

# 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: 580-80213-6

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:  
9/27/2018 2:13:00 PM

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

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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.*

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# Case Narrative

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

TestAmerica Job ID: 580-80213-6

**Job ID: 580-80213-6**

**Laboratory: TestAmerica Seattle**

## Narrative

### CASE NARRATIVE

Client: AECOM

Project: Portland Harbor Pre-Remedial Design

Report Number: 580-80213-6

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

Three samples were received on 9/10/2018 12:40 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.3° C.

This report contains results of the Rinse Blank sample only, for analyses performed by 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-RB-VV-090718 (580-80213-3) was analyzed for semivolatile organic compounds (GC-MS) in accordance with EPA SW-846 Method 8270D.** The sample was prepared on 09/12/2018 and analyzed on 09/14/2018.

Bis(2-ethylhexyl) phthalate exceeded the RPD limit for LCSD 580-283783/3-A. The LCS and LCSD recoveries and precision met acceptance limits.

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-RB-VV-090718 (580-80213-3) was analyzed for semivolatile organic compounds - Selected Ion Mode (SIM) in accordance with 8270D SIM.** The sample was prepared on 09/12/2018 and analyzed on 09/14/2018.

The continuing calibration verification (CCV) associated with batch 580-284016 recovered above the upper control limit for Benzo[k]fluoranthene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: PDI-RB-VV-090718 (580-80213-3) and (CCVIS 580-284016/3).

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-RB-VV-090718 (580-80213-3) was analyzed for organotins by GC/MS in accordance with the Krone Method.** The sample was prepared on 09/13/2018 and analyzed on 09/22/2018.

# Case Narrative

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

TestAmerica Job ID: 580-80213-6

## Job ID: 580-80213-6 (Continued)

### Laboratory: TestAmerica Seattle (Continued)

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

#### DIESEL AND MOTOR OIL RANGE ORGANICS

**Sample PDI-RB-VV-090718 (580-80213-3) was analyzed for diesel and motor oil range organics in accordance with Method NWTPH-Dx.** The sample was prepared on 09/18/2018 and analyzed on 09/19/2018.

Continuing calibration verification (CCV) standard associated with batch 580-284335 recovered outside %Drift acceptance criteria for o-Terphenyl surrogate. The %Recovery is within acceptance criteria for the surrogate in the CCV and associated samples; therefore, the data are qualified and reported. The following samples are impacted: PDI-RB-VV-090718 (580-80213-3), (CCV 580-284335/14), (CCV 580-284335/25), (CCVRT 580-284335/3), (LCS 580-284200/2-A), (LCSD 580-284200/3-A), and (MB 580-284200/1-A).

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

#### METALS (ICPMS)

**Sample PDI-RB-VV-090718 (580-80213-3) was analyzed for Metals (ICPMS) in accordance with 6020A\_LL.** The sample was prepared on 09/24/2018 and analyzed on 09/25/2018.

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

#### TOTAL MERCURY

**Sample PDI-RB-VV-090718 (580-80213-3) was analyzed for total mercury in accordance with EPA SW-846 Methods 7470A.** The sample was prepared and analyzed on 09/21/2018.

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

#### TOTAL ORGANIC CARBON

**Sample PDI-RB-VV-090718 (580-80213-3) was analyzed for total organic carbon in accordance with SM 5310B.** The sample was analyzed on 09/19/2018.

Total Organic Carbon was detected in method blank MB 580-284442/21 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. Because the result concentration was less than ½ the reporting limit, no corrective action was necessary.

No additional 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: 580-80213-6

## Qualifiers

### GC/MS Semi VOA

Qualifier	Qualifier Description
*	RPD of the LCS and LCSD exceeds the control limits

### Metals

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.

