL1 (580-77608-14) were analyzed for Total Solids @ 70C. The samples were analyzed on 06/22/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: AECOM
Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-77608-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
X	Surrogate is outside control limits

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
H	Sample was prepped or analyzed beyond the specified holding time
F1	MS and/or MSD Recovery is outside acceptance limits.
F2	MS/MSD RPD exceeds control limits
F3	Duplicate RPD exceeds the control limit
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL. The data are considered valid because the absolute difference is less than the RL.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
F3	Duplicate RPD exceeds the control limit

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: AECOM
Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-77608-1

Client Sample ID: PDI-SG-B405-BL1
Date Collected: 04/28/18 11:40
Date Received: 05/25/18 12:40

Lab Sample ID: 580-77608-12
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	14000		2000	44	mg/Kg			06/14/18 10:36	1
Total Solids	62.3		0.1	0.1	%			06/01/18 09:33	1
Total Solids @ 70°C	73		0.10	0.10	%			06/22/18 17:43	1

Method: D7928/D6913 - ASTM D7928/D6913

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Clay	1.4				%			06/17/18 10:45	1
Coarse Sand	5.8				%			06/17/18 10:45	1
Fine Sand	21.6				%			06/17/18 10:45	1
Gravel	38.3				%			06/17/18 10:45	1
Medium Sand	14.7				%			06/17/18 10:45	1
Silt	18.2				%			06/17/18 10:45	1

Client Sample ID: PDI-SG-B405-BL1
Date Collected: 04/28/18 11:40
Date Received: 05/25/18 12:40

Lab Sample ID: 580-77608-12
Matrix: Solid
Percent Solids: 62.3

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	210	J	730	180	mg/Kg	☼	06/12/18 11:54	06/24/18 00:17	10
Motor Oil (>C24-C36)	1500		730	260	mg/Kg	☼	06/12/18 11:54	06/24/18 00:17	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*48*	*X*	*50 - 150*	*06/12/18 11:54*	*06/24/18 00:17*	*10*

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	4.7		0.23	0.046	mg/Kg	☼	06/21/18 18:26	06/22/18 17:49	5
Cadmium	0.23		0.18	0.035	mg/Kg	☼	06/21/18 18:26	06/22/18 17:49	5
Copper	39	F1	0.46	0.10	mg/Kg	☼	06/21/18 18:26	06/22/18 17:49	5
Lead	42	F1 F2	0.23	0.022	mg/Kg	☼	06/21/18 18:26	06/22/18 17:49	5
Zinc	130		2.3	0.73	mg/Kg	☼	06/21/18 18:26	06/22/18 17:49	5

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.11	H B	0.033	0.010	mg/Kg	☼	06/19/18 15:36	06/20/18 15:20	1

Client: AECOM
Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-77608-1

Client Sample ID: PDI-SG-B409-BL1
Date Collected: 04/29/18 11:15
Date Received: 05/25/18 12:40

Lab Sample ID: 580-77608-13
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	2200		2000	44	mg/Kg			06/14/18 11:01	1
Total Solids	81.9		0.1	0.1	%			06/01/18 09:33	1
Total Solids @ 70°C	87		0.10	0.10	%			06/22/18 17:43	1

Method: D7928/D6913 - ASTM D7928/D6913

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Clay	0.0				%			06/17/18 10:45	1
Coarse Sand	17.6				%			06/17/18 10:45	1
Fine Sand	10.9				%			06/17/18 10:45	1
Gravel	45.5				%			06/17/18 10:45	1
Medium Sand	19.1				%			06/17/18 10:45	1
Silt	6.8				%			06/17/18 10:45	1

Client Sample ID: PDI-SG-B409-BL1
Date Collected: 04/29/18 11:15
Date Received: 05/25/18 12:40

Lab Sample ID: 580-77608-13
Matrix: Solid
Percent Solids: 81.9

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	14	J	57	14	mg/Kg	☼	06/12/18 11:54	06/14/18 12:57	1
Motor Oil (>C24-C36)	72		57	20	mg/Kg	☼	06/12/18 11:54	06/14/18 12:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*108*		*50 - 150*	*06/12/18 11:54*	*06/14/18 12:57*	*1*

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.8		0.20	0.040	mg/Kg	☼	06/21/18 18:26	06/22/18 18:21	5
Cadmium	0.049	J	0.16	0.031	mg/Kg	☼	06/21/18 18:26	06/22/18 18:21	5
Copper	14		0.40	0.087	mg/Kg	☼	06/21/18 18:26	06/22/18 18:21	5
Lead	13		0.20	0.019	mg/Kg	☼	06/21/18 18:26	06/22/18 18:21	5
Zinc	44		2.0	0.64	mg/Kg	☼	06/21/18 18:26	06/22/18 18:21	5

