

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

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TestAmerica Job ID: 580-80635-2

Client Project/Site: Portland Harbor Pre-Remedial Design

For:

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Authorized for release by:
10/15/2018 2:08:19 PM

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Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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

TestAmerica Job ID: 580-80635-2

Job ID: 580-80635-2

Laboratory: TestAmerica Seattle

Narrative

CASE NARRATIVE

Client: AECOM

Project: Portland Harbor Pre-Remedial Design

Report Number: 580-80635-2

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

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

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

This report contains results for 1613B Dioxins / Furans, performed at TestAmerica Sacramento.

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).

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.

DIOXIN/ FURAN

Samples PDI-SG-B436 (580-80635-1) and PDI-SG-B481 (580-80635-4) were analyzed for Dioxin/ Furan in accordance with 1613B. The samples were prepared on 10/11/2018 and analyzed on 10/13/2018.

Several analytes were detected in method blank MB 320-251492/1-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. Refer to the QC report for details.

EPA Method 1613B specifies a +/- 15 second retention time difference between the recovery standard in the initial calibration (ICAL) and the continuing calibration verification (CCV). The 13C-1,2,3,4-TCDD and 13C-1,2,3,7,8,9-HxCDD associated with the following samples run on instrument 10D5 exceeded this criteria: PDI-SG-B436 (580-80635-1), PDI-SG-B481 (580-80635-4), (CCV 320-251909/30), (LCS 320-251492/2-A), (LCSD 320-251492/3-A) and (MB 320-251492/1-A). This retention time shift is due to normal and reasonable column maintenance and does not affect the instrument chromatography resolution, sensitivity, or identification of target analytes. System retention times have been updated for proper analyte identification.

Due to the matrix, the initial volumes used for the following samples deviated from the standard procedure: PDI-SG-B436 (580-80635-1) and PDI-SG-B481 (580-80635-4). The reporting limits (RLs) have been adjusted proportionately. Samples are associated with preparation batch 320-251492.

Case Narrative

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

TestAmerica Job ID: 580-80635-2

Job ID: 580-80635-2 (Continued)

Laboratory: TestAmerica Seattle (Continued)

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

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Definitions/Glossary

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

TestAmerica Job ID: 580-80635-2

Qualifiers

Dioxin

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
q	The reported result is the estimated maximum possible concentration of this analyte, quantitated using the theoretical ion ratio. The measured ion ratio does not meet qualitative identification criteria and indicates a possible interference.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