### General Chemistry

Qualifier	Qualifier Description
B	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.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	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 Sample Results

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

TestAmerica Job ID: 580-80213-6

**Client Sample ID: PDI-RB-VV-090718**

**Lab Sample ID: 580-80213-3**

**Date Collected: 09/07/18 14:50**

**Matrix: Water**

**Date Received: 09/10/18 12:40**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	ND		0.098	0.018	ug/L		09/12/18 11:48	09/14/18 21:36	1
2-Methylnaphthalene	ND		0.098	0.020	ug/L		09/12/18 11:48	09/14/18 21:36	1
Acenaphthylene	ND		0.20	0.043	ug/L		09/12/18 11:48	09/14/18 21:36	1
Acenaphthene	ND		0.098	0.0059	ug/L		09/12/18 11:48	09/14/18 21:36	1
Fluorene	ND		0.098	0.013	ug/L		09/12/18 11:48	09/14/18 21:36	1
Phenanthrene	ND		0.098	0.019	ug/L		09/12/18 11:48	09/14/18 21:36	1
Anthracene	ND		0.098	0.0069	ug/L		09/12/18 11:48	09/14/18 21:36	1
Fluoranthene	ND		0.098	0.013	ug/L		09/12/18 11:48	09/14/18 21:36	1
Pyrene	ND		0.098	0.0088	ug/L		09/12/18 11:48	09/14/18 21:36	1
Benzo[a]anthracene	ND		0.098	0.0059	ug/L		09/12/18 11:48	09/14/18 21:36	1
Chrysene	ND		0.098	0.0059	ug/L		09/12/18 11:48	09/14/18 21:36	1
Benzo[b]fluoranthene	ND		0.098	0.0059	ug/L		09/12/18 11:48	09/14/18 21:36	1
Benzo[k]fluoranthene	ND		0.098	0.013	ug/L		09/12/18 11:48	09/14/18 21:36	1
Benzo[a]pyrene	ND		0.098	0.034	ug/L		09/12/18 11:48	09/14/18 21:36	1
Indeno[1,2,3-cd]pyrene	ND		0.098	0.0059	ug/L		09/12/18 11:48	09/14/18 21:36	1
Dibenz(a,h)anthracene	ND		0.098	0.0059	ug/L		09/12/18 11:48	09/14/18 21:36	1
Benzo[g,h,i]perylene	ND		0.20	0.075	ug/L		09/12/18 11:48	09/14/18 21:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	83		54 - 120	09/12/18 11:48	09/14/18 21:36	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND	*	15	6.1	ug/L		09/12/18 11:48	09/14/18 20:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14 (Surr)	100		55 - 126	09/12/18 11:48	09/14/18 20:01	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		0.33	0.051	ug/L		09/13/18 15:04	09/22/18 19:24	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Triphenyltin	98		10 - 142	09/13/18 15:04	09/22/18 19:24	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.067	mg/L		09/18/18 09:05	09/19/18 16:46	1
Motor Oil (>C24-C36)	ND		0.36	0.099	mg/L		09/18/18 09:05	09/19/18 16:46	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	87		50 - 150	09/18/18 09:05	09/19/18 16:46	1

### Method: 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00022	J	0.0010	0.00020	mg/L		09/24/18 15:57	09/25/18 14:13	1
Cadmium	ND		0.00040	0.00010	mg/L		09/24/18 15:57	09/25/18 14:13	1
Copper	ND		0.0020	0.00060	mg/L		09/24/18 15:57	09/25/18 14:13	1
Lead	ND		0.00080	0.00020	mg/L		09/24/18 15:57	09/25/18 14:13	1
Zinc	0.0026	J	0.0070	0.0019	mg/L		09/24/18 15:57	09/25/18 14:13	1

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# Client Sample Results

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

TestAmerica Job ID: 580-80213-6

**Client Sample ID: PDI-RB-VV-090718**

**Lab Sample ID: 580-80213-3**

**Date Collected: 09/07/18 14:50**

**Matrix: Water**

**Date Received: 09/10/18 12:40**

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030	0.00015	mg/L		09/21/18 10:43	09/21/18 15:47	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	0.75	J B	1.0	0.19	mg/L			09/19/18 13:23	1

# QC Sample Results

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

TestAmerica Job ID: 580-80213-6

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

**Lab Sample ID: MB 580-283783/1-A**  
**Matrix: Water**  
**Analysis Batch: 284020**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 283783**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND		15	6.3	ug/L		09/12/18 11:48	09/14/18 18:44	1
Surrogate	%Recovery	MB Qualifier	Limits						
Terphenyl-d14 (Surr)	80		55 - 126						
							Prepared	Analyzed	Dil Fac
							09/12/18 11:48	09/14/18 18:44	1

**Lab Sample ID: LCS 580-283783/2-A**  
**Matrix: Water**  
**Analysis Batch: 284020**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 283783**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits		
Bis(2-ethylhexyl) phthalate	2.00	ND		ug/L		89	20 - 150		
Surrogate	%Recovery	LCS Qualifier	Limits						
Terphenyl-d14 (Surr)	60		55 - 126						