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.041	H B	0.024	0.0073	mg/Kg	☼	06/19/18 15:36	06/20/18 15:22	1

Client: AECOM
Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-77608-1

Client Sample ID: PDI-SG-B414-BL1
Date Collected: 04/30/18 12:35
Date Received: 05/25/18 12:40

Lab Sample ID: 580-77608-14
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	47000		2000	44	mg/Kg			06/14/18 11:05	1
Total Solids	54.9		0.1	0.1	%			06/01/18 09:33	1
Total Solids @ 70°C	79		0.10	0.10	%			06/22/18 17:43	1

Method: D7928/D6913 - ASTM D7928/D6913

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Clay	1.0				%			06/17/18 10:45	1
Coarse Sand	4.3				%			06/17/18 10:45	1
Fine Sand	10.1				%			06/17/18 10:45	1
Gravel	61.1				%			06/17/18 10:45	1
Medium Sand	4.7				%			06/17/18 10:45	1
Silt	18.8				%			06/17/18 10:45	1

Client Sample ID: PDI-SG-B414-BL1
Date Collected: 04/30/18 12:35
Date Received: 05/25/18 12:40

Lab Sample ID: 580-77608-14
Matrix: Solid
Percent Solids: 54.9

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	300	J	780	190	mg/Kg	☼	06/12/18 11:54	06/24/18 00:37	10
Motor Oil (>C24-C36)	1200		780	270	mg/Kg	☼	06/12/18 11:54	06/24/18 00:37	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*60*		*50 - 150*	*06/12/18 11:54*	*06/24/18 00:37*	*10*

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	3.2		0.31	0.062	mg/Kg	☼	06/21/18 18:26	06/22/18 18:25	5
Cadmium	0.17	J	0.25	0.048	mg/Kg	☼	06/21/18 18:26	06/22/18 18:25	5
Copper	23		0.62	0.14	mg/Kg	☼	06/21/18 18:26	06/22/18 18:25	5
Lead	21		0.31	0.030	mg/Kg	☼	06/21/18 18:26	06/22/18 18:25	5
Zinc	66		3.1	1.0	mg/Kg	☼	06/21/18 18:26	06/22/18 18:25	5

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.16	H B	0.041	0.012	mg/Kg	☼	06/19/18 15:36	06/20/18 15:25	1

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-276035/1-A
Matrix: Solid
Analysis Batch: 276234

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 276035

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		50	12	mg/Kg		06/12/18 11:54	06/14/18 11:37	1
Motor Oil (>C24-C36)	ND		50	18	mg/Kg		06/12/18 11:54	06/14/18 11:37	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*114*		*50 - 150*	*06/12/18 11:54*	*06/14/18 11:37*	*1*

Lab Sample ID: LCS 580-276035/2-A
Matrix: Solid
Analysis Batch: 276234

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 276035

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
#2 Diesel (C10-C24)			500	491		mg/Kg		98	70 - 125		
Motor Oil (>C24-C36)			500	514		mg/Kg		103	70 - 129		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*98*		*50 - 150*

Lab Sample ID: LCSD 580-276035/3-A
Matrix: Solid
Analysis Batch: 276234

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 276035

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
#2 Diesel (C10-C24)			500	528		mg/Kg		106	70 - 125	7	16
Motor Oil (>C24-C36)			500	552		mg/Kg		110	70 - 129	7	16

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
o-Terphenyl	*97*		*50 - 150*

Lab Sample ID: 580-77608-14 DU
Matrix: Solid
Analysis Batch: 277201

Client Sample ID: PDI-SG-B414-BL1
Prep Type: Total/NA
Prep Batch: 276035

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
#2 Diesel (C10-C24)	300	J		246	J	mg/Kg	☼			19	35
Motor Oil (>C24-C36)	1200			990		mg/Kg	☼			22	35

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
o-Terphenyl	*46*	*X*	*50 - 150*

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 580-277005/22-A
Matrix: Solid
Analysis Batch: 277223

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 277005

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.25	0.050	mg/Kg		06/21/18 18:26	06/22/18 17:35	5

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 580-277005/22-A
Matrix: Solid
Analysis Batch: 277223

