

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

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TestAmerica Job ID: 580-80635-7

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: 11/28/2018 10:35:37 AM

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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.

Client: AECOM

TestAmerica Job ID: 580-80635-7

Project/Site: Portland Harbor Pre-Remedial Design

Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Definitions	6
Client Sample Results	7
QC Sample Results	9
Chronicle	15
Certification Summary	16
Sample Summary	17
Chain of Custody	18
Receint Checklists	21

Case Narrative

Client: AECOM TestAmerica Job ID: 580-80635-7

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-80635-7

Laboratory: TestAmerica Seattle

Narrative

CASE NARRATIVE Client: AECOM

Project: Portland Harbor Pre-Remedial Design Report Number: 580-80635-7

REVISION 1: NOVEMBER 28, 2018

This revision is to add missing QC data for Organotins - TBT analysis.

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

The samples were received on 9/27/2018 12:55 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were -11.0° C and 3.3° C.

Containers of the following samples were received from the Portland service center on dry ice at -10.0°C in the Seattle lab and were placed in CSU-19 at 10:10 on 9/28/18: PDI-SG-B436 (580-80635-1), PDI-SG-B474 (580-80635-2), PDI-SG-B480 (580-80635-3) and PDI-SG-B481 (580-80635-4).

The Chain of Custody (COC) indicates an additional container was provided for the following sample and assumed to be for Atterberg Limits. However, the COC indicates Atterberg (on hold) for sample PDI-SG-B474 (580-80635-2). The client requested the additional container be added to PDI-SG-B436 (580-80635-1) and Atterberg limits to be added and placed on hold.

The following samples were canceled for on hold Atterberg Limits by the client on 10/2/18: PDI-SG-B436 (580-80635-1), PDI-SG-B474 (580-80635-2), PDI-SG-B480 (580-80635-3) and PDI-SG-B481 (580-80635-4).

The following samples were activated for all on hold analysis by the client on 10/10/18: PDI-SG-B436 (580-80635-1) and PDI-SG-B481 (580-80635-4).

The following sample was activated for all remaining on hold analysis by the client on 10/23/2018: PDI-SG-B474 (580-80635-2). This report contains results for this sample only, for all 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.

SEMIVOLATILE ORGANIC COMPOUNDS (GC-MS)

Sample PDI-SG-B474 (580-80635-2) was analyzed for semivolatile organic compounds (GC-MS) in accordance with 8270D. The sample was prepared on 11/02/2018 and analyzed on 11/14/2018.

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Case Narrative

Client: AECOM TestAmerica Job ID: 580-80635-7

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-80635-7 (Continued)

Laboratory: TestAmerica Seattle (Continued)

Sample PDI-SG-B474 (580-80635-2) was frozen to maintain holding time. The sample was removed for thawing on 11/1/18 at 1819.

Bis(2-ethylhexyl) phthalate failed the recovery criteria high for LCS 580-288122/2-A. The analyte was biased high in the LCS and was not detected in the associated samples; therefore, the data have been reported.

Bis(2-ethylhexyl) phthalate failed the recovery criteria low for the MS of sample PDI-SG-B474MS (580-80635-2) in batch 580-288843. Bis(2-ethylhexyl) phthalate failed the recovery criteria low for the MSD of sample PDI-SG-B474MSD (580-80635-2) in batch 580-288843.

Sample PDI-SG-B474 (580-80635-2)[25X] 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.

SEMIVOLATILE ORGANIC COMPOUNDS - SELECTED ION MODE (SIM)

Sample PDI-SG-B474 (580-80635-2) was analyzed for semivolatile organic compounds - Selected Ion Mode (SIM) in accordance with SW846 8270D_SIM. The sample was prepared on 11/02/2018 and analyzed on 11/09/2018.

Sample PDI-SG-B474 (580-80635-2) was frozen in hold. The samples was removed from freezer on 11/01/18 at 18:19 and thawed.

