TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

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TestAmerica Job ID: 580-79055-1
Client Project/Site: Portland Harbor Pre-Remedial Design

For:
AECOM
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Attn: Amy Dahl

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Authorized for release by:
10/15/2018 1:21:24 PM

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Job ID: 580-79055-1

Laboratory: TestAmerica Seattle

Narrative

CASE NARRATIVE
Client: AECOM
Project: Portland Harbor Pre-Remedial Design
Report Number: 580-79055-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues.

It should be noted that samples with elevated Reporting Limits (RLs) resulting from a dilution may not be able to satisfy customer reporting limits in some cases. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes within the calibration range of the instrument or that reduces the interferences thereby enabling the quantification of target analytes.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

Two samples were received on 7/23/2018 2:35 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.6º C and 5.3º C.

A container for Atterberg limits was received for sample PDI-SG-B471 (580-79055-1) and PDI-SG-B472 (580-79055-2) however this analysis was not requested on the COC. The client requested we add the analysis on hold.

The following samples were activated by the client for all on hold analysis on 8/16/18:PDI-SG-B471 (580-79055-1) and PDI-SG-B472 (580-79055-2)

All samples were frozen to preserve the holding times. Samples were originally received and frozen at TestAmerica Sacramento on 7/24/18. Frozen samples were shipped to the Seattle laboratory on 9/10/18 and received/frozen in Seattle on 9/11/18.

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

This report contains results of all 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)

Samples PDI-SG-B471 (580-79055-1) and PDI-SG-B472 (580-79055-2) were analyzed for semivolatile organic compounds (GC-MS) in accordance with 8270D. The samples were prepared on 09/15/2018 and 09/19/2018 and analyzed on 09/20/2018 and 09/21/2018.

Bis(2-ethylhexyl) phthalate was detected in method blank MB 580-284043/1-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. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples were not performed.

Bis(2-ethylhexyl) phthalate was detected in method blank MB 580-284408/1-A at a level exceeding the reporting limit. 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 half the reporting limit (1/2RL); therefore, re-extraction and/or re-analysis of samples were not performed.

Job ID: 580-79055-1 (Continued)

Laboratory: TestAmerica Seattle (Continued)

Terphenyl-d14 (Surr) failed the surrogate recovery criteria high for MB 580-284408/1-A. Since the affected samples were within control limits and the method blank was ND for the affected analyte, the data is qualified and reported.

Bis(2-ethylhexyl) phthalate failed the recovery criteria high for the MS of sample PDI-SG-B472MS (580-79055-2) in batch 580-284567. Bis(2-ethylhexyl) phthalate failed the recovery criteria high for the MSD of sample PDI-SG-B472MSD (580-79055-2) in batch 580-284567. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

The opening CCV for analytical batch 284567 was 1% above %D criteria for surrogate Terphenyl-d14. Since all samples and batch QC were well above 1% %R for this surrogate, the small bias has not caused any of the data to be artificially passing due to the instrument bias. Therefore the data is qualified and reported. The following samples are impacted: PDI-SG-B472 (580-79055-2) and (CCVIS 580-284567/3).

The opening CCV for analytical batch 284395 was 3% above %D criteria for surrogate Terphenyl-d14. Since all samples and batch QC were well above 3% of the lower %R limit for this surrogate, the small bias has not causing any of the data to be artificially passing due to the instrument bias. Therefore the data is qualified and reported. The following samples are impacted: PDI-SG-B471 (580-79055-1), (CCVIS 580-284395/3), and (MB 580-284043/1-A).

Samples PDI-SG-B471 (580-79055-1) and PDI-SG-B472 (580-79055-2 were preserved by freezing within holding time. Samples were removed from the freezer 9/14/2018 and 9/18/2018. Therefore the samples are in hold and H-flags have been removed.

Samples PDI-SG-B471 (580-79055-1)[25X] and PDI-SG-B472 (580-79055-2)[10X] 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.

SEMIVOLATILE ORGANIC COMPOUNDS - SELECTED ION MODE (SIM)

Samples PDI-SG-B471 (580-79055-1) and PDI-SG-B472 (580-79055-2) were analyzed for semivolatile organic compounds - Selected Ion Mode (SIM) in accordance with SW846 8270D_SIM. The samples were prepared on 09/15/2018 and 10/09/2018 and analyzed on 09/19/2018 and 10/11/2018.

Fluoranthene, Phenanthrene and Pyrene were detected in method blank MB 580-284059/1-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.

Fluoranthene was detected in method blank MB 580-286035/1-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. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples were not performed.