**Lab Sample ID: LCSD 580-283783/3-A**  
**Matrix: Water**  
**Analysis Batch: 284020**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 283783**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Bis(2-ethylhexyl) phthalate	2.00	ND	*	ug/L		142	20 - 150	46	35
Surrogate	%Recovery	LCSD Qualifier	Limits						
Terphenyl-d14 (Surr)	68		55 - 126						

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

**Lab Sample ID: MB 580-283783/1-A**  
**Matrix: Water**  
**Analysis Batch: 284016**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 283783**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	ND		0.10	0.018	ug/L		09/12/18 11:48	09/14/18 18:35	1
2-Methylnaphthalene	ND		0.10	0.020	ug/L		09/12/18 11:48	09/14/18 18:35	1
Acenaphthylene	ND		0.20	0.044	ug/L		09/12/18 11:48	09/14/18 18:35	1
Acenaphthene	ND		0.10	0.0060	ug/L		09/12/18 11:48	09/14/18 18:35	1
Fluorene	ND		0.10	0.013	ug/L		09/12/18 11:48	09/14/18 18:35	1
Phenanthrene	ND		0.10	0.019	ug/L		09/12/18 11:48	09/14/18 18:35	1
Anthracene	ND		0.10	0.0070	ug/L		09/12/18 11:48	09/14/18 18:35	1
Fluoranthene	ND		0.10	0.013	ug/L		09/12/18 11:48	09/14/18 18:35	1
Pyrene	ND		0.10	0.0090	ug/L		09/12/18 11:48	09/14/18 18:35	1
Benzo[a]anthracene	ND		0.10	0.0060	ug/L		09/12/18 11:48	09/14/18 18:35	1
Chrysene	ND		0.10	0.0060	ug/L		09/12/18 11:48	09/14/18 18:35	1
Benzo[b]fluoranthene	ND		0.10	0.0060	ug/L		09/12/18 11:48	09/14/18 18:35	1
Benzo[k]fluoranthene	ND		0.10	0.013	ug/L		09/12/18 11:48	09/14/18 18:35	1
Benzo[a]pyrene	ND		0.10	0.035	ug/L		09/12/18 11:48	09/14/18 18:35	1
Indeno[1,2,3-cd]pyrene	ND		0.10	0.0060	ug/L		09/12/18 11:48	09/14/18 18:35	1

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# QC Sample Results

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

TestAmerica Job ID: 580-80213-6

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

**Lab Sample ID: MB 580-283783/1-A**  
**Matrix: Water**  
**Analysis Batch: 284016**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 283783**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibenz(a,h)anthracene	ND		0.10	0.0060	ug/L		09/12/18 11:48	09/14/18 18:35	1
Benzo[g,h,i]perylene	ND		0.20	0.076	ug/L		09/12/18 11:48	09/14/18 18:35	1

  

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	73		54 - 120	09/12/18 11:48	09/14/18 18:35	1

**Lab Sample ID: LCS 580-283783/2-A**  
**Matrix: Water**  
**Analysis Batch: 284016**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 283783**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Naphthalene	2.00	1.29		ug/L		64	58 - 120
2-Methylnaphthalene	2.00	1.37		ug/L		69	53 - 120
Acenaphthylene	2.00	1.46		ug/L		73	33 - 130
Acenaphthene	2.00	1.44		ug/L		72	64 - 120
Fluorene	2.00	1.50		ug/L		75	67 - 120
Phenanthrene	2.00	1.50		ug/L		75	69 - 120
Anthracene	2.00	1.37		ug/L		68	46 - 127
Fluoranthene	2.00	1.55		ug/L		77	72 - 120
Pyrene	2.00	1.53		ug/L		77	57 - 133
Benzo[a]anthracene	2.00	1.57		ug/L		78	70 - 120
Chrysene	2.00	1.50		ug/L		75	65 - 120
Benzo[b]fluoranthene	2.00	1.66		ug/L		83	57 - 132
Benzo[k]fluoranthene	2.00	1.82		ug/L		91	61 - 132
Benzo[a]pyrene	2.00	1.32		ug/L		66	23 - 141
Indeno[1,2,3-cd]pyrene	2.00	1.58		ug/L		79	53 - 133
Dibenz(a,h)anthracene	2.00	1.74		ug/L		87	57 - 132
Benzo[g,h,i]perylene	2.00	1.75		ug/L		87	52 - 129

