TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

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TestAmerica Job ID: 580-80635-7
Client Project/Site: Portland Harbor Pre-Remedial Design
Revision: 1

For:
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Authorized for release by:
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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 -11.0º C and 3.3º 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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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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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.

Qualifiers

GC/MS Semi VOA

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.
*	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.

Metals

Qualifier	Qualifier Description
H	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.
B	Compound was found in the blank and sample.

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 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

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylnaphthalene	ND		38	3.5	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Acenaphthene	**6.4**	**J B**	38	4.6	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Acenaphthylene	ND		38	3.8	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Anthracene	**10**	**J**	38	4.6	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Benzo[a]anthracene	**17**	**J**	38	5.8	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Benzo[a]pyrene	**15**	**J**	38	3.1	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Benzo[b]fluoranthene	**17**	**J**	38	4.5	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Benzo[g,h,i]perylene	**16**	**J**	38	3.8	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Benzo[k]fluoranthene	**6.1**	**J**	38	4.6	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Chrysene	**16**	**J**	38	12	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Dibenz(a,h)anthracene	ND		38	5.5	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Fluoranthene	**76**		38	11	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Fluorene	**6.7**	**J**	38	3.8	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Indeno[1,2,3-cd]pyrene	**15**	**J**	38	4.6	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Naphthalene	ND		38	6.1	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Phenanthrene	**49**	**B**	38	5.3	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25
Pyrene	**61**		38	7.5	ug/Kg	☼	11/02/18 17:11	11/09/18 22:37	25

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14	*84*		*57 - 120*	*11/02/18 17:11*	*11/09/18 22:37*	*25*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND		1100	130	ug/Kg	☼	11/02/18 18:31	11/14/18 10:47	25

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14 (Surr)	*81*		*58 - 120*	*11/02/18 18:31*	*11/14/18 10:47*	*25*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		120	30	ug/Kg	☼	11/02/18 14:40	11/15/18 17:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tripentyltin	*27*		*10 - 113*	*11/02/18 14:40*	*11/15/18 17:12*	*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)	**27**	**J**	74	18	mg/Kg	☼	11/02/18 15:51	11/08/18 19:17	1
Motor Oil (>C24-C36)	**190**		74	26	mg/Kg	☼	11/02/18 15:51	11/08/18 19:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*101*		*50 - 150*	*11/02/18 15:51*	*11/08/18 19:17*	*1*

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.8**		0.21	0.042	mg/Kg	☼	11/02/18 10:56	11/02/18 18:58	5
Cadmium	**0.067**	**J**	0.17	0.032	mg/Kg	☼	11/02/18 10:56	11/02/18 18:58	5
Copper	**18**	**B**	0.42	0.092	mg/Kg	☼	11/02/18 10:56	11/02/18 18:58	5
Lead	**5.8**		0.21	0.020	mg/Kg	☼	11/02/18 10:56	11/02/18 18:58	5
Zinc	**66**		2.1	0.67	mg/Kg	☼	11/02/18 10:56	11/02/18 18:58	5

Client Sample Results

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

TestAmerica Job ID: 580-80635-7

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

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.037	J H	0.041	0.012	mg/Kg	☼	10/31/18 10:53	10/31/18 13:54	1

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	H	0.10	0.10	%			11/19/18 16:06	1

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND		30	3.6	ug/Kg		11/02/18 18:31	11/14/18 09:57	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14 (Surr)	*95*		*58 - 120*	*11/02/18 18:31*	*11/14/18 09:57*	*1*

Lab Sample ID: LCS 580-288122/2-A
Matrix: Solid
Analysis Batch: 288843

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 288122

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bis(2-ethylhexyl) phthalate	50.0	65.0	*	ug/Kg		130	59 - 123

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

Lab Sample ID: 580-80635-2 MS
Matrix: Solid
Analysis Batch: 288843

Client Sample ID: PDI-SG-B474
Prep Type: Total/NA
Prep Batch: 288122

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Bis(2-ethylhexyl) phthalate	ND		76.4	163	J	ug/Kg	☼	NC	59 - 123

Surrogate	*MS %Recovery*	*MS 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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bis(2-ethylhexyl) phthalate	ND		76.8	147	J	ug/Kg	☼	NC	59 - 123	10	13

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Terphenyl-d14 (Surr)	*91*		*58 - 120*

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

Analyte	MB Result	MB 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

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

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

Analyte	MB Result	MB 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	1
Benzo[g,h,i]perylene	ND		1.0	0.10	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
Benzo[k]fluoranthene	ND		1.0	0.12	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
Chrysene	ND		1.0	0.30	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
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	1
Fluorene	ND		1.0	0.10	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
Indeno[1,2,3-cd]pyrene	ND		1.0	0.12	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
Naphthalene	0.288	J	1.0	0.16	ug/Kg		11/02/18 17:11	11/09/18 18:06	1
Phenanthrene	0.338	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	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14	*85*		*57 - 120*	*11/02/18 17:11*	*11/09/18 18:06*	*1*

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%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

