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: 580-79256-1
Client Project/Site: Portland Harbor Pre-Remedial Design

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

Attn: Amy Dahl

M. Elaine Walker

Authorized for release by:
8/9/2018 3:56:33 PM

Elaine Walker, Project Manager II
(253)248-4972
elaine.walker@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Job ID: 580-79256-1

Laboratory: TestAmerica Seattle

Narrative

CASE NARRATIVE
Client: AECOM
Project: Portland Harbor Pre-Remedial Design
Report Number: 580-79256-1

This case 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

One sample was received on 8/1/2018 2:10 PM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was -2.9º C.

The Client activated Metals, TOC, TS, and Grainsize analysis and this report only contains results for these analyses performed at TestAmerica Seattle.

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.

METALS (ICPMS)

Sample PDI-SG-B474 (580-79256-1) was analyzed for Metals (ICPMS) in accordance with 6020A_LL. The sample was prepared on 08/03/2018 and analyzed on 08/06/2018.

Manganese failed the recovery criteria high for the MS of sample PDI-SG-B474MS (580-79256-1) in batch 580-280903. Manganese failed the recovery criteria high for the MSD of sample PDI-SG-B474MSD (580-79256-1) in batch 580-280903. The associated LCS/LCSD recoveries met acceptance limits.

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Sample PDI-SG-B474 (580-79256-1)[100X] required dilution prior to analysis. 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.

TOTAL ORGANIC CARBON

Sample PDI-SG-B474 (580-79256-1) was analyzed for total organic carbon in accordance with EPA SW-846 Method 9060. The sample was analyzed on 08/07/2018.

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

GRAIN SIZE

Job ID: 580-79256-1 (Continued)

Laboratory: TestAmerica Seattle (Continued)

Sample PDI-SG-B474 (580-79256-1) was analyzed for grain size in accordance with ASTM D7928/D6913. The sample was analyzed on 08/02/2018.

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

PERCENT SOLIDS

Sample PDI-SG-B474 (580-79256-1) was analyzed for percent solids in accordance with ASTM D2216. The sample was analyzed on 08/06/2018.

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

TOTAL SOLIDS @ 70C

Sample PDI-SG-B474 (580-79256-1) was analyzed for Total Solids @ 70C. The sample was analyzed on 08/02/2018.

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: 580-79256-1

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

General Chemistry

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time

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: 580-79256-1

Client Sample ID: PDI-SG-B474
Date Collected: 07/11/18 16:20
Date Received: 08/01/18 14:10

Lab Sample ID: 580-79256-1
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	7200		2000	44	mg/Kg			08/07/18 13:34	1
Total Solids	62.7		0.1	0.1	%			08/06/18 15:17	1
Total Solids @ 70°C	66	H	0.10	0.10	%			08/02/18 13:52	1

Method: D7928/D6913 - ASTM D7928/D6913

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Clay	4.9				%			08/02/18 12:40	1
Coarse Sand	0.0				%			08/02/18 12:40	1
Fine Sand	77.2				%			08/02/18 12:40	1
Gravel	0.0				%			08/02/18 12:40	1
Medium Sand	1.7				%			08/02/18 12:40	1
Silt	16.2				%			08/02/18 12:40	1

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

TestAmerica Job ID: 580-79256-1

Client Sample ID: PDI-SG-B474
Date Collected: 07/11/18 16:20
Date Received: 08/01/18 14:10

Lab Sample ID: 580-79256-1
Matrix: Solid
Percent Solids: 62.7

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	3.3		0.28	0.057	mg/Kg	☼	08/03/18 14:13	08/06/18 10:39	5
Manganese	420		11	5.1	mg/Kg	☼	08/03/18 14:13	08/06/18 11:41	100

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 580-280798/10-A
Matrix: Solid
Analysis Batch: 280903

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 280798

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.25	0.050	mg/Kg		08/03/18 14:13	08/06/18 10:22	5
Manganese	ND		0.50	0.23	mg/Kg		08/03/18 14:13	08/06/18 10:22	5

Lab Sample ID: LCS 580-280798/11-A
Matrix: Solid
Analysis Batch: 280903

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280798

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Arsenic			200	194		mg/Kg		97	80 - 120		
Manganese			50.0	47.5		mg/Kg		95	80 - 120		

Lab Sample ID: LCSD 580-280798/12-A
Matrix: Solid
Analysis Batch: 280903

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 280798

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic			200	192		mg/Kg		96	80 - 120	1	20
Manganese			50.0	47.8		mg/Kg		96	80 - 120	1	20

Lab Sample ID: 580-79256-1 MS
Matrix: Solid
Analysis Batch: 280903

Client Sample ID: PDI-SG-B474
Prep Type: Total/NA
Prep Batch: 280798

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Arsenic	3.4	J	225	241		mg/Kg	☼	106	80 - 120		
Manganese	420		56.3	520	4	mg/Kg	☼	185	80 - 120		

Lab Sample ID: 580-79256-1 MSD
Matrix: Solid
Analysis Batch: 280903

Client Sample ID: PDI-SG-B474
Prep Type: Total/NA
Prep Batch: 280798

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	3.4	J	223	234		mg/Kg	☼	103	80 - 120	3	20
Manganese	420		55.9	523	4	mg/Kg	☼	190	80 - 120	0	20