Indeno[1,2,3-cd]pyrene failed the recovery criteria high for the MS of sample PDI-SG-B472MS (580-79055-2) in batch 580-286213. Indeno[1,2,3-cd]pyrene failed the recovery criteria high for the MSD of sample PDI-SG-B472MSD (580-79055-2) in batch 580-286213. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Samples PDI-SG-B471 (580-79055-1) and PDI-SG-B472 (580-79055-2) were frozen immediately after acquisition from the job site and transported to Sacramento, then to Seattle frozen. The samples were removed in the evening on 09/14/2018 and 10/8/2018. The samples were extracted within hold time; therefore, the H flags on these samples are removed.

Samples PDI-SG-B471 (580-79055-1)[50X] and PDI-SG-B472 (580-79055-2)[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.

Job ID: 580-79055-1 (Continued)

Laboratory: TestAmerica Seattle (Continued)

ORGANOTINS BY GC/MS

Samples PDI-SG-B471 (580-79055-1) and PDI-SG-B472 (580-79055-2) were analyzed for Organotins by GC/MS in accordance with the Krone Method. The samples were prepared on 09/15/2018 and 09/26/2018 and analyzed on 09/23/2018 and 10/09/2018.

The following samples were received frozen at the laboratory: PDI-SG-B471 (580-79055-1) and PDI-SG-B472 (580-79055-2). Therefore the extraction was in hold and the H-flags have been removed. The samples were received from the freezer on 9/14/2018 and 9/25/2018.

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

DIESEL AND EXTENDED RANGE ORGANICS

Samples PDI-SG-B471 (580-79055-1) and PDI-SG-B472 (580-79055-2) were analyzed for diesel and extended range organics in accordance with Method NWTPH-Dx. The samples were prepared on 09/19/2018 and analyzed on 09/22/2018.

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-B471 (580-79055-1) and PDI-SG-B472 (580-79055-2).

The following samples were thawed on the evening of 09/18/2018: PDI-SG-B471 (580-79055-1) and PDI-SG-B472 (580-79055-2). These samples were processed within holding time and the h-flags have been removed.

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

METALS (ICPMS)

Sample PDI-SG-B471 (580-79055-1) was analyzed for Metals (ICPMS) in accordance with 6020A_LL. The samples were prepared on 08/23/2018 and analyzed on 08/24/2018.

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

TOTAL MERCURY

Sample PDI-SG-B471 (580-79055-1) was analyzed for total mercury in accordance with EPA SW-846 Method 7471A. The samples were prepared and analyzed on 08/23/2018.

The following sample was prepared outside of preparation holding time due to client requesting analysis after holding time expired: PDII-SG-B471.

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-B471 (580-79055-1) was analyzed for total organic carbon in accordance with EPA SW-846 Method 9060. The samples were analyzed on 09/19/2018.

Total Organic Carbon - Duplicates was detected in method blank MB 580-284391/5 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. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples were not performed.

Sample PDI-SG-B471 (580-79055-1) was preserved by freezing within holding time. The sample was removed from the freezer 9/18/2018. Therefore the sample is in hold and H-flags have been removed.

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

TOTAL SOLIDS @ 70C

Sample PDI-SG-B471 (580-79055-1) was analyzed for Total Solids @ 70C. The samples were analyzed on 09/13/2018.

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.
B	Compound was found in the blank and sample.
F1	MS and/or MSD Recovery is outside acceptance limits.
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
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.
¤	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-B471

Date Collected: 07/21/18 10:45
Date Received: 07/23/18 14:35

Lab Sample ID: 580-79055-1
Matrix: Solid
Percent Solids: 51.7

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylnaphthalene	21	J	90	8.1	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Acenaphthene	14	J	90	11	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Acenaphthylene	13	J	90	9.0	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Anthracene	25	J	90	11	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Benzo[a]anthracene	76	J	90	14	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Benzo[a]pyrene	65	J	90	7.2	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Benzo[b]fluoranthene	100		90	11	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Benzo[g,h,i]perylene	54	J	90	9.0	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Benzo[k]fluoranthene	34	J	90	11	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Chrysene	98		90	27	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Dibenz(a,h)anthracene	ND		90	13	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Fluoranthene	190	B	90	25	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Fluorene	17	J	90	9.0	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Indeno[1,2,3-cd]pyrene	53	J	90	11	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Naphthalene	42	J	90	14	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Phenanthrene	110	B	90	12	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50
Pyrene	180	B	90	17	ug/Kg	☼	09/15/18 16:23	09/19/18 16:47	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14	*119*		*57 - 120*	*09/15/18 16:23*	*09/19/18 16:47*	*50*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND		1400	160	ug/Kg	☼	09/15/18 08:47	09/20/18 02:49	25