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 277005

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.20	0.039	mg/Kg		06/21/18 18:26	06/22/18 17:35	5
Copper	ND		0.50	0.11	mg/Kg		06/21/18 18:26	06/22/18 17:35	5
Lead	ND		0.25	0.024	mg/Kg		06/21/18 18:26	06/22/18 17:35	5
Zinc	ND		2.5	0.81	mg/Kg		06/21/18 18:26	06/22/18 17:35	5

Lab Sample ID: LCS 580-277005/23-A
Matrix: Solid
Analysis Batch: 277223

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 277005

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	200	196		mg/Kg		98	80 - 120
Cadmium	5.00	4.87		mg/Kg		97	80 - 120
Copper	25.0	25.7		mg/Kg		103	80 - 120
Lead	50.0	49.8		mg/Kg		100	80 - 120
Zinc	200	200		mg/Kg		100	80 - 120

Lab Sample ID: LCSD 580-277005/24-A
Matrix: Solid
Analysis Batch: 277223

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 277005

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	200	196		mg/Kg		98	80 - 120	0	20
Cadmium	5.00	4.80		mg/Kg		96	80 - 120	1	20
Copper	25.0	25.6		mg/Kg		102	80 - 120	1	20
Lead	50.0	49.4		mg/Kg		99	80 - 120	1	20
Zinc	200	202		mg/Kg		101	80 - 120	1	20

Lab Sample ID: 580-77608-12 MS
Matrix: Solid
Analysis Batch: 277223

Client Sample ID: PDI-SG-B405-BL1
Prep Type: Total/NA
Prep Batch: 277005

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	4.7		188	189		mg/Kg	☼	98	80 - 120
Cadmium	0.23		4.70	5.48		mg/Kg	☼	111	80 - 120
Copper	39	F1	23.5	60.6		mg/Kg	☼	92	80 - 120
Lead	42	F1 F2	47.0	102	F1	mg/Kg	☼	129	80 - 120
Zinc	130		188	349		mg/Kg	☼	114	80 - 120

Lab Sample ID: 580-77608-12 MSD
Matrix: Solid
Analysis Batch: 277223

Client Sample ID: PDI-SG-B405-BL1
Prep Type: Total/NA
Prep Batch: 277005

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	4.7		189	202		mg/Kg	☼	105	80 - 120	7	20
Cadmium	0.23		4.72	5.22		mg/Kg	☼	106	80 - 120	5	20
Copper	39	F1	23.6	71.5	F1	mg/Kg	☼	138	80 - 120	17	20
Lead	42	F1 F2	47.2	134	F1 F2	mg/Kg	☼	194	80 - 120	26	20
Zinc	130		189	357		mg/Kg	☼	118	80 - 120	2	20

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 580-77608-12 DU
Matrix: Solid
Analysis Batch: 277223

Client Sample ID: PDI-SG-B405-BL1
Prep Type: Total/NA
Prep Batch: 277005

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	4.7		3.35	F3	mg/Kg	☼	33	20
Cadmium	0.23		0.175	J F5	mg/Kg	☼	28	20
Copper	39	F1	32.9		mg/Kg	☼	17	20
Lead	42	F1 F2	28.8	F3	mg/Kg	☼	37	20
Zinc	130		114		mg/Kg	☼	16	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 580-276720/25-A
Matrix: Solid
Analysis Batch: 276893

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 276720

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0101	J	0.030	0.0090	mg/Kg		06/19/18 15:36	06/20/18 14:21	1

Lab Sample ID: LCS 580-276720/26-A
Matrix: Solid
Analysis Batch: 276893

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 276720

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.167	0.158		mg/Kg		95	80 - 120

Lab Sample ID: LCSD 580-276720/27-A
Matrix: Solid
Analysis Batch: 276893

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 276720

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.167	0.162		mg/Kg		97	80 - 120	2	20

Method: 9060_PSEP - TOC (Puget Sound)

Lab Sample ID: MB 580-276283/3
Matrix: Solid
Analysis Batch: 276283

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	ND		2000	44	mg/Kg			06/14/18 10:27	1

Lab Sample ID: LCS 580-276283/4
Matrix: Solid
Analysis Batch: 276283

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Duplicates	4620	5560		mg/Kg		120	68 - 149

Method: 9060_PSEP - TOC (Puget Sound) (Continued)

Lab Sample ID: LCSD 580-276283/5
Matrix: Solid
Analysis Batch: 276283

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon - Duplicates			4620	5030		mg/Kg		109	68 - 149	10	32