  

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Terphenyl-d14	74		54 - 120

**Lab Sample ID: LCSD 580-283783/3-A**  
**Matrix: Water**  
**Analysis Batch: 284016**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 283783**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Naphthalene	2.00	1.58		ug/L		79	58 - 120	20	23
2-Methylnaphthalene	2.00	1.65		ug/L		83	53 - 120	19	23
Acenaphthylene	2.00	1.74		ug/L		87	33 - 130	18	34
Acenaphthene	2.00	1.70		ug/L		85	64 - 120	17	20
Fluorene	2.00	1.77		ug/L		89	67 - 120	16	20
Phenanthrene	2.00	1.73		ug/L		87	69 - 120	15	21
Anthracene	2.00	1.53		ug/L		76	46 - 127	11	19
Fluoranthene	2.00	1.80		ug/L		90	72 - 120	15	21
Pyrene	2.00	1.76		ug/L		88	57 - 133	14	21
Benzo[a]anthracene	2.00	1.68		ug/L		84	70 - 120	7	17
Chrysene	2.00	1.78		ug/L		89	65 - 120	17	19

TestAmerica Seattle

# QC Sample Results

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

TestAmerica Job ID: 580-80213-6

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

**Lab Sample ID: LCSD 580-283783/3-A**  
**Matrix: Water**  
**Analysis Batch: 284016**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 283783**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzo[b]fluoranthene	2.00	1.95		ug/L		98	57 - 132	16	25
Benzo[k]fluoranthene	2.00	2.04		ug/L		102	61 - 132	11	22
Benzo[a]pyrene	2.00	1.43		ug/L		72	23 - 141	8	35
Indeno[1,2,3-cd]pyrene	2.00	1.84		ug/L		92	53 - 133	15	25
Dibenz(a,h)anthracene	2.00	2.02		ug/L		101	57 - 132	15	24
Benzo[g,h,i]perylene	2.00	1.99		ug/L		100	52 - 129	13	24

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Terphenyl-d14	84		54 - 120

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

**Lab Sample ID: MB 580-283926/1-A**  
**Matrix: Water**  
**Analysis Batch: 284676**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 283926**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		0.30	0.046	ug/L		09/13/18 15:04	09/22/18 16:45	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tripentyltin	98		10 - 142	09/13/18 15:04	09/22/18 16:45	1

**Lab Sample ID: LCS 580-283926/2-A**  
**Matrix: Water**  
**Analysis Batch: 284676**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 283926**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Tributyltin	0.898	0.900		ug/L		100	11 - 150

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Tripentyltin	105		10 - 142

**Lab Sample ID: LCSD 580-283926/3-A**  
**Matrix: Water**  
**Analysis Batch: 284676**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 283926**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Tributyltin	0.898	1.03		ug/L		115	11 - 150	13	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Tripentyltin	110		10 - 142

TestAmerica Seattle

# QC Sample Results

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

TestAmerica Job ID: 580-80213-6

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

**Lab Sample ID: MB 580-284200/1-A**  
**Matrix: Water**  
**Analysis Batch: 284335**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 284200**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.065	mg/L		09/18/18 09:05	09/19/18 15:39	1
Motor Oil (>C24-C36)	ND		0.35	0.096	mg/L		09/18/18 09:05	09/19/18 15:39	1

  

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl	84		50 - 150	09/18/18 09:05	09/19/18 15:39	1

**Lab Sample ID: LCS 580-284200/2-A**  
**Matrix: Water**  
**Analysis Batch: 284335**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 284200**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
#2 Diesel (C10-C24)	2.00	1.24		mg/L		62	50 - 120
Motor Oil (>C24-C36)	2.00	1.78		mg/L		89	64 - 120

  

Surrogate	LCS %Recovery	LCS Qualifier	Limits
<i>o</i> -Terphenyl	88		50 - 150

**Lab Sample ID: LCSD 580-284200/3-A**  
**Matrix: Water**  
**Analysis Batch: 284335**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 284200**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
#2 Diesel (C10-C24)	2.00	1.33		mg/L		66	50 - 120	7	26
Motor Oil (>C24-C36)	2.00	1.82		mg/L		91	64 - 120	2	24