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14 (Surr)	*83*		*58 - 120*	*09/15/18 08:47*	*09/20/18 02:49*	*25*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		140	38	ug/Kg	☼	09/15/18 09:00	09/23/18 01:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tripentyltin	*50*		*10 - 113*	*09/15/18 09:00*	*09/23/18 01:28*	*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)	190		88	22	mg/Kg	☼	09/19/18 16:08	09/22/18 15:55	1
Motor Oil (>C24-C36)	720		88	31	mg/Kg	☼	09/19/18 16:08	09/22/18 15:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*111*		*50 - 150*	*09/19/18 16:08*	*09/22/18 15:55*	*1*

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	4.3		0.34	0.068	mg/Kg	☼	08/23/18 17:18	08/24/18 16:08	5
Cadmium	0.21	J	0.27	0.052	mg/Kg	☼	08/23/18 17:18	08/24/18 16:08	5
Copper	35		0.68	0.15	mg/Kg	☼	08/23/18 17:18	08/24/18 16:08	5
Lead	15		0.34	0.032	mg/Kg	☼	08/23/18 17:18	08/24/18 16:08	5
Manganese	750		0.68	0.31	mg/Kg	☼	08/23/18 17:18	08/24/18 16:08	5
Zinc	210		3.4	1.1	mg/Kg	☼	08/23/18 17:18	08/24/18 16:08	5

Client Sample Results

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

TestAmerica Job ID: 580-79055-1

Client Sample ID: PDI-SG-B471
Date Collected: 07/21/18 10:45
Date Received: 07/23/18 14:35

Lab Sample ID: 580-79055-1
Matrix: Solid
Percent Solids: 51.7

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.11	H	0.038	0.011	mg/Kg	☼	08/23/18 10:12	08/23/18 15:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	27000	B	2000	44	mg/Kg			09/19/18 13:36	1
Total Solids @ 70°C	54	H	0.10	0.10	%			09/13/18 02:08	1

Client Sample ID: PDI-SG-B472
Date Collected: 07/21/18 12:20
Date Received: 07/23/18 14:35

Lab Sample ID: 580-79055-2
Matrix: Solid
Percent Solids: 55.4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylnaphthalene	ND		45	4.0	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Acenaphthene	ND		45	5.4	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Acenaphthylene	ND		45	4.5	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Anthracene	**5.4**	**J**	45	5.4	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Benzo[a]anthracene	**27**	**J**	45	6.8	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Benzo[a]pyrene	**24**	**J**	45	3.6	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Benzo[b]fluoranthene	**36**	**J**	45	5.3	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Benzo[g,h,i]perylene	ND		45	4.5	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Benzo[k]fluoranthene	**8.4**	**J**	45	5.4	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Chrysene	ND		45	13	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Dibenz(a,h)anthracene	ND		45	6.5	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Fluoranthene	**40**	**J B**	45	13	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Fluorene	**5.1**	**J**	45	4.5	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Indeno[1,2,3-cd]pyrene	**30**	**J F1**	45	5.4	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Naphthalene	ND		45	7.2	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Phenanthrene	**18**	**J**	45	6.2	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25
Pyrene	**40**	**J**	45	8.7	ug/Kg	☼	10/09/18 16:09	10/11/18 13:56	25

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14	*93*		*57 - 120*	*10/09/18 16:09*	*10/11/18 13:56*	*25*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND	F1	540	64	ug/Kg	☼	09/19/18 17:04	09/21/18 14:04	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14 (Surr)	*116*		*58 - 120*	*09/19/18 17:04*	*09/21/18 14:04*	*10*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		130	33	ug/Kg	☼	09/26/18 09:35	10/09/18 21:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tripentyltin	*16*		*10 - 113*	*09/26/18 09:35*	*10/09/18 21:26*	*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)	**63**	**J**	86	21	mg/Kg	☼	09/19/18 16:08	09/22/18 16:16	1
Motor Oil (>C24-C36)	**300**		86	30	mg/Kg	☼	09/19/18 16:08	09/22/18 16:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*102*		*50 - 150*	*09/19/18 16:08*	*09/22/18 16:16*	*1*

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

Lab Sample ID: MB 580-284043/1-A
Matrix: Solid
Analysis Batch: 284395

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 284043

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	3.89	J	30	3.6	ug/Kg		09/15/18 08:47	09/19/18 17:23	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14 (Surr)	*107*		*58 - 120*	*09/15/18 08:47*	*09/19/18 17:23*	*1*

Lab Sample ID: LCS 580-284043/2-A
Matrix: Solid
Analysis Batch: 284567

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 284043

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bis(2-ethylhexyl) phthalate	50.0	46.4		ug/Kg		93	59 - 123

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Terphenyl-d14 (Surr)	*113*		*58 - 120*

Lab Sample ID: MB 580-284408/1-A
Matrix: Solid
Analysis Batch: 284567

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 284408

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	5.71	J	30	3.6	ug/Kg		09/19/18 17:04	09/21/18 13:15	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14 (Surr)	*129*	*X*	*58 - 120*	*09/19/18 17:04*	*09/21/18 13:15*	*1*