Lab Sample ID: 580-77608-12 MS
Matrix: Solid
Analysis Batch: 276283

Client Sample ID: PDI-SG-B405-BL1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon - Duplicates	14000		120000	123000		mg/Kg		90	68 - 149		

Lab Sample ID: 580-77608-12 MSD
Matrix: Solid
Analysis Batch: 276283

Client Sample ID: PDI-SG-B405-BL1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon - Duplicates	14000		120000	122000		mg/Kg		89	68 - 149	1	32

Lab Sample ID: 580-77608-12 DU
Matrix: Solid
Analysis Batch: 276283

Client Sample ID: PDI-SG-B405-BL1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Organic Carbon - Duplicates	14000			14200		mg/Kg				2	50

Lab Sample ID: 580-77608-12 TRL
Matrix: Solid
Analysis Batch: 276283

Client Sample ID: PDI-SG-B405-BL1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		TRL Result	TRL Qualifier	Unit	D			RSD	RSD Limit
Total Organic Carbon - Duplicates	14000			12000		mg/Kg				10	20

Method: D 2216 - Percent Moisture

Lab Sample ID: 580-77608-14 DU
Matrix: Solid
Analysis Batch: 275162

Client Sample ID: PDI-SG-B414-BL1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Solids	54.9			78.2	F3	%				35	20

Client Sample ID: PDI-SG-B405-BL1
Lab Sample ID: 580-77608-12
Date Collected: 04/28/18 11:40
Matrix: Solid
Date Received: 05/25/18 12:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9060_PSEP		1	276283	06/14/18 10:36	Z1T	TAL SEA
Total/NA	Analysis	D 2216		1	275162	06/01/18 09:33	KMS	TAL SEA
Total/NA	Analysis	Moisture 70C		1	277136	06/22/18 17:43	HJM	TAL SEA
Total/NA	Analysis	D7928/D6913		1	276514	06/17/18 10:45	DB	TAL SEA

Client Sample ID: PDI-SG-B405-BL1
Lab Sample ID: 580-77608-12
Date Collected: 04/28/18 11:40
Matrix: Solid
Date Received: 05/25/18 12:40
Percent Solids: 62.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			276035	06/12/18 11:54	BAH	TAL SEA
Total/NA	Analysis	NWTPH-Dx		10	277201	06/24/18 00:17	W1T	TAL SEA
Total/NA	Prep	3050B			277005	06/21/18 18:26	CJB	TAL SEA
Total/NA	Analysis	6020B		5	277223	06/22/18 17:49	FCW	TAL SEA
Total/NA	Prep	7471A			276720	06/19/18 15:36	CJB	TAL SEA
Total/NA	Analysis	7471A		1	276893	06/20/18 15:20	FCW	TAL SEA

Client Sample ID: PDI-SG-B409-BL1
Lab Sample ID: 580-77608-13
Date Collected: 04/29/18 11:15
Matrix: Solid
Date Received: 05/25/18 12:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9060_PSEP		1	276283	06/14/18 11:01	Z1T	TAL SEA
Total/NA	Analysis	D 2216		1	275162	06/01/18 09:33	KMS	TAL SEA
Total/NA	Analysis	Moisture 70C		1	277136	06/22/18 17:43	HJM	TAL SEA
Total/NA	Analysis	D7928/D6913		1	276514	06/17/18 10:45	DB	TAL SEA

Client Sample ID: PDI-SG-B409-BL1
Lab Sample ID: 580-77608-13
Date Collected: 04/29/18 11:15
Matrix: Solid
Date Received: 05/25/18 12:40
Percent Solids: 81.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			276035	06/12/18 11:54	BAH	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	276234	06/14/18 12:57	T1W	TAL SEA
Total/NA	Prep	3050B			277005	06/21/18 18:26	CJB	TAL SEA
Total/NA	Analysis	6020B		5	277223	06/22/18 18:21	FCW	TAL SEA
Total/NA	Prep	7471A			276720	06/19/18 15:36	CJB	TAL SEA
Total/NA	Analysis	7471A		1	276893	06/20/18 15:22	FCW	TAL SEA

Lab Chronicle

Client: AECOM
Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-77608-1

Client Sample ID: PDI-SG-B414-BL1

Date Collected: 04/30/18 12:35
Date Received: 05/25/18 12:40

Lab Sample ID: 580-77608-14
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9060_PSEP		1	276283	06/14/18 11:05	Z1T	TAL SEA
Total/NA	Analysis	D 2216		1	275162	06/01/18 09:33	KMS	TAL SEA
Total/NA	Analysis	Moisture 70C		1	277136	06/22/18 17:43	HJM	TAL SEA
Total/NA	Analysis	D7928/D6913		1	276514	06/17/18 10:45	DB	TAL SEA