2-Methylnaphthalene, Acenaphthene, Naphthalene and Phenanthrene were detected in method blank MB 580-288111/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Sample PDI-SG-B474 (580-80635-2)[25X] required dilution prior to analysis due to the nature of the sample matrix. 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.

ORGANOTINS BY GC/MS

Sample PDI-SG-B474 (580-80635-2) was analyzed for Organotins by GC/MS in accordance with the Krone Method. The sample was prepared on 11/02/2018 and analyzed on 11/15/2018.

Sample PDI-SG-B474 (580-80635-2) was frozen in hold. The sample was removed from freezer on 11/01/18 at 18:19 and thawed.

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

DIESEL AND EXTENDED RANGE ORGANICS

Sample PDI-SG-B474 (580-80635-2) was analyzed for diesel and extended range organics in accordance with Method NWTPH-Dx. The sample was prepared on 11/02/2018 and analyzed on 11/08/2018.

Sample PDI-SG-B474 (580-80635-2) was frozen in hold. The sample was removed from freezer on 11/1/18 at 1819 and thawed.

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-B474 (580-80635-2) and PDI-SG-B474 DU (580-80635-2 DU).

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

METALS (ICPMS)

Sample PDI-SG-B474 (580-80635-2) was analyzed for Metals (ICPMS) in accordance with 6020A_LL. The sample was prepared and analyzed on 11/02/2018.

Copper was detected in method blank MB 580-288047/20-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.

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Case Narrative

Client: AECOM TestAmerica Job ID: 580-80635-7

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-80635-7 (Continued)

Laboratory: TestAmerica Seattle (Continued)

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

TOTAL MERCURY

Sample PDI-SG-B474 (580-80635-2) was analyzed for total mercury in accordance with EPA SW-846 Method 7471A. The sample was prepared and analyzed on 10/31/2018.

The following sample was prepared outside of preparation holding time due to client requesting analysis after holding time expired: PDI-SG-B474 (580-80635-2).

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 (580-80635-2) was analyzed for total organic carbon in accordance with EPA SW-846 Method 9060. The sample was analyzed on 11/06/2018.

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

PERCENT SOLIDS

Sample PDI-SG-B474 (580-80635-2) was analyzed for percent solids in accordance with ASTM D2216. The sample was analyzed on 11/03/2018.

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 (580-80635-2) was analyzed for Total Solids @ 70C. The sample was analyzed on 11/19/2018.

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

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Definitions/Glossary

Client: AECOM TestAmerica Job ID: 580-80635-7

Project/Site: Portland Harbor Pre-Remedial Design

Qualifiers

GC/MS Semi VOA

Qualifier	Qualifier Description
В	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
*	LCS or LCSD is outside acceptance limits.

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.
Matala	

Metals

Qualifier	Qualifier Description
Н	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
В	Compound was found in the blank and sample.

General Chemistry

Qualifier	Qualifier Description
Н	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.
n	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

Client Sample ID: PDI-SG-B474

Date Collected: 08/17/18 15:53 Date Received: 09/27/18 12:55 Lab Sample ID: 580-80635-2

