TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

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TestAmerica Job ID: 580-78854-7
Client Project/Site: Portland Harbor Pre-Remedial Design
Revision: 1

For:
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Attn: Amy Dahl

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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: 580-78854-7

REVISION 1: NOVEMBER 13, 2018

This revision was required to remove the initial Organotin result as it was performed prior to activation by the client. The sample was later activated for Organotins and the sample was logged for the analysis a second time. Both sets of data were reported in the original report. The client requested that only the second result be reported for Organotins. In addition, the sample was incorrectly "B" flagged for Naphthalene, but this analyte was not present in the method blank. Fluoranthene, Phenanthrene, and Pyrene were detected in the method blank and those analytes have been flagged accordingly. Lastly, it was discovered that the data was calculated using the TS @ 70C, rather than the normal solids @ 102C.

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

Two samples were received on 7/16/2018 12:50 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.1° C.

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

This report contains results for all analyses performed at TestAmerica Seattle.

All samples were frozen to preserve the holding times. Samples were originally received and frozen at TestAmerica Sacramento on 7/17/18. Frozen samples were shipped from the Sacramento laboratory on 9/10/18 and received/frozen in Seattle on 9/11/18.

The following sample was activated for the remaining on hold analysis by the client on 10/11/18: PDI-SG-S266 (580-78854-2).

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-S266 (580-78854-2) was analyzed for semivolatile organic compounds (GC-MS) in accordance with 8270D. The sample was prepared on 10/14/2018 and analyzed on 10/18/2018.

Sample PDI-SG-S266 (580-78854-2) was frozen in hold. The sample was removed from freezer on 10/13/18 at 20:15 and thawed.

Sample PDI-SG-S266 (580-78854-2)[50X] required dilution prior to analysis due to the nature of the sample matrix. The reporting limits

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Laboratory: TestAmerica Seattle (Continued)

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-S266 (580-78854-2) was analyzed for semivolatile organic compounds - Selected Ion Mode (SIM) in accordance with SW846 8270D_SIM. The sample was prepared on 10/14/2018 and analyzed on 10/16/2018.

Sample PDI-SG-S266 (580-78854-2) was frozen after initial extraction to extend hold. The sample was removed from freezer for re-extraction on 10/13/18 at 20:15 and thawed.

Fluoranthene, Phenanthrene and Pyrene were detected in method blank MB 580-286471/1-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. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples were not performed.

Terphenyl-d14 failed the surrogate recovery criteria low for LCS 580-286471/2-A. Since all the affected samples met acceptance criteria for this surrogate, the data is qualified and reported.

Anthracene failed the recovery criteria 1% low for LCS 580-286471/2-A. This is not indicative of a systematic control problem because these were random marginal exceedances. Qualified results have been reported.

Sample PDI-SG-S266 (580-78854-2)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

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

ORGANOTINS BY GC/MS

Sample PDI-SG-S266 (580-78854-2) was analyzed for Organotins by GC/MS in accordance with the Krone Method. The sample was prepared on 10/14/2018 and analyzed on 10/18/2018.

Sample PDI-SG-S266 (580-78854-2) was frozen in hold. The sample was removed from freezer on 10/13/18 at 20:15 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-S266 (580-78854-2) was analyzed for diesel and extended range organics in accordance with Method NWTPH-Dx. The sample was prepared on 10/14/2018 and analyzed on 10/18/2018.

Sample PDI-SG-S266 (580-78854-2) was frozen in hold. The sample was removed from freezer on 10/13/18 at 20:15 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-S266 (580-78854-2) and PDI-SG-S266 DU (580-78854-2 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-S266 (580-78854-2) was analyzed for Metals (ICPMS) in accordance with 6020A_LL. The sample was prepared on 10/26/2018 and analyzed on 10/29/2018.

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

TOTAL MERCURY

Sample PDI-SG-S266 (580-78854-2) was analyzed for total mercury in accordance with EPA SW-846 Method 7471A. The samples were prepared and analyzed on 10/26/2018.

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Laboratory: TestAmerica Seattle (Continued)

The request for analysis of the following sample was received outside of holding time: PDI-SG-S266 (580-78854-2).

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

TOTAL SOLIDS @ 70C

Sample PDI-SG-S266 (580-78854-2) was analyzed for Total Solids @ 70C. The samples were analyzed on 10/14/2018.

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
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.
B	Compound was found in the blank and sample.
X	Surrogate is outside control 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.