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

TestAmerica Job ID: 580-80635-2

Client Sample ID: PDI-SG-B436

Lab Sample ID: 580-80635-1

Date Collected: 08/16/18 11:40

Matrix: Solid

Date Received: 09/27/18 12:55

Percent Solids: 53.0

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,3,4,6,7,8-HpCDD	0.055	B	0.0047	0.00033	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
1,2,3,4,6,7,8-HpCDF	0.012	B q	0.0047	0.00021	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
1,2,3,4,7,8,9-HpCDF	0.0012	J B	0.0047	0.00024	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
1,2,3,4,7,8-HxCDD	0.00070	J B	0.0047	0.000041	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
1,2,3,4,7,8-HxCDF	0.0043	J	0.0047	0.00012	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
1,2,3,6,7,8-HxCDD	0.0025	J B	0.0047	0.000040	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
1,2,3,6,7,8-HxCDF	0.0010	J B	0.0047	0.00011	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
1,2,3,7,8,9-HxCDD	0.0017	J B	0.0047	0.000038	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
1,2,3,7,8,9-HxCDF	0.00021	J B	0.0047	0.000070	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
1,2,3,7,8-PeCDD	0.00033	J B q	0.0047	0.000070	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
1,2,3,7,8-PeCDF	0.00031	J B	0.0047	0.000078	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
2,3,4,6,7,8-HxCDF	0.00059	J	0.0047	0.000075	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
2,3,4,7,8-PeCDF	0.00072	J B	0.0047	0.000087	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
2,3,7,8-TCDD	0.00021	J q	0.00093	0.000035	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
2,3,7,8-TCDF	0.00075	J B	0.00093	0.000039	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
OCDD	0.50	B	0.0093	0.00021	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1
OCDF	0.029	B	0.0093	0.000039	ug/Kg	☼	10/11/18 13:38	10/13/18 15:50	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-1,2,3,4,6,7,8-HpCDD	60		23 - 140	10/11/18 13:38	10/13/18 15:50	1
13C-1,2,3,4,6,7,8-HpCDF	48		28 - 143	10/11/18 13:38	10/13/18 15:50	1
13C-1,2,3,4,7,8,9-HpCDF	56		26 - 138	10/11/18 13:38	10/13/18 15:50	1
13C-1,2,3,4,7,8-HxCDD	62		32 - 141	10/11/18 13:38	10/13/18 15:50	1
13C-1,2,3,4,7,8-HxCDF	58		26 - 152	10/11/18 13:38	10/13/18 15:50	1
13C-1,2,3,6,7,8-HxCDD	61		28 - 130	10/11/18 13:38	10/13/18 15:50	1
13C-1,2,3,6,7,8-HxCDF	59		26 - 123	10/11/18 13:38	10/13/18 15:50	1
13C-1,2,3,7,8,9-HxCDF	66		29 - 147	10/11/18 13:38	10/13/18 15:50	1
13C-1,2,3,7,8-PeCDD	65		25 - 181	10/11/18 13:38	10/13/18 15:50	1
13C-1,2,3,7,8-PeCDF	64		24 - 185	10/11/18 13:38	10/13/18 15:50	1
13C-2,3,4,6,7,8-HxCDF	60		28 - 136	10/11/18 13:38	10/13/18 15:50	1
13C-2,3,4,7,8-PeCDF	63		21 - 178	10/11/18 13:38	10/13/18 15:50	1
13C-2,3,7,8-TCDD	69		25 - 164	10/11/18 13:38	10/13/18 15:50	1
13C-2,3,7,8-TCDF	67		24 - 169	10/11/18 13:38	10/13/18 15:50	1
13C-OCDD	57		17 - 157	10/11/18 13:38	10/13/18 15:50	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	94		35 - 197	10/11/18 13:38	10/13/18 15:50	1

Client Sample Results

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

TestAmerica Job ID: 580-80635-2

Client Sample ID: PDI-SG-B481

Lab Sample ID: 580-80635-4

Date Collected: 07/27/18 13:30

Matrix: Solid

Date Received: 09/27/18 12:55

Percent Solids: 55.1

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,3,4,6,7,8-HpCDD	0.041	B	0.0044	0.00026	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
1,2,3,4,6,7,8-HpCDF	0.0089	q B	0.0044	0.00018	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
1,2,3,4,7,8,9-HpCDF	0.00055	J B	0.0044	0.00020	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
1,2,3,4,7,8-HxCDD	0.00089	J B	0.0044	0.000048	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
1,2,3,4,7,8-HxCDF	0.0016	J	0.0044	0.00010	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
1,2,3,6,7,8-HxCDD	0.0021	J B	0.0044	0.000046	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
1,2,3,6,7,8-HxCDF	0.00076	J B	0.0044	0.000094	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
1,2,3,7,8,9-HxCDD	0.0022	J B	0.0044	0.000044	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
1,2,3,7,8,9-HxCDF	0.00012	J B	0.0044	0.000064	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
1,2,3,7,8-PeCDD	0.00060	J B	0.0044	0.000059	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
1,2,3,7,8-PeCDF	0.00063	J B	0.0044	0.000062	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
2,3,4,6,7,8-HxCDF	0.00075	J	0.0044	0.000070	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
2,3,4,7,8-PeCDF	0.00097	J B	0.0044	0.000067	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
2,3,7,8-TCDD	0.00014	J q	0.00089	0.000031	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
OCDD	0.30	B	0.0089	0.00015	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1
OCDF	0.031	B	0.0089	0.000040	ug/Kg	☼	10/11/18 13:38	10/13/18 16:36	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-1,2,3,4,6,7,8-HpCDD	64		23 - 140	10/11/18 13:38	10/13/18 16:36	1
13C-1,2,3,4,6,7,8-HpCDF	53		28 - 143	10/11/18 13:38	10/13/18 16:36	1
13C-1,2,3,4,7,8,9-HpCDF	63		26 - 138	10/11/18 13:38	10/13/18 16:36	1
13C-1,2,3,4,7,8-HxCDD	64		32 - 141	10/11/18 13:38	10/13/18 16:36	1
13C-1,2,3,4,7,8-HxCDF	62		26 - 152	10/11/18 13:38	10/13/18 16:36	1
13C-1,2,3,6,7,8-HxCDD	64		28 - 130	10/11/18 13:38	10/13/18 16:36	1
13C-1,2,3,6,7,8-HxCDF	62		26 - 123	10/11/18 13:38	10/13/18 16:36	1
13C-1,2,3,7,8,9-HxCDF	71		29 - 147	10/11/18 13:38	10/13/18 16:36	1
13C-1,2,3,7,8-PeCDD	68		25 - 181	10/11/18 13:38	10/13/18 16:36	1
13C-1,2,3,7,8-PeCDF	67		24 - 185	10/11/18 13:38	10/13/18 16:36	1
13C-2,3,4,6,7,8-HxCDF	63		28 - 136	10/11/18 13:38	10/13/18 16:36	1
13C-2,3,4,7,8-PeCDF	68		21 - 178	10/11/18 13:38	10/13/18 16:36	1
13C-2,3,7,8-TCDD	72		25 - 164	10/11/18 13:38	10/13/18 16:36	1
13C-OCDD	59		17 - 157	10/11/18 13:38	10/13/18 16:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	99		35 - 197	10/11/18 13:38	10/13/18 16:36	1