Matrix: Solid Percent Solids: 64.7

Analyte	Result ND	Qualifier	RL	MDL		— D	Prepared	Analyzed 11/09/18 22:37	Dil
2-Methylnaphthalene			38		ug/Kg				
Acenaphthene	6.4	JB	38		ug/Kg	₩.		11/09/18 22:37	
Acenaphthylene	ND		38		ug/Kg			11/09/18 22:37	
Anthracene	10		38		ug/Kg	*		11/09/18 22:37	
Benzo[a]anthracene	17		38		ug/Kg	₩	11/02/18 17:11	11/09/18 22:37	
Benzo[a]pyrene	15	J	38		ug/Kg	₩	11/02/18 17:11	11/09/18 22:37	
Benzo[b]fluoranthene	17	J	38	4.5	ug/Kg	≎	11/02/18 17:11	11/09/18 22:37	
Benzo[g,h,i]perylene	16	J	38	3.8	ug/Kg	₩	11/02/18 17:11	11/09/18 22:37	
Benzo[k]fluoranthene	6.1	J	38	4.6	ug/Kg	₩	11/02/18 17:11	11/09/18 22:37	
hrysene	16	J	38	12	ug/Kg	≎	11/02/18 17:11	11/09/18 22:37	
ibenz(a,h)anthracene	ND		38	5.5	ug/Kg	₩	11/02/18 17:11	11/09/18 22:37	
luoranthene	76		38	11	ug/Kg	₩	11/02/18 17:11	11/09/18 22:37	
luorene	6.7	J	38	3.8	ug/Kg		11/02/18 17:11	11/09/18 22:37	
ndeno[1,2,3-cd]pyrene	15	J	38		ug/Kg	₩	11/02/18 17:11	11/09/18 22:37	
aphthalene	ND		38		ug/Kg	₩		11/09/18 22:37	
henanthrene	49		38		ug/Kg			11/09/18 22:37	
yrene	61	_	38		ug/Kg	₽		11/09/18 22:37	
urrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil
erphenyl-d14	84		57 - 120				11/02/18 17:11	11/09/18 22:37	
is(2-ethylhexyl) phthalate	ND %Recovery	Qualifier	1100	100	ug/Kg	— ಫ	Prepared	11/14/18 10:47 Analyzed	Di
N	0/5	0					5	A 1	5.
erphenyl-d14 (Surr)	81	Qualifier	58 - 120					11/14/18 10:47	-
lethod: Organotins - Org			DI	MDI	11-:4		Drawarad	Analyzad	Dil
nalyte		Qualifier	RL	MDL		— D <u>₩</u>	Prepared	Analyzed	Dil
ributyltin	ND		120	30	ug/Kg	1 ;	11/02/18 14:40	11/15/18 17:12	
urrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil
ripentyltin	27		10 - 113				11/02/18 14:40	11/15/18 17:12	
lethod: NWTPH-Dx - Nor	thwest - Semi-V	olatile Pet	roleum Prod	ucts (G0	C)				
nalyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil
2 Diesel (C10-C24)	27	J	74	18	mg/Kg	<u> </u>	11/02/18 15:51	11/08/18 19:17	
lotor Oil (>C24-C36)	190		74	26	mg/Kg	₩	11/02/18 15:51	11/08/18 19:17	
urrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil
-Terphenyl	101		50 - 150				11/02/18 15:51	11/08/18 19:17	
Method: 6020B - Metals (I	CP/MS)								
		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil
nalyte			0.21	0.042	mg/Kg	₩	11/02/18 10:56	11/02/18 18:58	
•	2.8		Ŭ. = .						
rsenic	2.8 0.067	J	0.17	0.032	mg/Kg	≎	11/02/18 10:56	11/02/18 18:58	
arsenic Cadmium						☆			
Analyte Arsenic Cadmium Copper Lead	0.067		0.17	0.092	mg/Kg mg/Kg mg/Kg	₽		11/02/18 18:58	

Client Sample Results

Client: AECOM TestAmerica Job ID: 580-80635-7

Project/Site: Portland Harbor Pre-Remedial Design

Client Sample ID: PDI-SG-B474 Lab Sample ID: 580-80635-2

Date Collected: 08/17/18 15:53 Matrix: Solid

Date Received: 09/27/18 12:55 Percent Solids: 64.7

Method: 7471A - Mercury (CVAA	Result	Qualifier	RL 0.041	MDL		D ≅	Prepared 10/31/18 10:53	Analyzed 10/31/18 13:54	Dil Fac
Mercury	0.037	JH	0.041	0.012	mg/Kg	**	10/31/16 10.53	10/31/16 13.54	ļ
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	6800		2000	44	mg/Kg			11/06/18 12:05	1
Total Solids	64.7		0.1	0.1	%			11/03/18 10:42	1
Total Solids @ 70°C	65	Н	0.10	0.10	%			11/19/18 16:06	1