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-S266

Date Collected: 07/13/18 12:10
Date Received: 07/16/18 12:50

Lab Sample ID: 580-78854-2

Matrix: Solid
Percent Solids: 57.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylnaphthalene	**1.8**	**J**	17	1.5	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Acenaphthene	ND		17	2.0	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Acenaphthylene	ND		17	1.7	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Anthracene	ND	*	17	2.0	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Benzo[a]anthracene	**3.7**	**J**	17	2.6	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Benzo[a]pyrene	**4.8**	**J**	17	1.3	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Benzo[b]fluoranthene	**6.4**	**J**	17	2.0	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Benzo[g,h,i]perylene	**2.9**	**J**	17	1.7	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Benzo[k]fluoranthene	**3.0**	**J**	17	2.0	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Chrysene	**6.5**	**J**	17	5.0	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Dibenz(a,h)anthracene	ND		17	2.4	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Fluoranthene	**10**	**J B**	17	4.7	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Fluorene	ND		17	1.7	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Indeno[1,2,3-cd]pyrene	**3.5**	**J**	17	2.0	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Naphthalene	**3.7**	**J**	17	2.7	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Phenanthrene	ND		17	2.3	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10
Pyrene	**9.1**	**J B**	17	3.3	ug/Kg	☼	10/14/18 11:47	10/16/18 18:54	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14	*90*		*57 - 120*	*10/14/18 11:47*	*10/16/18 18:54*	*10*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND		2600	300	ug/Kg	☼	10/14/18 11:28	10/18/18 22:47	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14 (Surr)	*90*		*58 - 120*	*10/14/18 11:28*	*10/18/18 22:47*	*50*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		120	32	ug/Kg	☼	10/14/18 12:16	10/18/18 16:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tripentyltin	*34*		*10 - 113*	*10/14/18 12:16*	*10/18/18 16:23*	*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)	**60**	**J**	80	20	mg/Kg	☼	10/14/18 11:06	10/18/18 19:36	1
Motor Oil (>C24-C36)	**290**		80	28	mg/Kg	☼	10/14/18 11:06	10/18/18 19:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*94*		*50 - 150*	*10/14/18 11:06*	*10/18/18 19:36*	*1*

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	**0.12**	**J**	0.21	0.041	mg/Kg	☼	10/26/18 14:57	10/29/18 16:10	5
Copper	**49**		0.53	0.12	mg/Kg	☼	10/26/18 14:57	10/29/18 16:10	5
Lead	**9.1**		0.26	0.025	mg/Kg	☼	10/26/18 14:57	10/29/18 16:10	5
Zinc	**88**		2.6	0.85	mg/Kg	☼	10/26/18 14:57	10/29/18 16:10	5

Client Sample ID: PDI-SG-S266
Lab Sample ID: 580-78854-2
Date Collected: 07/13/18 12:10
Matrix: Solid
Date Received: 07/16/18 12:50
Percent Solids: 57.5

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.049	H	0.032	0.0095	mg/Kg	☼	10/26/18 09:42	10/26/18 13:26	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Solids @ 70°C	69	H	0.10	0.10	%			10/14/18 10:49	1

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

Lab Sample ID: MB 580-286469/1-A
Matrix: Solid
Analysis Batch: 286907

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 286469

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND		30	3.6	ug/Kg		10/14/18 11:28	10/18/18 19:24	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14 (Surr)	*95*		*58 - 120*	*10/14/18 11:28*	*10/18/18 19:24*	*1*

Lab Sample ID: LCS 580-286469/2-A
Matrix: Solid
Analysis Batch: 286907

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 286469

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Bis(2-ethylhexyl) phthalate			50.0	46.2		ug/Kg		92	59 - 123		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Terphenyl-d14 (Surr)	*99*		*58 - 120*