  

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
<i>o</i> -Terphenyl	115		50 - 150

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

**Lab Sample ID: MB 580-284793/22-A**  
**Matrix: Water**  
**Analysis Batch: 284913**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 284793**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010	0.00020	mg/L		09/24/18 15:57	09/25/18 13:30	1
Cadmium	ND		0.00040	0.00010	mg/L		09/24/18 15:57	09/25/18 13:30	1
Copper	ND		0.0020	0.00060	mg/L		09/24/18 15:57	09/25/18 13:30	1
Lead	ND		0.00080	0.00020	mg/L		09/24/18 15:57	09/25/18 13:30	1
Zinc	ND		0.0070	0.0019	mg/L		09/24/18 15:57	09/25/18 13:30	1

**Lab Sample ID: LCS 580-284793/23-A**  
**Matrix: Water**  
**Analysis Batch: 284913**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 284793**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	4.00	4.03		mg/L		101	80 - 120

TestAmerica Seattle

# QC Sample Results

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

TestAmerica Job ID: 580-80213-6

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

**Lab Sample ID: LCS 580-284793/23-A**  
**Matrix: Water**  
**Analysis Batch: 284913**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 284793**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.100	0.103		mg/L		103	80 - 120
Copper	0.500	0.503		mg/L		101	80 - 120
Lead	1.00	0.978		mg/L		98	80 - 120
Zinc	4.00	3.99		mg/L		100	80 - 120

**Lab Sample ID: LCSD 580-284793/24-A**  
**Matrix: Water**  
**Analysis Batch: 284913**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total Recoverable**  
**Prep Batch: 284793**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Arsenic	4.00	3.99		mg/L		100	80 - 120	1	20
Cadmium	0.100	0.101		mg/L		101	80 - 120	2	20
Copper	0.500	0.499		mg/L		100	80 - 120	1	20
Lead	1.00	0.974		mg/L		97	80 - 120	0	20
Zinc	4.00	3.98		mg/L		100	80 - 120	0	20

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: MB 580-284560/20-A**  
**Matrix: Water**  
**Analysis Batch: 284734**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 284560**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030	0.00015	mg/L		09/21/18 10:43	09/21/18 15:17	1

**Lab Sample ID: LCS 580-284560/21-A**  
**Matrix: Water**  
**Analysis Batch: 284734**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 284560**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00200	0.00200		mg/L		100	80 - 120

**Lab Sample ID: LCSD 580-284560/22-A**  
**Matrix: Water**  
**Analysis Batch: 284734**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 284560**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Mercury	0.00200	0.00201		mg/L		101	80 - 120	0	20

## Method: SM 5310B - Organic Carbon, Total (TOC)

**Lab Sample ID: MB 580-284442/21**  
**Matrix: Water**  
**Analysis Batch: 284442**

**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	0.423	J	1.0	0.19	mg/L			09/19/18 13:23	1

TestAmerica Seattle

# QC Sample Results

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

TestAmerica Job ID: 580-80213-6

## Method: SM 5310B - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LCS 580-284442/22  
Matrix: Water  
Analysis Batch: 284442

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	10.0	9.86		mg/L		99	85 - 115

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# Lab Chronicle

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

TestAmerica Job ID: 580-80213-6

**Client Sample ID: PDI-RB-VV-090718**

**Lab Sample ID: 580-80213-3**

**Date Collected: 09/07/18 14:50**

**Matrix: Water**

**Date Received: 09/10/18 12:40**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			283783	09/12/18 11:48	JSM	TAL SEA
Total/NA	Analysis	8270D		1	284020	09/14/18 20:01	T1W	TAL SEA
Total/NA	Prep	3520C			283783	09/12/18 11:48	JSM	TAL SEA
Total/NA	Analysis	8270D SIM		1	284016	09/14/18 21:36	CJ	TAL SEA
Total/NA	Prep	Organotin			283926	09/13/18 15:04	JSM	TAL SEA
Total/NA	Analysis	Organotins		1	284676	09/22/18 19:24	ERZ	TAL SEA
Total/NA	Prep	3510C			284200	09/18/18 09:05	KS	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	284335	09/19/18 16:46	JCM	TAL SEA
Total Recoverable	Prep	3005A			284793	09/24/18 15:57	JKM	TAL SEA
Total Recoverable	Analysis	6020B		1	284913	09/25/18 14:13	FCW	TAL SEA
Total/NA	Prep	7470A			284560	09/21/18 10:43	T1H	TAL SEA
Total/NA	Analysis	7470A		1	284734	09/21/18 15:47	FCW	TAL SEA
Total/NA	Analysis	SM 5310B		1	284442	09/19/18 13:23	TTN	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: 580-80213-6