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-80635-7

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-288122/1-A

Matrix: Solid

Analysis Batch: 288843

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

Prep Batch: 288122

MB MB

Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac 30 11/02/18 18:31 11/14/18 09:57 Bis(2-ethylhexyl) phthalate $\overline{\mathsf{ND}}$ 3.6 ug/Kg

MB MB

Surrogate Qualifier Limits Prepared Analyzed Dil Fac %Recovery Terphenyl-d14 (Surr) 95 58 - 120 11/02/18 18:31 11/14/18 09:57

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 580-288122/2-A

Matrix: Solid

Analyte

Analysis Batch: 288843

Bis(2-ethylhexyl) phthalate

Spike

Added

50.0

LCS LCS Result Qualifier

65.0

D %Rec

130

Unit

ug/Kg

Prep Type: Total/NA **Prep Batch: 288122**

%Rec. Limits

59 - 123

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 (Surr) 58 - 120 93

Client Sample ID: PDI-SG-B474

Matrix: Solid

Bis(2-ethylhexyl) phthalate

Analysis Batch: 288843

Lab Sample ID: 580-80635-2 MS

Spike Sample Sample

MS MS

MSD MSD

Prep Type: Total/NA **Prep Batch: 288122**

%Rec.

Limits

Result Qualifier Added Result Qualifier Unit D %Rec 76.4 $\overline{\mathsf{ND}}$ 163 ug/Kg NC 59 - 123

MS MS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 (Surr) 90 58 - 120

Lab Sample ID: 580-80635-2 MSD

Matrix: Solid

Analysis Batch: 288843

Client Sample ID: PDI-SG-B474

Prep Type: Total/NA

Prep Batch: 288122

%Rec. **RPD**

Analyte Result Qualifier Added Result Qualifier Unit D %Rec Limits **RPD** Limit Bis(2-ethylhexyl) phthalate ND 76.8 147 J ug/Kg NC 59 - 123

Spike

MSD MSD

Sample Sample

%Recovery Qualifier

Surrogate Limits Terphenyl-d14 (Surr) 58 - 120 91

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: MB 580-288111/1-A

Matrix: Solid

Analysis Batch: 288554

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

Prep Batch: 288111

-	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylnaphthalene	0.150	J	1.0	0.090	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
Acenaphthene	0.183	J	1.0	0.12	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
Acenaphthylene	ND		1.0	0.10	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
Anthracene	ND		1.0	0.12	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
Benzo[a]anthracene	ND		1.0	0.15	ug/Kg		11/02/18 17:11	11/09/18 18:06	1

Project/Site: Portland Harbor Pre-Remedial Design

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Lab Sample ID: MB 580-288111/1-A

Matrix: Solid

Client: AECOM

Analysis Batch: 288554

Client Sample ID: Method Blank **Prep Type: Total/NA Prep Batch: 288111**

	MB N	ИΒ							
Analyte	Result C	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]pyrene	ND		1.0	0.080	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
Benzo[b]fluoranthene	ND		1.0	0.12	ug/Kg		11/02/18 17:11	11/09/18 18:06	•
Benzo[g,h,i]perylene	ND		1.0	0.10	ug/Kg		11/02/18 17:11	11/09/18 18:06	
Benzo[k]fluoranthene	ND		1.0	0.12	ug/Kg		11/02/18 17:11	11/09/18 18:06	•
Chrysene	ND		1.0	0.30	ug/Kg		11/02/18 17:11	11/09/18 18:06	•
Dibenz(a,h)anthracene	ND		1.0	0.14	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
Fluoranthene	ND		1.0	0.28	ug/Kg		11/02/18 17:11	11/09/18 18:06	•
Fluorene	ND		1.0	0.10	ug/Kg		11/02/18 17:11	11/09/18 18:06	
Indeno[1,2,3-cd]pyrene	ND		1.0	0.12	ug/Kg		11/02/18 17:11	11/09/18 18:06	•
Naphthalene	0.288 J	J	1.0	0.16	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
Phenanthrene	0.338 J	J	1.0	0.14	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
Pyrene	ND		1.0	0.19	ug/Kg		11/02/18 17:11	11/09/18 18:06	•