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

Lab Sample ID: MB 580-286471/1-A
Matrix: Solid
Analysis Batch: 286592

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 286471

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylnaphthalene	ND		1.0	0.090	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Acenaphthene	ND		1.0	0.12	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Acenaphthylene	ND		1.0	0.10	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Anthracene	ND		1.0	0.12	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Benzo[a]anthracene	ND		1.0	0.15	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Benzo[a]pyrene	ND		1.0	0.080	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Benzo[b]fluoranthene	ND		1.0	0.12	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Benzo[g,h,i]perylene	ND		1.0	0.10	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Benzo[k]fluoranthene	ND		1.0	0.12	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Chrysene	ND		1.0	0.30	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Dibenz(a,h)anthracene	ND		1.0	0.14	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Fluoranthene	0.471	J	1.0	0.28	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Fluorene	ND		1.0	0.10	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Indeno[1,2,3-cd]pyrene	ND		1.0	0.12	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Naphthalene	ND		1.0	0.16	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Phenanthrene	0.411	J	1.0	0.14	ug/Kg		10/14/18 11:47	10/16/18 18:05	1
Pyrene	0.567	J	1.0	0.19	ug/Kg		10/14/18 11:47	10/16/18 18:05	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14	*91*		*57 - 120*	*10/14/18 11:47*	*10/16/18 18:05*	*1*

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

Lab Sample ID: LCS 580-286471/2-A
Matrix: Solid
Analysis Batch: 286776

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 286471

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Methylnaphthalene	200	148		ug/Kg		74	68 - 120
Acenaphthene	200	150		ug/Kg		75	68 - 120
Acenaphthylene	200	146		ug/Kg		73	68 - 120
Anthracene	200	144	*	ug/Kg		72	73 - 125
Benzo[a]anthracene	200	170		ug/Kg		85	66 - 120
Benzo[a]pyrene	200	152		ug/Kg		76	72 - 124
Benzo[b]fluoranthene	200	188		ug/Kg		94	63 - 121
Benzo[g,h,i]perylene	200	165		ug/Kg		83	63 - 120
Benzo[k]fluoranthene	200	176		ug/Kg		88	63 - 123
Chrysene	200	177		ug/Kg		88	69 - 120
Dibenz(a,h)anthracene	200	186		ug/Kg		93	70 - 125
Fluoranthene	200	177		ug/Kg		88	74 - 125
Fluorene	200	163		ug/Kg		82	73 - 120
Indeno[1,2,3-cd]pyrene	200	178		ug/Kg		89	65 - 121
Naphthalene	200	146		ug/Kg		73	70 - 120
Phenanthrene	200	157		ug/Kg		78	73 - 120
Pyrene	200	168		ug/Kg		84	70 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Terphenyl-d14	*49*	*X*	*57 - 120*

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

Lab Sample ID: MB 580-286476/1-A
Matrix: Solid
Analysis Batch: 286845

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 286476

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		75	20	ug/Kg		10/14/18 12:16	10/18/18 14:40	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tripentyltin	*48*		*10 - 113*	*10/14/18 12:16*	*10/18/18 14:40*	*1*

Lab Sample ID: LCS 580-286476/2-A
Matrix: Solid
Analysis Batch: 286845

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 286476

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Tributyltin	357	143		ug/Kg		40	14 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tripentyltin	*43*		*10 - 113*

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

Lab Sample ID: LCSD 580-286476/3-A
Matrix: Solid
Analysis Batch: 286845

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 286476

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Tributyltin			357	158		ug/Kg		44	14 - 150	10	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Tripentyltin	*44*		*10 - 113*

Lab Sample ID: 580-78854-2 MS
Matrix: Solid
Analysis Batch: 286845

Client Sample ID: PDI-SG-S266
Prep Type: Total/NA
Prep Batch: 286476

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Tributyltin	ND		574	149		ug/Kg	☼	26	14 - 150

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tripentyltin	*27*		*10 - 113*

Lab Sample ID: 580-78854-2 MSD
Matrix: Solid
Analysis Batch: 286845

Client Sample ID: PDI-SG-S266
Prep Type: Total/NA
Prep Batch: 286476

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Tributyltin	ND		615	134		ug/Kg	☼	22	14 - 150	10	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tripentyltin	*22*		*10 - 113*

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

Lab Sample ID: MB 580-286460/1-A
Matrix: Solid
Analysis Batch: 286884

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 286460

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		50	12	mg/Kg		10/14/18 11:06	10/18/18 18:31	1
Motor Oil (>C24-C36)	ND		50	18	mg/Kg		10/14/18 11:06	10/18/18 18:31	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*97*		*50 - 150*	*10/14/18 11:06*	*10/18/18 18:31*	*1*

Lab Sample ID: LCS 580-286460/2-A
Matrix: Solid
Analysis Batch: 286884

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 286460

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
#2 Diesel (C10-C24)			500	528		mg/Kg		106	70 - 125
Motor Oil (>C24-C36)			500	559		mg/Kg		112	70 - 129