Lab Sample ID: 580-79256-1 DU
Matrix: Solid
Analysis Batch: 280903

Client Sample ID: PDI-SG-B474
Prep Type: Total/NA
Prep Batch: 280798

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Arsenic	3.3			3.31		mg/Kg	☼			1	20
Manganese	400			404		mg/Kg	☼			0	20

Method: 9060_PSEP - TOC (Puget Sound)

Lab Sample ID: MB 580-281046/3
Matrix: Solid
Analysis Batch: 281046

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			08/07/18 13:26	1

Lab Sample ID: LCS 580-281046/4
Matrix: Solid
Analysis Batch: 281046

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			4270	3990		mg/Kg		94	68 - 149		

Lab Sample ID: LCSD 580-281046/5
Matrix: Solid
Analysis Batch: 281046

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			4270	3880		mg/Kg		91	68 - 149	3	32

Lab Sample ID: 580-79256-1 MS
Matrix: Solid
Analysis Batch: 281046

Client Sample ID: PDI-SG-B474
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon - Duplicates	7200		120000	130000		mg/Kg		103	68 - 149		

Lab Sample ID: 580-79256-1 MSD
Matrix: Solid
Analysis Batch: 281046

Client Sample ID: PDI-SG-B474
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	7200		120000	117000		mg/Kg		92	68 - 149	11	32

Lab Sample ID: 580-79256-1 DU
Matrix: Solid
Analysis Batch: 281046

Client Sample ID: PDI-SG-B474
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Organic Carbon - Duplicates	7200			7200		mg/Kg				0.2	50

Lab Sample ID: 580-79256-1 TRL
Matrix: Solid
Analysis Batch: 281046

Client Sample ID: PDI-SG-B474
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		TRL Result	TRL Qualifier	Unit	D			RSD	RSD Limit
Total Organic Carbon - Duplicates	7200			7540		mg/Kg				3	20

Lab Chronicle

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

TestAmerica Job ID: 580-79256-1

Client Sample ID: PDI-SG-B474

Lab Sample ID: 580-79256-1

Date Collected: 07/11/18 16:20

Matrix: Solid

Date Received: 08/01/18 14:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9060_PSEP		1	281046	08/07/18 13:34	Z1T	TAL SEA
Total/NA	Analysis	D 2216		1	280929	08/06/18 15:17	JCM	TAL SEA
Total/NA	Analysis	Moisture 70C		1	281038	08/02/18 13:52	HJM	TAL SEA
Total/NA	Analysis	D7928/D6913		1	280552	08/02/18 12:40	JKM	TAL SEA

Client Sample ID: PDI-SG-B474

Lab Sample ID: 580-79256-1

Date Collected: 07/11/18 16:20

Matrix: Solid

Date Received: 08/01/18 14:10

Percent Solids: 62.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			280798	08/03/18 14:13	T1H	TAL SEA
Total/NA	Analysis	6020B		5	280903	08/06/18 10:39	FCW	TAL SEA
Total/NA	Prep	3050B			280798	08/03/18 14:13	T1H	TAL SEA
Total/NA	Analysis	6020B		100	280903	08/06/18 11:41	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: 580-79256-1
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: 580-79256-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-79256-1	PDI-SG-B474	Solid	07/11/18 16:20	08/01/18 14:10

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) _____	**Site Contact: Jennifer Ray** **Laboratory Contact: Elaine-Walker**	**8/1/2018** **Carrier: Courier**	COC No: 1 1 of 3 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 Type: D/U	☐ 21 days ☒ Other _ASAP_____ **RUSH!**			

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	Fraction	As+Mn Metals	Grain size ASTM D7928/D6913	Total organic carbon, Total solids 9060 (104C & 70C)	Archive Archive-200	Sample Specific Notes:
PDI-SG-B474	7/11/2018	16:20	SS		LS	4		x*	x*	x*	x*	All volume except GS Frozen 7/13/18 @ 1000

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)

580-79256 Chain of Custody

Sample Disposal

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

Special Instructions/QC Requirements & Comments:

Analyze samples for grain size ASAP, Hold (H) remaining analyses pending further instruction.

Separate reports for each lab.

Rush TAT

-29

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8/1/18 1340	[signature]	M-E-	8/1/18 1340
[signature]	M-E-	8/1/18 1410	[signature]	TAOR	8/1/18 1410
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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 ASAP **RUSH!**	**Site Contact: Jennifer Ray** **Laboratory Contact: Elaine-Walker**	**8/1/2018** **Carrier: Courier**	COC No: 1 ___1___ of __3___ 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 Type: D/U				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	Fraction	As+Mn Metals	Grain size ASTM D7928/D6913	Total organic carbon, Total solids 9060 (104C & 70C)	Archive Archive-200	Sample Specific Notes:
PDI-SG-B474	7/11/2018	16:20	SS		LS	4		x*	x*	x*	x*	All volume except GS Frozen 7/13/18 @ 1000

580-79256 Chain of Custody

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* ☒ *Disposal By Lab* ☒ *Archive For 12 Months*

Special Instructions/QC Requirements & Comments:

Analyze samples for grain size ASAP, Hold (H) remaining analyses pending further instruction.

Separate reports for each lab.

Rush TAT

-209

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	AECOM	8/1/18 1340		M-E-	8/1/18 1340
	M-E-	8/1/18 1410		TAOOR	8/1/18 1410
	TAOOR	8/1/18 1700		TASea	8-2-18 0930

IRS 20.1/0.1, 1.1/1.1

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-79256-1

Login Number: 79256
List Number: 1
Creator: Rogers, Angeline D

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	