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

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

Lab Sample ID: MB 580-288077/1-A
Matrix: Solid
Analysis Batch: 288964

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 288077

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		75	20	ug/Kg		11/02/18 14:40	11/15/18 09:27	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tripentyltin	*21*		*10 - 113*	*11/02/18 14:40*	*11/15/18 09:27*	*1*

Lab Sample ID: LCS 580-288077/2-A
Matrix: Solid
Analysis Batch: 288964

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 288077

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Tributyltin			357	91.0		ug/Kg		25	14 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tripentyltin	*17*		*10 - 113*

Lab Sample ID: LCSD 580-288077/3-A
Matrix: Solid
Analysis Batch: 288964

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 288077

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Tributyltin			357	90.0		ug/Kg		25	14 - 150	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Tripentyltin	*20*		*10 - 113*

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

Lab Sample ID: MB 580-288086/1-A
Matrix: Solid
Analysis Batch: 288430

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 288086

Analyte	MB Result	MB 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

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*98*		*50 - 150*	*11/02/18 15:51*	*11/08/18 12:31*	*1*

Lab Sample ID: LCS 580-288086/2-A
Matrix: Solid
Analysis Batch: 288430

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 288086

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
#2 Diesel (C10-C24)			500	428		mg/Kg		86	70 - 125		
Motor Oil (>C24-C36)			500	454		mg/Kg		91	70 - 129		

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

Lab Sample ID: LCS 580-288086/2-A
Matrix: Solid
Analysis Batch: 288430

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 288086

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

Lab Sample ID: LCSD 580-288086/3-A
Matrix: Solid
Analysis Batch: 288430

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 288086

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
#2 Diesel (C10-C24)			500	418		mg/Kg		84	70 - 125	3	16
Motor Oil (>C24-C36)			500	436		mg/Kg		87	70 - 129	4	16

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
o-Terphenyl	101		50 - 150

Lab Sample ID: 580-80635-2 DU
Matrix: Solid
Analysis Batch: 288430

Client Sample ID: PDI-SG-B474
Prep Type: Total/NA
Prep Batch: 288086

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
#2 Diesel (C10-C24)	27	J		21.9	J	mg/Kg	☼			21	35
Motor Oil (>C24-C36)	190			151		mg/Kg	☼			23	35

Surrogate	DU %Recovery	DU Qualifier	Limits
o-Terphenyl	97		50 - 150

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 580-288047/20-A
Matrix: Solid
Analysis Batch: 288150

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 288047

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.25	0.050	mg/Kg		11/02/18 10:56	11/02/18 18:03	5
Cadmium	ND		0.20	0.039	mg/Kg		11/02/18 10:56	11/02/18 18:03	5
Copper	0.158	J	0.50	0.11	mg/Kg		11/02/18 10:56	11/02/18 18:03	5
Lead	ND		0.25	0.024	mg/Kg		11/02/18 10:56	11/02/18 18:03	5
Zinc	ND		2.5	0.81	mg/Kg		11/02/18 10:56	11/02/18 18:03	5

Lab Sample ID: LCS 580-288047/21-A
Matrix: Solid
Analysis Batch: 288150

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 288047

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Arsenic			50.0	51.1		mg/Kg		102	80 - 120		
Cadmium			50.0	49.6		mg/Kg		99	80 - 120		
Copper			50.0	50.1		mg/Kg		100	80 - 120		
Lead			50.0	47.8		mg/Kg		96	80 - 120		
Zinc			50.0	50.1		mg/Kg		100	80 - 120		

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

Lab Sample ID: LCSD 580-288047/22-A
Matrix: Solid
Analysis Batch: 288150

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 288047

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	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
Matrix: Solid
Analysis Batch: 287887

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 287855

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.030	0.0090	mg/Kg		10/31/18 10:53	10/31/18 12:55	1

Lab Sample ID: LCS 580-287855/23-A
Matrix: Solid
Analysis Batch: 287887

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 287855

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

Lab Sample ID: LCSD 580-287855/24-A
Matrix: Solid
Analysis Batch: 287887

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 287855

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.167	0.176		mg/Kg		106	80 - 120	2	20

Method: 9060_PSEP - TOC (Puget Sound)

Lab Sample ID: MB 580-288296/5
Matrix: Solid
Analysis Batch: 288296

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			11/06/18 10:27	1

Lab Sample ID: LCS 580-288296/6
Matrix: Solid
Analysis Batch: 288296

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	3540		mg/Kg		83	68 - 149

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

Lab Sample ID: LCSD 580-288296/7
Matrix: Solid
Analysis Batch: 288296

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	3600		mg/Kg		84	68 - 149	2	32

Lab Chronicle

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

TestAmerica Job ID: 580-80635-7

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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared 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

Matrix: Solid

Date Received: 09/27/18 12:55

Percent Solids: 64.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared 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

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

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
580-80635-2	PDI-SG-B474	Solid	08/17/18 15:53	09/27/18 12:55