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 85 57 - 120 11/02/18 17:11 11/09/18 18:06

Lab Sample ID: LCS 580-288111/2-A

Matrix: Solid

Analysis Batch: 288554

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

Prep Batch: 288111

	Spike	LCS	LCS				%Rec.
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits
2-Methylnaphthalene	200	181		ug/Kg		90	68 - 120
Acenaphthene	200	196		ug/Kg		98	68 - 120
Acenaphthylene	200	197		ug/Kg		98	68 - 120
Anthracene	200	193		ug/Kg		97	73 - 125
Benzo[a]anthracene	200	206		ug/Kg		103	66 - 120
Benzo[a]pyrene	200	204		ug/Kg		102	72 - 124
Benzo[b]fluoranthene	200	224		ug/Kg		112	63 - 121
Benzo[g,h,i]perylene	200	204		ug/Kg		102	63 - 120
Benzo[k]fluoranthene	200	209		ug/Kg		104	63 - 123
Chrysene	200	199		ug/Kg		100	69 - 120
Dibenz(a,h)anthracene	200	204		ug/Kg		102	70 - 125
Fluoranthene	200	202		ug/Kg		101	74 - 125
Fluorene	200	199		ug/Kg		99	73 - 120
Indeno[1,2,3-cd]pyrene	200	214		ug/Kg		107	65 - 121
Naphthalene	200	180		ug/Kg		90	70 - 120
Phenanthrene	200	185		ug/Kg		93	73 - 120
Pyrene	200	196		ug/Kg		98	70 - 120

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 81 57 - 120

Client Sample ID: Method Blank

Project/Site: Portland Harbor Pre-Remedial Design

Method: Organotins - Organotins, PSEP (GC/MS)

Lab Sample ID: MB 580-288077/1-A

Matrix: Solid

Analyte

Tributyltin

Surrogate

Tripentyltin

Client: AECOM

Analysis Batch: 288964

MB MB

MB MB

21

%Recovery

Result Qualifier

 $\overline{\mathsf{ND}}$

Qualifier

RL 75

MDL Unit 20 ug/Kg

Prepared 11/02/18 14:40 11/15/18 09:27

Analyzed

Prep Type: Total/NA

Prep Batch: 288077

Dil Fac

Prepared Analyzed Dil Fac 11/02/18 14:40 11/15/18 09:27

> Prep Type: Total/NA **Prep Batch: 288077**

Lab Sample ID: LCS 580-288077/2-A

Matrix: Solid

Analysis Batch: 288964

Analyte Tributyltin

Spike Added

357

Spike

Added

357

Limits

10 - 113

LCS LCS Result Qualifier 91.0

LCSD LCSD

LCS LCS

90.0

Result Qualifier

Unit ug/Kg

Unit

ug/Kg

D %Rec 25

Limits

Client Sample ID: Lab Control Sample

%Rec.

14 - 150

LCS LCS

Surrogate %Recovery Qualifier Limits Tripentyltin 10 - 113

Lab Sample ID: LCSD 580-288077/3-A

Matrix: Solid

Analysis Batch: 288964

Analyte Tributyltin

Surrogate %Recovery Qualifier Tripentyltin

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 288077 RPD %Rec.

%Rec Limits RPD Limit 25 14 - 150

LCSD LCSD

Limits 20 10 - 113

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

MR MR

Lab Sample ID: MB 580-288086/1-A

Lab Sample ID: LCS 580-288086/2-A

Matrix: Solid

Matrix: Solid

Analysis Batch: 288430

Analysis Batch: 288430

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 288086

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		50	12	mg/Kg		11/02/18 15:51	11/08/18 12:31	1
Motor Oil (>C24-C36)	ND		50	18	mg/Kg		11/02/18 15:51	11/08/18 12:31	1

MB MB Qualifier Limits

Surrogate %Recovery 50 - 150 o-Terphenyl 98

11/02/18 15:51 11/08/18 12:31

Analyzed

Prepared

Client Sample ID: Lab Control Sample

Prep Type: Total/NA Prep Batch: 288086

Dil Fac

%Rec.