Client Sample ID: PDI-SG-B414-BL1

Date Collected: 04/30/18 12:35
Date Received: 05/25/18 12:40

Lab Sample ID: 580-77608-14
Matrix: Solid
Percent Solids: 54.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			276035	06/12/18 11:54	BAH	TAL SEA
Total/NA	Analysis	NWTPH-Dx		10	277201	06/24/18 00:37	W1T	TAL SEA
Total/NA	Prep	3050B			277005	06/21/18 18:26	CJB	TAL SEA
Total/NA	Analysis	6020B		5	277223	06/22/18 18:25	FCW	TAL SEA
Total/NA	Prep	7471A			276720	06/19/18 15:36	CJB	TAL SEA
Total/NA	Analysis	7471A		1	276893	06/20/18 15:25	FCW	TAL SEA

Laboratory References:

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: AECOM
TestAmerica Job ID: 580-77608-1
Project/Site: Portland Harbor Pre-Remedial Design

Laboratory: TestAmerica Seattle

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-024	01-19-19
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	11-05-18
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	07-31-19
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

Sample Summary

Client: AECOM
Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-77608-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-77608-12	PDI-SG-B405-BL1	Solid	04/28/18 11:40	05/25/18 12:40
580-77608-13	PDI-SG-B409-BL1	Solid	04/29/18 11:15	05/25/18 12:40
580-77608-14	PDI-SG-B414-BL1	Solid	04/30/18 12:35	05/25/18 12:40

580-77608 Chain of Custody

SURFACE SEDIMENT
CHAIN OF CUSTODY

TestAmerica-Seattle 5755-8th-Street-East Tacoma, WA 98424-1317 **Ph: 253-922-2310 Fax: 253-922-5047**	**Project Contact: Amy Dahl / Chelsey Cook** **Tel: (206) 438-2261 / (206) 438-2010** **Analysis Turnaround Time** Calendar (C) or Work Days (W) _____ ☐ 21 days ☐ Other _____	**Site Contact: Jennifer Ray / Michaela McCoog** **Laboratory Contact: Elaine-Walker**	5/25/2018 **Carrier: courier**	COC No: 4 2 of 2 pages
Client Contact AECOM 1111 3rd Ave Suite 1600 Seattle, WA 98101 Phone: (206) 438-2700 Fax: 1+(866) 495-5288 Project Name: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling Portland, OR Project #: 60566335 Study: Surface Sediment				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	Fraction	Hold -20 C	PCB Congeners 1668A	PCDD/Fs 1613B	TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A	Grain size ASTM D7928/D6913	Total organic carbon, Total solids 9060	Sample Specific Notes:
PDI-SG-B405-BL1	4/28/2018	11:40	SS			6		x	H	H	H	H	H	Frozen 5/1/18 09:00
PDI-SG-B409-BL1	4/29/2018	11:15	SS			6		x	H	H	H	H	H	Frozen 5/1/18 09:00
PDI-SG-B414-BL1	4/30/2018	12:35	SS			6		x	H	H	H	H	H	Frozen 5/1/18 09:00

Analyze per AECOM 6/7/18 EW

Container Type: WMG=Wide Mouth Glass Jar, P=HDPE, PP=Polypropylene, AG=amber glass, G=glass, RC=Resin Column

Preservative: HCl = Hydrochloric Acid, H3PO4 = Phosphoric Acid, HNO3 = Nitric Acid

Fraction: D = Dissolved, PRT = Particulate, T = Total (unfiltered)

Sample Disposal

☐ Return To Client X Disposal By Lab X Archive For 12 Months

Special Instructions/QC Requirements & Comments:

Please hold in freezer pending approval of analyses marked H.

Separate reports for each lab when analyzed

	Company:	Date/Time:		Company:	Date/Time:
Relinquished by: Michael McCoy	AECOM	5-25-18	Received by:	M-E	5-25-18 1200
Relinquished by:	M-E	5-25-18 1240	Received by:	TAPOR	5/25/18 1240
Relinquished by:	TA-POR	5/25/18 1700	Received by: B Hall	SRA TR	5/30/18 0910

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-77608-1

Login Number: 77608
List Number: 1
Creator: Gonzales, Steve

List Source: TestAmerica Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Walker, M Elaine

From: Dahl, Amy <amy.dahl@aecom.com>
Sent: Thursday, June 07, 2018 12:57 PM
To: Cook, Chelsey; Presley, Kim
Cc: Walker, M Elaine; Ray, Jennifer
Subject: Portland Harbor: holding samples authorized for analysis

Hi Elaine, the 14 samples tabulated below previously frozen and submitted on 5/25/18 to be held frozen are authorized by EPA for analysis. Please take them off hold, noting on the COCs "analyze per AECOM 6/7/18". Please send sample confirmations.