Lab Sample ID: LCS 580-284408/2-A
Matrix: Solid
Analysis Batch: 284567

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 284408

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bis(2-ethylhexyl) phthalate	50.0	48.6		ug/Kg		97	59 - 123

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

Lab Sample ID: 580-79055-2 MS
Matrix: Solid
Analysis Batch: 284567

Client Sample ID: PDI-SG-B472
Prep Type: Total/NA
Prep Batch: 284408

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Bis(2-ethylhexyl) phthalate	ND	F1	88.9	131	J F1	ug/Kg	☼	147	59 - 123

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Terphenyl-d14 (Surr)	*96*		*58 - 120*

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

Lab Sample ID: 580-79055-2 MSD
Matrix: Solid
Analysis Batch: 284567

Client Sample ID: PDI-SG-B472
Prep Type: Total/NA
Prep Batch: 284408

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bis(2-ethylhexyl) phthalate	ND	F1	88.3	128	J F1	ug/Kg	☼	145	59 - 123	2	13

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Terphenyl-d14 (Surr)	*100*		*58 - 120*

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

Lab Sample ID: MB 580-284059/1-A
Matrix: Solid
Analysis Batch: 284623

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 284059

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylnaphthalene	ND		1.0	0.090	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Acenaphthene	ND		1.0	0.12	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Acenaphthylene	ND		1.0	0.10	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Anthracene	ND		1.0	0.12	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Benzo[a]anthracene	ND		1.0	0.15	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Benzo[a]pyrene	ND		1.0	0.080	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Benzo[b]fluoranthene	ND		1.0	0.12	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Benzo[g,h,i]perylene	ND		1.0	0.10	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Benzo[k]fluoranthene	ND		1.0	0.12	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Chrysene	ND		1.0	0.30	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Dibenz(a,h)anthracene	ND		1.0	0.14	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Fluoranthene	0.373	J	1.0	0.28	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Fluorene	ND		1.0	0.10	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Indeno[1,2,3-cd]pyrene	ND		1.0	0.12	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Naphthalene	ND		1.0	0.16	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Phenanthrene	0.734	J	1.0	0.14	ug/Kg		09/15/18 16:23	09/21/18 17:08	1
Pyrene	0.314	J	1.0	0.19	ug/Kg		09/15/18 16:23	09/21/18 17:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14	*91*		*57 - 120*	*09/15/18 16:23*	*09/21/18 17:08*	*1*

Lab Sample ID: LCS 580-284059/2-A
Matrix: Solid
Analysis Batch: 284415

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 284059

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Methylnaphthalene	200	183		ug/Kg		92	68 - 120
Acenaphthene	200	191		ug/Kg		95	68 - 120
Acenaphthylene	200	203		ug/Kg		101	68 - 120
Anthracene	200	180		ug/Kg		90	73 - 125
Benzo[a]anthracene	200	183		ug/Kg		91	66 - 120
Benzo[a]pyrene	200	201		ug/Kg		100	72 - 124
Benzo[b]fluoranthene	200	205		ug/Kg		103	63 - 121
Benzo[g,h,i]perylene	200	206		ug/Kg		103	63 - 120
Benzo[k]fluoranthene	200	212		ug/Kg		106	63 - 123

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

Lab Sample ID: LCS 580-284059/2-A
Matrix: Solid
Analysis Batch: 284415

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 284059

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chrysene	200	210		ug/Kg		105	69 - 120
Dibenz(a,h)anthracene	200	232		ug/Kg		116	70 - 125
Fluoranthene	200	200		ug/Kg		100	74 - 125
Fluorene	200	189		ug/Kg		95	73 - 120
Indeno[1,2,3-cd]pyrene	200	239		ug/Kg		120	65 - 121
Naphthalene	200	177		ug/Kg		89	70 - 120
Phenanthrene	200	189		ug/Kg		94	73 - 120
Pyrene	200	198		ug/Kg		99	70 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Terphenyl-d14	*107*		*57 - 120*

Lab Sample ID: MB 580-286035/1-A
Matrix: Solid
Analysis Batch: 286213

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 286035

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylnaphthalene	ND		1.0	0.090	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Acenaphthene	ND		1.0	0.12	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Acenaphthylene	ND		1.0	0.10	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Anthracene	ND		1.0	0.12	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Benzo[a]anthracene	ND		1.0	0.15	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Benzo[a]pyrene	ND		1.0	0.080	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Benzo[b]fluoranthene	ND		1.0	0.12	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Benzo[g,h,i]perylene	ND		1.0	0.10	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Benzo[k]fluoranthene	ND		1.0	0.12	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Chrysene	ND		1.0	0.30	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Dibenz(a,h)anthracene	ND		1.0	0.14	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Fluoranthene	0.386	J	1.0	0.28	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Fluorene	ND		1.0	0.10	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Indeno[1,2,3-cd]pyrene	ND		1.0	0.12	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Naphthalene	ND		1.0	0.16	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Phenanthrene	ND		1.0	0.14	ug/Kg		10/09/18 16:09	10/11/18 12:14	1
Pyrene	ND		1.0	0.19	ug/Kg		10/09/18 16:09	10/11/18 12:14	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14	*101*		*57 - 120*	*10/09/18 16:09*	*10/11/18 12:14*	*1*