Limits

70 - 125

Added Result Qualifier Unit %Rec Analyte #2 Diesel (C10-C24) 500 428 86 mg/Kg Motor Oil (>C24-C36) 500 454 mg/Kg 91 70 - 129

Spike

Project/Site: Portland Harbor Pre-Remedial Design

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

Spike

Added

500

500

LCSD LCSD

DU DU

21.9

151

Result Qualifier

MDL Unit

0.050 mg/Kg

0.039 mg/Kg

0.11 mg/Kg

0.024 mg/Kg

0.81 mg/Kg

Unit

mg/Kg

mq/Kq

mg/Kg

mg/Kg

mg/Kg

D

100

LCS LCS

50.1

418

436

Result Qualifier

Unit

Unit

mg/Kg

mg/Kg

Lab Sample ID: LCS 580-288086/2-A

Matrix: Solid

Client: AECOM

Analysis Batch: 288430

LCS LCS

Sample Sample

MB MB

 \overline{ND}

ND

0.158 J

ND

ND

Result Qualifier

Surrogate %Recovery Qualifier Limits o-Terphenyl 50 - 150 105

Lab Sample ID: LCSD 580-288086/3-A

Matrix: Solid

Analysis Batch: 288430

Analyte

#2 Diesel (C10-C24) Motor Oil (>C24-C36)

LCSD LCSD %Recovery Qualifier Surrogate

Limits o-Terphenyl 101 50 - 150

Lab Sample ID: 580-80635-2 DU

Matrix: Solid

Analysis Batch: 288430

Analyte Result Qualifier #2 Diesel (C10-C24) J 27 Motor Oil (>C24-C36) 190

DU DU Surrogate %Recovery Qualifier

Limits o-Terphenyl 50 - 150

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 580-288047/20-A

Matrix: Solid

Arsenic

Copper

Lead

Zinc

Cadmium

Analysis Batch: 288150

Analyte

Zinc

Lab Sample ID: LCS 580-288047/21-A **Matrix: Solid**

Analysis Batch: 288150

Analyte Added Result Qualifier Arsenic 50.0 51.1 Cadmium 50.0 49.6 Copper 50.0 50 1 Lead 50.0 47.8

Page 12 of 21

RL

0.25

0.20

0.50

0.25

2.5

Spike

50.0

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 288086

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA Prep Batch: 288086

%Rec. **RPD** Limits RPD Limit

mg/Kg 84 70 - 125 3 16 mg/Kg 87 70 - 129 16

%Rec

D

D

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Client Sample ID: PDI-SG-B474

Prep Type: Total/NA

Prep Batch: 288086

RPD RPD Limit 21 35

23 35

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

Prep Batch: 288047

Prepared Analyzed Dil Fac 11/02/18 10:56 11/02/18 18:03 5 11/02/18 10:56 11/02/18 18:03 5 5 11/02/18 10:56 11/02/18 18:03 11/02/18 10:56 11/02/18 18:03 5 11/02/18 10:56 11/02/18 18:03

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

80 - 120

Prep Batch: 288047

%Rec.

%Rec	Limits	
102	80 - 120	
99	80 - 120	
100	80 - 120	
96	80 - 120	

Prep Batch: 287855

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

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

Lab Sample ID: LCSD 580-288047/22-A			C	Client S	ample	ID: Lab	Control	Sample	Dup
Matrix: Solid							Prep Ty	pe: Tot	al/NA
Analysis Batch: 288150							Prep B	atch: 28	38 047
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	50.0	48.2		mg/Kg		96	80 - 120	6	20
Cadmium	50.0	47.3		mg/Kg		95	80 - 120	5	20
Copper	50.0	48.1		mg/Kg		96	80 - 120	4	20
Lead	50.0	47.5		mg/Kg		95	80 - 120	1	20
Zinc	50.0	51.3		mg/Kg		103	80 - 120	2	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 580-287855/22-A Client Sample ID: Method Blank Prep Type: Total/NA