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**	**Site Contact: Jennifer Ray** **Laboratory Contact: Elaine-Walker**	9/26/2018 COC No: 1 1 of 1 COCs
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	**Analysis Turnaround Time** Calendar (C) or Work Days (W) _____ ☐ 21 days ☒ Other _ASAP_____		Carrier: Courier 580-80635 Chain of Custody

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, Metals, Mercury NWTPH-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, Krom/Unger	ATTACHED	Sample Specific Notes:
PDI-SG-B436	8/16/2018	11:40	SS		MM	8		H	H	H	x	H	H	H		ALL FROZEN (EXCEPT ASTM) 8/10 @1405
PDI-SG-B474	8/17/2018	15:53	SS		MM	7		H	H	H	x	H	H	H	H	↓
PDI-SG-B480	8/17/2018	11:05	SS		MM	7		H	H	H	x	H	H	H		FROZEN 7/30 @0805
PDI-SG-B481	7/27/2018	1330	SS		MM	7		H	H	H	x	H	H	H		

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.
KEEP FROZEN SAMPLES UPON RECEIPT -11.0 3.3

Relinquished by:	Company: AECOM	Date/Time: 9/26/18 1215	Received by:	Company: M.E.	Date/Time: 9/26/18 1215
Relinquished by:	Company: M.E.	Date/Time: 9/26/18 1255	Received by:	Company: TA-POR	Date/Time: 9/26/18 1255
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**	**Site Contact: Jennifer Ray** **Laboratory Contact: Elaine-Walker**	9/26/2018 COC No: 1 **Carrier: Courier** 1 of 1 COCs

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

Analysis Turnaround Time
Calendar (C) or Work Days (W) ____
☐ 21 days
☒ Other _ASAP_____

580-80635 Chain of Custody

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, Metals, Mercury NWTPH-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	ATTRSCS16	Sample Specific Notes:
PDI-SG-B436	8/16/2018	11:40	SS		MM	18		H	H	H	x	H	H	H		ALL FROZEN (EXCEPT GRAIN SIZE) 8/19 @ 1405 ↓ FROZEN 7/30 COBUS
PDI-SG-B474	8/17/2018	15:53	SS		MM	7		H	H	H	x	H	H	H	H	
PDI-SG-B480	8/17/2018	11:05	SS		MM	7		H	H	H	x	H	H	H		
PDI-SG-B481	7/27/2018	1330	SS		MM	7		H	H	H	x	H	H	H		

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.
KEEP FROZEN STORES UPON RECEIPT -11.0 3.3

Relinquished by:	Company: RECOM	Date/Time: 9/26/18 1215	Received by:	Company: M.E.	Date/Time: 9/26/18 1215
Relinquished by:	Company: M.E.	Date/Time: 9/26/18 1255	Received by:	Company: TA-POR	Date/Time: 9/26/18 1255
Relinquished by:	Company:	Date/Time:	Received by: Tom Blanford	Company: TA-Sea	Date/Time: 9/28/18 0930

IR4 -10.0/-10.0

Revised

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	Project Contact: Amy Dahl / Chelsey Cook
AECOM	Tel: (206) 438-2261 / (206) 438-2010
1111 3rd Ave Suite 1600	Analysis Turnaround Time
Seattle, WA 98101	Calendar (C) or Work Days (W) _____
Phone: (206) 438-2700 Fax: 1+(866) 495-5288	☐ 21 days
Project Name: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling	☒ Other _ASAP_____
Portland, OR	
Project #: 60566335 Study: Surface Sediment	
Sample Type: D/U	

Site Contact: Jennifer Ray
Laboratory Contact: Elaine-Walker
Carrier: Courier
9/26/2018
COC No: 1
1 of 1 COCs

580-80635 Chain of Custody

KP 10/2/18

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, Metals, Mercury NWTPH-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, Krom/Unger	ATTACHED	Sample Specific Notes:
PDI-SG-B436	8/16/2018	11:40	SS		MM	8		H	H	H	x	H	H	H	X	Per Aecom
PDI-SG-B474	8/17/2018	15:53	SS		MM	7		H	H	H	x	H	H	H	X	
PDI-SG-B480	8/17/2018	11:05	SS		MM	7		H	H	H	x	H	H	H		
PDI-SG-B481	7/27/2018	1330	SS		MM	7		H	H	H	x	H	H	H		

All frozen (except ASTM/Archive) 8/10 @ 1405 → Frozen 7/30 @ 0805

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.

KEEP FROZEN SAMPLES UPON RECEIPT -11.0 3.3

Relinquished by:	Company: AECOM	Date/Time: 9/26/18 1215	Received by:	Company: M.E.	Date/Time: 9/26/18 1215
Relinquished by:	Company: M.E.	Date/Time: 9/26/18 1255	Received by:	Company: TA-POR	Date/Time: 9/26/18 1255
Relinquished by:	Company:	Date/Time:	Received by:	Company: TA-Sea	Date/Time: 9/28/18 0930

IR4 -10.0/-10.0

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-80635-7

Login Number: 80635
List Number: 1
Creator: O'Connell, Jason I

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.	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	