Lab Sample ID: LCS 580-286035/2-A
Matrix: Solid
Analysis Batch: 286213

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 286035

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Methylnaphthalene	200	166		ug/Kg		83	68 - 120
Acenaphthene	200	160		ug/Kg		80	68 - 120
Acenaphthylene	200	157		ug/Kg		79	68 - 120
Anthracene	200	199		ug/Kg		100	73 - 125
Benzo[a]anthracene	200	211		ug/Kg		106	66 - 120

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

Lab Sample ID: LCS 580-286035/2-A
Matrix: Solid
Analysis Batch: 286213

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 286035

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzo[a]pyrene	200	204		ug/Kg		102	72 - 124
Benzo[b]fluoranthene	200	202		ug/Kg		101	63 - 121
Benzo[g,h,i]perylene	200	189		ug/Kg		95	63 - 120
Benzo[k]fluoranthene	200	194		ug/Kg		97	63 - 123
Chrysene	200	189		ug/Kg		95	69 - 120
Dibenz(a,h)anthracene	200	211		ug/Kg		105	70 - 125
Fluoranthene	200	202		ug/Kg		101	74 - 125
Fluorene	200	172		ug/Kg		86	73 - 120
Indeno[1,2,3-cd]pyrene	200	223		ug/Kg		112	65 - 121
Naphthalene	200	157		ug/Kg		78	70 - 120
Phenanthrene	200	181		ug/Kg		91	73 - 120
Pyrene	200	193		ug/Kg		97	70 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Terphenyl-d14	*91*		*57 - 120*

Lab Sample ID: 580-79055-2 MS
Matrix: Solid
Analysis Batch: 286213

Client Sample ID: PDI-SG-B472
Prep Type: Total/NA
Prep Batch: 286035

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Methylnaphthalene	ND		355	302		ug/Kg	☼	85	68 - 120
Acenaphthene	ND		355	321		ug/Kg	☼	90	68 - 120
Acenaphthylene	ND		355	312		ug/Kg	☼	88	68 - 120
Anthracene	5.4	J	355	386		ug/Kg	☼	107	73 - 125
Benzo[a]anthracene	27	J	355	391		ug/Kg	☼	103	66 - 120
Benzo[a]pyrene	24	J	355	356		ug/Kg	☼	94	72 - 124
Benzo[b]fluoranthene	36	J	355	359		ug/Kg	☼	91	63 - 121
Benzo[g,h,i]perylene	ND		355	320		ug/Kg	☼	90	63 - 120
Benzo[k]fluoranthene	8.4	J	355	322		ug/Kg	☼	88	63 - 123
Chrysene	ND		355	341		ug/Kg	☼	96	69 - 120
Dibenz(a,h)anthracene	ND		355	408		ug/Kg	☼	115	70 - 125
Fluoranthene	40	J B	355	407		ug/Kg	☼	103	74 - 125
Fluorene	5.1	J	355	351		ug/Kg	☼	97	73 - 120
Indeno[1,2,3-cd]pyrene	30	J F1	355	482	F1	ug/Kg	☼	127	65 - 121
Naphthalene	ND		355	272		ug/Kg	☼	77	70 - 120
Phenanthrene	18	J	355	375		ug/Kg	☼	101	73 - 120
Pyrene	40	J	355	404		ug/Kg	☼	103	70 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Terphenyl-d14	*95*		*57 - 120*

Lab Sample ID: 580-79055-2 MSD
Matrix: Solid
Analysis Batch: 286213

Client Sample ID: PDI-SG-B472
Prep Type: Total/NA
Prep Batch: 286035

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Methylnaphthalene	ND		351	288		ug/Kg	☼	82	68 - 120	5	12