Matrix: Solid

Analysis Batch: 287887

MB MB Result Qualifier RL **MDL** Unit **Analyte** Prepared Analyzed Dil Fac 0.030 10/31/18 10:53 10/31/18 12:55 Mercury $\overline{\mathsf{ND}}$ 0.0090 mg/Kg

Lab Sample ID: LCS 580-287855/23-A **Client Sample ID: Lab Control Sample Matrix: Solid** Prep Type: Total/NA **Analysis Batch: 287887 Prep Batch: 287855**

LCS LCS Spike %Rec. Analyte Added Result Qualifier Limits Unit D %Rec Mercury 0.167 0.180 mg/Kg 108 80 - 120

Lab Sample ID: LCSD 580-287855/24-A Client Sample ID: Lab Control Sample Dup **Matrix: Solid** Prep Type: Total/NA **Prep Batch: 287855 Analysis Batch: 287887** Spike LCSD LCSD %Rec. **RPD** Analyte Added Result Qualifier Unit %Rec Limits RPD Limit Mercury 0.167 0.176 mg/Kg 106 80 - 120

Method: 9060_PSEP - TOC (Puget Sound)

Lab Sample ID: MB 580-288296/5 Client Sample ID: Method Blank **Matrix: Solid** Prep Type: Total/NA

Analysis Batch: 288296

MB MB Analyte Result Qualifier RL **MDL** Unit Dil Fac D Prepared Analyzed Total Organic Carbon - Duplicates 2000 44 mg/Kg 11/06/18 10:27 $\overline{\mathsf{ND}}$

Lab Sample ID: LCS 580-288296/6 **Client Sample ID: Lab Control Sample**

Matrix: Solid Analysis Batch: 288296

Spike LCS LCS %Rec. Added Result Qualifier Unit %Rec Limits Analyte 4270 3540 83 68 - 149 Total Organic Carbon mg/Kg

Duplicates

TestAmerica Seattle

Prep Type: Total/NA

QC Sample Results

Client: AECOM TestAmerica Job ID: 580-80635-7

Project/Site: Portland Harbor Pre-Remedial Design

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

Lab Sample ID: LCSD 580-288296/7	Client Sample ID: Lab Control Sample Dup
Matrix: Solid	Prep Type: Total/NA

Analysis Batch: 288296

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Organic Carbon -	4270	3600		mg/Kg	_	84	68 - 149	2	32
Duplicates									

Lab Chronicle

Client: AECOM Project/Site: Portland Harbor Pre-Remedial Design TestAmerica Job ID: 580-80635-7

Lab Sample ID: 580-80635-2

Lab Gampie ib. 000-00000-2

Date Collected: 08/17/18 15:53 Matrix: Solid

Date Received: 09/27/18 12:55

Client Sample ID: PDI-SG-B474

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	9060_PSEP		1	288296	11/06/18 12:05	A1K	TAL SEA
Total/NA	Analysis	D 2216		1	288128	11/03/18 10:42	BAH	TAL SEA
Total/NA	Analysis	Moisture 70C		1	289298	11/19/18 16:06	A1K	TAL SEA

Client Sample ID: PDI-SG-B474 Lab Sample ID: 580-80635-2

Date Collected: 08/17/18 15:53 Edb Gample 1B: 300-3003-2

Date Received: 09/27/18 12:55 Percent Solids: 64.7

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3550B			288122	11/02/18 18:31	KMS	TAL SEA
Total/NA	Analysis	8270D		25	288843	11/14/18 10:47	W1T	TAL SEA
Total/NA	Prep	3546			288111	11/02/18 17:11	BAH	TAL SEA
Total/NA	Analysis	8270D SIM		25	288554	11/09/18 22:37	W1T	TAL SEA
Total/NA	Prep	Organotin Prep			288077	11/02/18 14:40	BAH	TAL SEA
Total/NA	Analysis	Organotins		1	288965	11/15/18 17:12	DSO	TAL SEA
Total/NA	Prep	3546			288086	11/02/18 15:51	KMS	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	288430	11/08/18 19:17	D1R	TAL SEA
Total/NA	Prep	3050B			288047	11/02/18 10:56	T1H	TAL SEA
Total/NA	Analysis	6020B		5	288150	11/02/18 18:58	FCW	TAL SEA
Total/NA	Prep	7471A			287855	10/31/18 10:53	T1H	TAL SEA
Total/NA	Analysis	7471A		1	287887	10/31/18 13:54	T1H	TAL SEA