PDI-SG-B405-BL1
PDI-SG-B409-BL1
PDI-SG-B414-BL1
PDI-SG-S010
PDI-SG-S078
PDI-SG-S084
PDI-SG-S090
PDI-SG-S097
PDI-SG-S115
PDI-SG-S147
PDI-SG-S204
PDI-SG-S255
PDI-SG-S135
PDI-SG-S157

Thank you,

PRIVILEGED AND CONFIDENTIAL / JOINT DEFENSE COMMUNICATION / ATTORNEY CLIENT WORK PRODUCT

Amy Dahl, PhD
Chemist, Environment, Pacific Northwest
D +1-206-438-2261
amy.dahl@aecom.com

AECOM
1111 Third Avenue, Suite 1600
Seattle, WA 98101, United States
T +1-206-438-2700
aecom.com

From: Cook, Chelsey
Sent: Tuesday, June 05, 2018 9:43 AM
To: Presley, Kim; Dahl, Amy
Cc: Walker, M Elaine
Subject: RE: TestAmerica Seattle sample confirmation files from 580-77608-2 Portland Harbor Pre-Remedial Design

Hi Kim,

It looks like the SRS samples are -2 and the SMA samples are -3, but we need them to be on different lab groups all together.

For all of the data we have so far, the dashes on the lab group numbers have indicated the different labs (and different data). When we end up analyzing these samples we want the data reported with different lab groups, and the -1 to be the Wa lab, -2 Sacramento, and -3 Knoxville.

Can we log them in separate lab groups all together?

Thanks,

Chelsey Cook
Staff Chemist
D 1-206-438-2010
chelsey.cook@aecom.com

AECOM
1111 3rd Avenue, Suite 1600
Seattle, WA 98101, USA
T +206-438-2700
www.aecom.com

From: Presley, Kim [mailto:Kim.Presley@testamericainc.com]
Sent: Monday, June 04, 2018 4:30 PM
To: Cook, Chelsey; Dahl, Amy
Cc: Walker, M Elaine
Subject: RE: TestAmerica Seattle sample confirmation files from 580-77608-2 Portland Harbor Pre-Remedial Design

Hi Chelsey,

I split the SMA samples and the COCs from the others and resent the conf for 580-77608-2 as well as the new job 580-77608-3.

KIM A PRESLEY
Project Management Assistant

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

5755 8th Street East
Tacoma, WA 98424
Tel: 253.922.2310
www.testamericainc.com

From: Cook, Chelsey [mailto:Chelsey.Cook@aecom.com]
Sent: Monday, June 04, 2018 4:17 PM
To: Presley, Kim; Dahl, Amy
Cc: Walker, M Elaine
Subject: RE: TestAmerica Seattle sample confirmation files from 580-77608-2 Portland Harbor Pre-Remedial Design

-External Email-

Hi Kim,

The two sample types should be on separate work orders. Could you please split them and send revised acknowledgments?

Thanks,

Chelsey Cook
Staff Chemist
D 1-206-438-2010
chelsey.cook@aecom.com

AECOM
1111 3rd Avenue, Suite 1600
Seattle, WA 98101, USA
T +206-438-2700
www.aecom.com

From: Presley, Kim [mailto:kim.presley@testamericainc.com]
Sent: Monday, June 04, 2018 1:21 PM
To: Dahl, Amy; Cook, Chelsey; Mixon, Karen
Subject: TestAmerica Seattle sample confirmation files from 580-77608-2 Portland Harbor Pre-Remedial Design

Hello,

Attached please find the Seattle sample confirmation files for job 580-77608-2; Portland Harbor Pre-Remedial Design

Please feel free to contact me or your PM Elaine Walker if you have any questions.

Thank you.

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: Project Feedback

KIM A PRESLEY
Project Manager Assistant

TestAmerica Seattle
THE LEADER IN ENVIRONMENTAL TESTING

Tel: 253.922.2310
www.testamericainc.com

Reference: [245209]
Attachments: 2