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
Nevada	State Program	9	WA000502019-1	07-31-19
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: 580-80213-6

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-80213-3	PDI-RB-VV-090718	Water	09/07/18 14:50	09/10/18 12:40

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580-80213 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

**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 Water Sediment  
Sample Type: D/U

**Project Contact:** Amy Dahl / Chelsey Cook  
Tel: (206) 438-2261 / (206) 438-2010  
Analysis Turnaround Time  
Calendar (C) or Work Days (W)  
21 days (water)  
Other ASAP (63 only)

**Site Contact:** Jennifer Ray  
Laboratory Contact: Elaine-Walker  
Carrier: Courier

COC No: 1 of 1 pages

Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	Fraction	TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A	PCDD/Fs 1613B	PCB Congeners 168A	TCDFs 1613B	PAHs, BEHP, Tributyltin, 8270-SIM, 8270-LT, Kron/Unger	Archive Archive - 20 C (104C & 70C)	Total organic carbon, Total solids 9060	Crain size ASTM D7928/D6913	WQ - PCB Congeners 168A	WQ - TPH Diesel NWTPH-Dx	WQ - Metals, Mercury 6020B, 7470	WQ - Total Organic Carbon SMS10B	WQ - PAHs 8270-SIM	WQ - Pesticides 1669M	WQ - BEHP EPA 8270D-LL	WQ - Tributyltin Kron/Unger		
9/7/2018	12:08	SS		MSH	7		H	H			H	H	H	x										
9/7/2018	9:58	SS		MSH	7		H	H			H	H	H	x										
9/7/2018	14:50	W		JH	14																			

**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)

Special Instructions/QC Requirements & Comments:  
 Analyze samples for grain size ASAP, Hold (H) remaining analyses pending further instruction.  
 Separate reports for each lab.

Relinquished by: <i>[Signature]</i>	Company: AECOM	Date/Time: 9/10/18 1204	Received by: <i>[Signature]</i>	Company: M.E.	Date/Time: 9/10/18 1204
Relinquished by: <i>[Signature]</i>	Company: M.E.	Date/Time: 9/10/18 1240	Received by: <i>[Signature]</i>	Company: M.E.	Date/Time: 9/10/18 1204
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

63

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## SURFACE SEDIMENT CHAIN OF CUSTODY