Laboratory References:

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

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Accreditation/Certification Summary

Client: AECOM TestAmerica Job ID: 580-80635-7

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
Montana (UST)	State Program	8	N/A	04-30-20
Nevada	State Program	9	WA000502019-1	07-31-19
Oregon	NELAP	10	WA100007	11-05-19
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

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Sample Summary

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-80635-7

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
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AECOM	<u> </u>	Tel:	(206) 438-2	261 / (206) 43	8-2010		Lat	orator	y Cont	act: E	aine-V	Valker				Carrier;	Courier					1 of1 COC	.s
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Phone: (206) 438-2700 Fax: 1+(866) 495-5288]									± ±	ĺ	s 9060		N N		-							
Project Name: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling	21 days								NWTP	D7928/D6913	ıl solid		8270-	ė,									
Portland, OR	Other_ASAP									Į.	28/1	Tot.		iţi.									
Project #: 60566335 Study: Surface Sediment	1	_	2-31-22-31-32-33					≨ §		Mer.	97G	ig g	-20 C	but	%		580-	80635	Chain	of Cu	stody		
Sample Type: D/U								ners (60	1613B	. Metals.	ASTM	organic carbon, Total solids & 70C)		HP, Tri Unger	The SCHO			1	1 1			t	
Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	Fraction	PCB Conge	PCBB/Fs 1	TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A	Grain size	Total orga (104C & 7	Archive Archive	PAHs, BEHP, Tributytin, 8270-SIM, 8270- LL, Kron/Unger	AT							Sample Specific Note	es:
PDI-SG-B436	8/16/2018	11:40	SS		ММ	18		н	Н	В	x	н	н	Н								AU MOTEN (53	SPI
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Preservative: HCl = Hydrochloric Acid, H3PO4 = Phosph	· · · · · · · · · · · · · · · · · · ·	• •			,																_		
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SURFACE SEDIMENT

CHAIN OF CUSTODY

Laboratory Contact: Elaine-Walker

Site Contact: Jennifer Ray

Project Contact: Amy Dahl / Chelsey Cook

Tel: (206) 438-2261 / (206) 438-2010

TestAmerica-Seattle

5755-8th-Street-East Tacoma, WA 98424-1317

Ph: 253-922-2310

AECOM

Fax: 253-922-5047 Client Contact

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Client Contact	Project Contact: Amy Dahl / Chelsey Cook	Г	Site Contact: Jennifer Ray	Jennifer Ray			ŀ			9/26/2018 FC	COC No. 1	Γ
AECOM	Tel: (206) 438-2261 / (206) 438-2010		Laboratory Contact: Elaine-Walker	ntact: Elain	ne-Walker		٥	Carrier: Courier			7	T
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Container Type: WMG=Wide Mouth Glass Jar, P=HDPE, PP=Polypropylene, AG=amber glass, G=glass, RC=Resin Column	P=Polypropylene, AG≔amber glass, G≍glass, R	C=Resin Column	H			+				+		T
Preservetive: HCI = Hydrochloric Acid, H3PO4 = Phosphoric Acid, HNO3 = Nitric Acid Fraction: D = Dissolved, PRT = Particulate, T = Total tunfilmed	ric Acid, HNO3 = Nitric Acid											T
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PRUISED.

Client: AECOM

List Source: TestAmerica Seattle

Job Number: 580-80635-7

Login Number: 80635 List Number: 1

Creator: O'Connell, Jason I

Creator. O Connell, Jason I		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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.	False	Refer to Job Narrative for details.
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.	True	
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	