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

Lab Sample ID: LCS 580-286460/2-A
Matrix: Solid
Analysis Batch: 286884

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 286460

Surrogate	LCS %Recovery	LCS Qualifier	Limits
o-Terphenyl	102		50 - 150

Lab Sample ID: LCSD 580-286460/3-A
Matrix: Solid
Analysis Batch: 286884

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 286460

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
#2 Diesel (C10-C24)			500	517		mg/Kg		103	70 - 125	2	16
Motor Oil (>C24-C36)			500	549		mg/Kg		110	70 - 129	2	16

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
o-Terphenyl	112		50 - 150

Lab Sample ID: 580-78854-2 DU
Matrix: Solid
Analysis Batch: 286884

Client Sample ID: PDI-SG-S266
Prep Type: Total/NA
Prep Batch: 286460

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
#2 Diesel (C10-C24)	60	J		57.6	J	mg/Kg	☼			5	35
Motor Oil (>C24-C36)	290			267		mg/Kg	☼			9	35

Surrogate	DU %Recovery	DU Qualifier	Limits
o-Terphenyl	95		50 - 150

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 580-287557/20-A
Matrix: Solid
Analysis Batch: 287712

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 287557

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.20	0.039	mg/Kg		10/26/18 14:57	10/29/18 14:17	5
Copper	ND		0.50	0.11	mg/Kg		10/26/18 14:57	10/29/18 14:17	5
Lead	ND		0.25	0.024	mg/Kg		10/26/18 14:57	10/29/18 14:17	5
Zinc	ND		2.5	0.81	mg/Kg		10/26/18 14:57	10/29/18 14:17	5

Lab Sample ID: LCS 580-287557/21-A
Matrix: Solid
Analysis Batch: 287712

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 287557

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Cadmium			5.00	4.80		mg/Kg		96	80 - 120		
Copper			25.0	24.9		mg/Kg		100	80 - 120		
Lead			50.0	46.9		mg/Kg		94	80 - 120		
Zinc			200	190		mg/Kg		95	80 - 120		

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

Lab Sample ID: LCSD 580-287557/22-A
Matrix: Solid
Analysis Batch: 287712

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 287557

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium			5.00	5.07		mg/Kg		101	80 - 120	5	20
Copper			25.0	25.3		mg/Kg		101	80 - 120	2	20
Lead			50.0	46.9		mg/Kg		94	80 - 120	0	20
Zinc			200	193		mg/Kg		96	80 - 120	1	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 580-287482/22-A
Matrix: Solid
Analysis Batch: 287539

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 287482

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.030	0.0090	mg/Kg		10/26/18 09:47	10/26/18 12:59	1

Lab Sample ID: LCS 580-287482/23-A
Matrix: Solid
Analysis Batch: 287539

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 287482

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			0.167	0.152		mg/Kg		91	80 - 120		

Lab Sample ID: LCSD 580-287482/24-A
Matrix: Solid
Analysis Batch: 287539

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 287482

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury			0.167	0.135		mg/Kg		81	80 - 120	12	20

Method: Moisture 70C - Percent Moisture, 70 C

Lab Sample ID: 580-78854-2 DU
Matrix: Solid
Analysis Batch: 286459

Client Sample ID: PDI-SG-S266
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Solids @ 70°C	69	H		69		%				0.5	20

Lab Chronicle

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

TestAmerica Job ID: 580-78854-7

Client Sample ID: PDI-SG-S266
Date Collected: 07/13/18 12:10
Date Received: 07/16/18 12:50

Lab Sample ID: 580-78854-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture 70C		1	286459	10/14/18 10:49	BAH	TAL SEA

Client Sample ID: PDI-SG-S266
Date Collected: 07/13/18 12:10
Date Received: 07/16/18 12:50

Lab Sample ID: 580-78854-2
Matrix: Solid
Percent Solids: 57.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550B			286469	10/14/18 11:28	BAH	TAL SEA
Total/NA	Analysis	8270D		50	286907	10/18/18 22:47	CJ	TAL SEA
Total/NA	Prep	3546			286471	10/14/18 11:47	BAH	TAL SEA
Total/NA	Analysis	8270D SIM		10	286592	10/16/18 18:54	ADB	TAL SEA
Total/NA	Prep	Organotin Prep			286476	10/14/18 12:16	BAH	TAL SEA
Total/NA	Analysis	Organotins		1	286845	10/18/18 16:23	ERB	TAL SEA
Total/NA	Prep	3546			286460	10/14/18 11:06	BAH	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	286884	10/18/18 19:36	W1T	TAL SEA
Total/NA	Prep	3050B			287557	10/26/18 14:57	T1H	TAL SEA
Total/NA	Analysis	6020B		5	287712	10/29/18 16:10	FCW	TAL SEA
Total/NA	Prep	7471A			287482	10/26/18 09:42	JKM	TAL SEA
Total/NA	Analysis	7471A		1	287539	10/26/18 13:26	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: 580-78854-7
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
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	11-05-19
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: 580-78854-7