580-80213 Chain of Custody

<b>TestAmerica-Seattle</b> 5755-8th-Street-East Tacoma, WA 98424-1317 Ph: 253-922-2310 Fax: 253-922-5047		<b>SURFACE SEDIMENT CHAIN OF CUSTODY</b>										9/10/2018 COC No. 1																																																																																																										
<b>Client Contact</b> AECOM 1111 3rd Ave Suite 1600 Seattle, WA 98101 Phone: (206) 438-2700 Fax: 1+(866) 495-5288		<b>Project Contact: Amy Dahl / Chelsey Cook</b> Tel: (206) 438-2261 / (206) 438-2010				<b>Site Contact: Jennifer Ray</b> Laboratory Contact: Elaine-Walker				<b>Carrier: Courier</b> 1 of 1 pages																																																																																																												
<b>Analysis Turnaround Time</b> Calendar (C) or Work Days (W) <input checked="" type="checkbox"/> 21 days (water) <input checked="" type="checkbox"/> Other ASAP (GS only)		<table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <thead> <tr> <th style="width: 15%;">Sample Identification</th> <th style="width: 10%;">Sample Date</th> <th style="width: 10%;">Sample Time</th> <th style="width: 10%;">Matrix</th> <th style="width: 10%;">QC Sample</th> <th style="width: 10%;">Sampler's Initials</th> <th style="width: 10%;">Total No. of Cont.</th> <th style="width: 5%;">Fraction</th> <th style="width: 5%;">PCB Congeners 1668A</th> <th style="width: 5%;">PCDD/Fs 1613B</th> <th style="width: 5%;">TPH Diesel, Metal, Mercury NWT/PH-Dx 6020B, 7471A</th> <th style="width: 5%;">Grain size ASTM D7928/D6913</th> <th style="width: 5%;">Total organic carbon, Total solids 9060 (104C &amp; 70C)</th> <th style="width: 5%;">Archive Archive -20 C</th> <th style="width: 5%;">PAHs, BEHP, Tributyltin, 8270-SIM, 8270-LL, Kron/Unger</th> <th style="width: 5%;">WQ - PCB Congeners 1668A</th> <th style="width: 5%;">WQ - PCDD/Fs 1613B</th> <th style="width: 5%;">WQ - TPH Diesel NWT/PH-Dx</th> <th style="width: 5%;">WQ - Metals, Mercury 6020B, 7470</th> <th style="width: 5%;">WQ - Total Organic Carbon SM4310B</th> <th style="width: 5%;">WQ - PAHs 8270-SIM</th> <th style="width: 5%;">WQ - Pesticides 1669M</th> <th style="width: 5%;">WQ - BEHP EPA 8270B-1-L</th> <th style="width: 5%;">WQ - Tributyltin Kron/Unger</th> <th style="width: 15%;">Sample Specific Notes:</th> </tr> </thead> <tbody> <tr> <td>PDI-SG-B431</td> <td>9/7/2018</td> <td>12:08</td> <td>SS</td> <td></td> <td>MSH</td> <td>7</td> <td></td> <td>H</td> <td>H</td> <td>H</td> <td>x</td> <td>H</td> <td>H</td> <td>H</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>PDI-SG-B479</td> <td>9/7/2018</td> <td>9:58</td> <td>SS</td> <td></td> <td>MSH</td> <td>7</td> <td></td> <td>H</td> <td>H</td> <td>H</td> <td>x</td> <td>H</td> <td>H</td> <td>H</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>PDI-RB-VV-090718</td> <td>9/7/2018</td> <td>14:50</td> <td>W</td> <td></td> <td>JH</td> <td>14</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> <td></td> <td>x</td> <td>x</td> <td></td> <td></td> </tr> </tbody> </table>												Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	Fraction	PCB Congeners 1668A	PCDD/Fs 1613B	TPH Diesel, Metal, Mercury NWT/PH-Dx 6020B, 7471A	Grain size ASTM D7928/D6913	Total organic carbon, Total solids 9060 (104C & 70C)	Archive Archive -20 C	PAHs, BEHP, Tributyltin, 8270-SIM, 8270-LL, Kron/Unger	WQ - PCB Congeners 1668A	WQ - PCDD/Fs 1613B	WQ - TPH Diesel NWT/PH-Dx	WQ - Metals, Mercury 6020B, 7470	WQ - Total Organic Carbon SM4310B	WQ - PAHs 8270-SIM	WQ - Pesticides 1669M	WQ - BEHP EPA 8270B-1-L	WQ - Tributyltin Kron/Unger	Sample Specific Notes:	PDI-SG-B431	9/7/2018	12:08	SS		MSH	7		H	H	H	x	H	H	H													PDI-SG-B479	9/7/2018	9:58	SS		MSH	7		H	H	H	x	H	H	H													PDI-RB-VV-090718	9/7/2018	14:50	W		JH	14									x	x	x	x	x	x		x	x		
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PDI-SG-B479	9/7/2018	9:58	SS		MSH	7		H	H	H	x	H	H	H																																																																																																								
PDI-RB-VV-090718	9/7/2018	14:50	W		JH	14									x	x	x	x	x	x		x	x																																																																																															
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Relinquished by: <i>[Signature]</i>	Company: AECOM	Date/Time: 9/10/18 1204	Relinquished by: <i>[Signature]</i>	Company: M.E.	Date/Time: 9/10/18 1240	Relinquished by: <i>[Signature]</i>	Company: TAYOR	Date/Time: 9/10/18 1700	Received by: <i>[Signature]</i>	Company: M.E.	Date/Time: 9/10/18 1204	Received by: <i>[Signature]</i>	Company: TAYOR	Date/Time: 9/11/18 0950																																																																																																								

RS 1.6/1.6

# Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-80213-6

**Login Number: 80213**

**List Source: TestAmerica Seattle**

**List Number: 1**

**Creator: Antonson, Angeline D**

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.	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	