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

Lab Sample ID: 580-79055-2 MSD
Matrix: Solid
Analysis Batch: 286213

Client Sample ID: PDI-SG-B472
Prep Type: Total/NA
Prep Batch: 286035

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acenaphthene	ND		351	301		ug/Kg	☼	86	68 - 120	6	12
Acenaphthylene	ND		351	290		ug/Kg	☼	83	68 - 120	7	12
Anthracene	5.4	J	351	355		ug/Kg	☼	100	73 - 125	8	12
Benzo[a]anthracene	27	J	351	381		ug/Kg	☼	101	66 - 120	3	14
Benzo[a]pyrene	24	J	351	341		ug/Kg	☼	90	72 - 124	4	12
Benzo[b]fluoranthene	36	J	351	343		ug/Kg	☼	87	63 - 121	5	10
Benzo[g,h,i]perylene	ND		351	307		ug/Kg	☼	87	63 - 120	4	14
Benzo[k]fluoranthene	8.4	J	351	300		ug/Kg	☼	83	63 - 123	7	15
Chrysene	ND		351	327		ug/Kg	☼	93	69 - 120	4	10
Dibenz(a,h)anthracene	ND		351	366		ug/Kg	☼	104	70 - 125	11	13
Fluoranthene	40	J B	351	411		ug/Kg	☼	106	74 - 125	1	13
Fluorene	5.1	J	351	324		ug/Kg	☼	91	73 - 120	8	13
Indeno[1,2,3-cd]pyrene	30	J F1	351	458	F1	ug/Kg	☼	122	65 - 121	5	15
Naphthalene	ND		351	280		ug/Kg	☼	80	70 - 120	3	12
Phenanthrene	18	J	351	360		ug/Kg	☼	97	73 - 120	4	11
Pyrene	40	J	351	404		ug/Kg	☼	104	70 - 120	0	12

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Terphenyl-d14	*89*		*57 - 120*

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

Lab Sample ID: MB 580-284045/1-A
Matrix: Solid
Analysis Batch: 284676

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 284045

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		75	20	ug/Kg		09/15/18 09:00	09/22/18 18:04	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tripentyltin	*52*		*10 - 113*	*09/15/18 09:00*	*09/22/18 18:04*	*1*

Lab Sample ID: LCS 580-284045/2-A
Matrix: Solid
Analysis Batch: 284676

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 284045

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Tributyltin			71.8	46.9	J	ug/Kg		65	14 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tripentyltin	*64*		*10 - 113*

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

Lab Sample ID: MB 580-284918/1-A
Matrix: Solid
Analysis Batch: 285981

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 284918

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		75	20	ug/Kg		09/26/18 09:35	10/09/18 16:44	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tripentyltin	*54*		*10 - 113*	*09/26/18 09:35*	*10/09/18 16:44*	*1*

Lab Sample ID: LCS 580-284918/2-A
Matrix: Solid
Analysis Batch: 285981

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 284918

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Tributyltin	178	95.2		ug/Kg		53	14 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tripentyltin	*52*		*10 - 113*

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

Lab Sample ID: MB 580-284396/1-A
Matrix: Solid
Analysis Batch: 284670

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 284396

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		50	12	mg/Kg		09/19/18 16:08	09/22/18 14:52	1
Motor Oil (>C24-C36)	ND		50	18	mg/Kg		09/19/18 16:08	09/22/18 14:52	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*104*		*50 - 150*	*09/19/18 16:08*	*09/22/18 14:52*	*1*

Lab Sample ID: LCS 580-284396/2-A
Matrix: Solid
Analysis Batch: 284670

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 284396

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
#2 Diesel (C10-C24)	500	471		mg/Kg		94	70 - 125
Motor Oil (>C24-C36)	500	484		mg/Kg		97	70 - 129

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*97*		*50 - 150*

Lab Sample ID: LCSD 580-284396/3-A
Matrix: Solid
Analysis Batch: 284670

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 284396

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
#2 Diesel (C10-C24)	500	476		mg/Kg		95	70 - 125	1	16
Motor Oil (>C24-C36)	500	495		mg/Kg		99	70 - 129	2	16

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

Lab Sample ID: LCSD 580-284396/3-A
Matrix: Solid
Analysis Batch: 284670

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 284396

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
o-Terphenyl	*96*		*50 - 150*

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 580-282341/22-A
Matrix: Solid
Analysis Batch: 282750

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 282341

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.25	0.050	mg/Kg		08/23/18 17:18	08/24/18 14:19	5
Cadmium	ND		0.20	0.039	mg/Kg		08/23/18 17:18	08/24/18 14:19	5
Copper	ND		0.50	0.11	mg/Kg		08/23/18 17:18	08/24/18 14:19	5
Lead	ND		0.25	0.024	mg/Kg		08/23/18 17:18	08/24/18 14:19	5
Manganese	ND		0.50	0.23	mg/Kg		08/23/18 17:18	08/24/18 14:19	5
Zinc	ND		2.5	0.81	mg/Kg		08/23/18 17:18	08/24/18 14:19	5