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-78854-2	PDI-SG-S266	Solid	07/13/18 12:10	07/16/18 12:50

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 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 ☒ Other _ASAP_____	**Site Contact: Jennifer Ray** **Laboratory Contact: Elaine-Walker** **Carrier: Courier** **7/16/2018** COC No: 1 __1__ of __1__ pages

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	Atterberg Limits ASTM D4318	WQ - PCB Congeners 1668A	WQ - PCDD/Fs 1613B	TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A	WQ - Total Organic Carbon SM5310B	WQ - PAHs 8270-SIM	WQ - BEHP EPA 8270D-LL	WQ - Tributyltin Krone/Unger	Sample Specific Notes:
PDI-SG-B483	7/13/2018	14:50	SS		LS	8		H	H	x*	x*	x*	H	H	H								
PDI-SG-~~B487~~ WP-B487	7/13/2018	12:10	SS		LS	~~8~~ 7		H	H	x*	x*	x*	H	H	~~H~~								

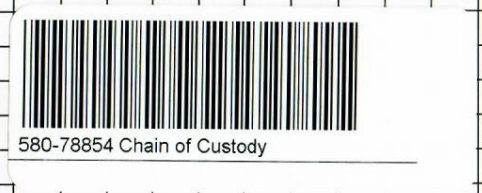
Container Type: WMG=Wide Mouth Glass Jar, P=HDPE, PP=Polypropylene, AG=amber glass, G=glass, RC=Resin Column

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:

Separate reports for each lab.

x*- Analyze for grain size, metals (6020B analytes only), Mn, and TOC (9060 @ 104C & 70C) ASAP.

H - Hold analyses pending further instruction.

1.5

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	AECOM	7/16/18 1210		M.E.	7/16/18 1210
	M.E.	7/16/18 1250		TAKR	7/16/18 1250

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**	**7/16/2018** COC No: 1 **Carrier: Courier** 1 of 1 pages
Client Contact AECOM 1111 3rd Ave Suite 1600 Seattle, WA 98101 Phone: (206) 438-2700 Fax: 1+(866) 495-5288 Project Name: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling Portland, OR Project #: 60566335 Study: **Surface Sediment** Sample Type: D/U	**Analysis Turnaround Time** Calendar (C) or Work Days (W) _____ ☐ 21 days ☒ Other _ASAP_____		

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	Atterberg Limits ASTM D4318	WQ - PCB Congeners 1668A	WQ - PCDD/Fs 1613B	TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A	WQ - Total Organic Carbon SM5310B	WQ - PAHs 8270-SIM	WQ - BEHP EPA 8270D-LL	WQ - Tributyltin Krone/Unger	Sample Specific Notes:
PDI-SG-B483	7/13/2018	14:50	SS		LS	8		H	H	x*	x*	x*	H	H	H								
PDI-SG-~~B487~~ W2-B487	7/13/2018	12:10	SS		LS	~~7~~		H	H	x*	x*	x*	H	H	~~H~~								

580-78854 Chain of Custody

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

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

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

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

Special Instructions/QC Requirements & Comments:
Separate reports for each lab.
x*- Analyze for grain size, metals (6020B analytes only), Mn, and TOC (9060 @ 104C & 70C) ASAP.
H - Hold analyses pending further instruction.

1 of 5

Relinquished by:	Company: AECOM	Date/Time: 7/16/18 1210	Received by:	Company: M.E.	Date/Time: 7/16/18 1210
Relinquished by:	Company: M.E.	Date/Time: 7/16/18 1250	Received by:	Company: TARR	Date/Time: 7/16/18 1250
Relinquished by:	Company: TARR	Date/Time: 7/16/18 1700	Received by:	Company: SEA TR	Date/Time: 7/17/18 0930

FRS = 0.710.7 w/C.S.

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-78854-7

Login Number: 78854
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.	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	