Lab Sample ID: LCS 580-282341/23-A
Matrix: Solid
Analysis Batch: 282750

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 282341

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	200	199		mg/Kg		100	80 - 120
Cadmium	5.00	5.21		mg/Kg		104	80 - 120
Copper	25.0	25.2		mg/Kg		101	80 - 120
Lead	50.0	47.6		mg/Kg		95	80 - 120
Manganese	50.0	48.5		mg/Kg		97	80 - 120
Zinc	200	195		mg/Kg		98	80 - 120

Lab Sample ID: LCSD 580-282341/24-A
Matrix: Solid
Analysis Batch: 282750

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 282341

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	200	196		mg/Kg		98	80 - 120	1	20
Cadmium	5.00	5.18		mg/Kg		104	80 - 120	1	20
Copper	25.0	24.8		mg/Kg		99	80 - 120	2	20
Lead	50.0	47.4		mg/Kg		95	80 - 120	1	20
Manganese	50.0	47.7		mg/Kg		95	80 - 120	2	20
Zinc	200	195		mg/Kg		97	80 - 120	0	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 580-282266/22-A
Matrix: Solid
Analysis Batch: 282350

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 282266

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.030	0.0090	mg/Kg		08/23/18 10:12	08/23/18 14:23	1

Method: 7471A - Mercury (CVAA) (Continued)

Lab Sample ID: LCS 580-282266/23-A
Matrix: Solid
Analysis Batch: 282350

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 282266

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.167	0.163		mg/Kg		98	80 - 120

Lab Sample ID: LCSD 580-282266/24-A
Matrix: Solid
Analysis Batch: 282350

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 282266

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.167	0.160		mg/Kg		96	80 - 120	2	20

Method: 9060_PSEP - TOC (Puget Sound)

Lab Sample ID: MB 580-284391/5
Matrix: Solid
Analysis Batch: 284391

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	119	J	2000	44	mg/Kg			09/19/18 12:31	1

Lab Sample ID: LCS 580-284391/6
Matrix: Solid
Analysis Batch: 284391

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	4310		mg/Kg		101	68 - 149

Lab Sample ID: LCSD 580-284391/7
Matrix: Solid
Analysis Batch: 284391

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	3680		mg/Kg		86	68 - 149	16	32

Method: Moisture 70C - Percent Moisture, 70 C

Lab Sample ID: 580-79055-1 DU
Matrix: Solid
Analysis Batch: 283855

Client Sample ID: PDI-SG-B471
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Solids @ 70°C	54	H	54		%		0.5	20

Lab Chronicle

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

TestAmerica Job ID: 580-79055-1

Client Sample ID: PDI-SG-B471
Date Collected: 07/21/18 10:45
Date Received: 07/23/18 14:35

Lab Sample ID: 580-79055-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9060_PSEP		1	284391	09/19/18 13:36	TTN	TAL SEA
Total/NA	Analysis	Moisture 70C		1	283855	09/13/18 02:08	HJM	TAL SEA

Client Sample ID: PDI-SG-B471
Date Collected: 07/21/18 10:45
Date Received: 07/23/18 14:35

Lab Sample ID: 580-79055-1
Matrix: Solid
Percent Solids: 51.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550B			284043	09/15/18 08:47	DB	TAL SEA
Total/NA	Analysis	8270D		25	284395	09/20/18 02:49	ERZ	TAL SEA
Total/NA	Prep	3546			284059	09/15/18 16:23	DB	TAL SEA
Total/NA	Analysis	8270D SIM		50	284415	09/19/18 16:47	CJ	TAL SEA
Total/NA	Prep	Organotin Prep			284045	09/15/18 09:00	KMS	TAL SEA
Total/NA	Analysis	Organotins		1	284676	09/23/18 01:28	ERZ	TAL SEA
Total/NA	Prep	3546			284396	09/19/18 16:08	SPS	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	284670	09/22/18 15:55	JCM	TAL SEA
Total/NA	Prep	3050B			282341	08/23/18 17:18	T1H	TAL SEA
Total/NA	Analysis	6020B		5	282750	08/24/18 16:08	FCW	TAL SEA
Total/NA	Prep	7471A			282266	08/23/18 10:12	T1H	TAL SEA
Total/NA	Analysis	7471A		1	282350	08/23/18 15:04	FCW	TAL SEA

Client Sample ID: PDI-SG-B472
Date Collected: 07/21/18 12:20
Date Received: 07/23/18 14:35

Lab Sample ID: 580-79055-2
Matrix: Solid
Percent Solids: 55.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550B			284408	09/19/18 17:04	SPS	TAL SEA
Total/NA	Analysis	8270D		10	284567	09/21/18 14:04	ERZ	TAL SEA
Total/NA	Prep	3546			286035	10/09/18 16:09	BAH	TAL SEA
Total/NA	Analysis	8270D SIM		25	286213	10/11/18 13:56	ADB	TAL SEA
Total/NA	Prep	Organotin Prep			284918	09/26/18 09:35	APR	TAL SEA
Total/NA	Analysis	Organotins		1	285981	10/09/18 21:26	ERZ	TAL SEA
Total/NA	Prep	3546			284396	09/19/18 16:08	SPS	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	284670	09/22/18 16:16	JCM	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: 580-79055-1
Project/Site: Portland Harbor Pre-Remedial Design

Laboratory: TestAmerica Seattle

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-024	01-19-19
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	11-05-18
Montana (UST)	State Program	8	N/A	04-30-20
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: 580-79055-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-79055-1	PDI-SG-B471	Solid	07/21/18 10:45	07/23/18 14:35
580-79055-2	PDI-SG-B472	Solid	07/21/18 12:20	07/23/18 14:35

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
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_____	7/23/2018 Carrier: Courier

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	Atterberg Limits ASTM D4318	Sample Specific Notes:
PDI-SG-B471	7/21/2018	10:45	SS		ED	7		H	H	H	x	H	H	H		
PDI-SG-B472	7/21/2018	12:20	SS		ED	7		H	H	H	x	H	H	H	H	

580-79055 Chain of Custody

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

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

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

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

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

7.06, 5.03

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Michael Mg	AECOM	7-23-18 1410	Jessica Mg	M-E-	7/23/18 1410
Jessica Mg	M-E-	7/23/18 1435	[illegible]	TAPOR	7/23/18 1435

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) 436-2010 Analysis Turnaround Time Calendar (C) or Work Days (W) ☐ 21 days ☒ Other ASAP	Site Contact: Jennifer Ray Laboratory Contact: Elaine-Walker	Carrier: Courier 7/23/2018	COC No: 1 1 of 1 pages

Client Contact	Sample Type	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, Tributylin, 8270-SIM, 8270-LL, Kronfl/unger	Atterberg Limits ASTM D4318	Sample Specific Notes:
AECOM 1111 3rd Ave Suite 1600 Seattle, WA 98101 Phone: (206) 438-2700 Fax: 1+(866) 495-5288	D/U	PDI-SG-B471	7/21/2018	10:45	SS		ED	7		H	H	H	x	H	H	H		
Project Name: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling Portland, OR Project #: 60566335 Study: Surface Sediment		PDI-SG-B472	7/21/2018	12:20	SS		ED	7		H	H	H	x	H	H	H	H	

580-79055 Chain of Custody

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

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

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

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

Special Instructions/QC Requirements & Comments:

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

Separate reports for each lab.

7.66, 5.3

	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by: Michael Mc	AECOM	7-23-18 1410	Received by: Jessica Mc	M-E-	7/23/18 1410
Relinquished by: Jessica Mc	M-E-	7/23/18 1435	Received by: D Rogers	TAPOR	7/23/18 1435
Relinquished by: D Rogers	TAPOR	7/23/18 1700	Received by: B. Hill	SEA TT	7/24/18 0950

IRS = 1.1/1.1 W/C.S

Revised

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: Andy Dahl / Chelsey Cook Tel: (206) 438-2261 / (206) 431-2010
Client Contact: AECOM 1111 3rd Ave Suite 1600 Seattle, WA 98101 Phone: (206) 438-2700 Fax: 1+(866) 495-5288	Analysis Turnaround Time Calendar (C) or Work Days (W) ☐ 21 days ☒ Other ASAP
Project Name: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling Portland, OR Project #: 60566335 Study: Surface Sediment Sample Type: D/U	File Contact: Jennifer Ray Laboratory Contact: Elaine-Walker Carrier: Courier 7/23/2018
	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, SEHP, Tributyltin, 8270-SIM, 8270-LL, Kreal/Unger	Attering Limits ASTM D4318	Sample Specific Notes:
PDI-SG-B471	7/21/2018	10:45	SS		ED	7		H	H	H	x	H	H	H	(H)	— Per Aecom Added on Hold 7/24/18 EWD
PDI-SG-B472	7/21/2018	12:20	SS		ED	7		H	H	H	x	H	H	H	H	

580-79055 Chain of Custody

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

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

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

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

Special Instructions/QC Requirements & Comments:

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

Separate reports for each lab.

7de, 5.3

	Company	Date/Time		Company	Date/Time
Relinquished by: Michael Hall	AECOM	7-23-18 1410	Received by: Jessica Nye	M-E-	7/23/18 1410
Relinquished by: Jessica Nye	M-E-	7/23/18 1435	Received by: Dan Regan	TAPOR	7/23/18 1435
Relinquished by: Dan Regan	TAPOR	7/23/18 1700	Received by: B. Hall	SRM TA	7/24/18 0950

DL5 = 1.1/1.1 W/C.S

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-79055-1

Login Number: 79055
List Number: 1
Creator: Antonson, Angeline D

List Source: TestAmerica Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	