Method: 1613B - Dioxins and Furans (HRGC/HRMS) - RA

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF	0.00098	B	0.00089	0.000080	ug/Kg	☼	10/11/18 13:38	10/13/18 00:12	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDF	69		24 - 169	10/11/18 13:38	10/13/18 00:12	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	70		35 - 197	10/11/18 13:38	10/13/18 00:12	1

QC Sample Results

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

TestAmerica Job ID: 580-80635-2

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Lab Sample ID: MB 320-251492/1-A
Matrix: Solid
Analysis Batch: 251909

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 251492

Analyte	MB Result	MB Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,3,4,6,7,8-HpCDD	0.000140	J	0.0050	0.000015	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
1,2,3,4,6,7,8-HpCDF	0.000101	J q	0.0050	0.000020	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
1,2,3,4,7,8,9-HpCDF	0.000121	J q	0.0050	0.000029	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
1,2,3,4,7,8-HxCDD	0.000118	J q	0.0050	0.000016	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
1,2,3,4,7,8-HxCDF	ND		0.0050	0.000025	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
1,2,3,6,7,8-HxCDD	0.0000595	J	0.0050	0.000015	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
1,2,3,6,7,8-HxCDF	0.0000354	J	0.0050	0.000022	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
1,2,3,7,8,9-HxCDD	0.0000758	J	0.0050	0.000015	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
1,2,3,7,8,9-HxCDF	0.000135	J	0.0050	0.000017	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
1,2,3,7,8-PeCDD	0.0000284	J	0.0050	0.000025	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
1,2,3,7,8-PeCDF	0.0000538	J	0.0050	0.000018	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
2,3,4,6,7,8-HxCDF	ND		0.0050	0.000016	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
2,3,4,7,8-PeCDF	0.0000536	J	0.0050	0.000020	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
2,3,7,8-TCDD	ND		0.0010	0.000026	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
2,3,7,8-TCDF	0.000512	J	0.0010	0.000015	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
OCDD	0.000862	J	0.010	0.000021	ug/Kg		10/11/18 13:38	10/13/18 13:32	1
OCDF	0.000332	J	0.010	0.000031	ug/Kg		10/11/18 13:38	10/13/18 13:32	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-1,2,3,4,6,7,8-HpCDD	78		23 - 140	10/11/18 13:38	10/13/18 13:32	1
13C-1,2,3,4,6,7,8-HpCDF	75		28 - 143	10/11/18 13:38	10/13/18 13:32	1
13C-1,2,3,4,7,8,9-HpCDF	75		26 - 138	10/11/18 13:38	10/13/18 13:32	1
13C-1,2,3,4,7,8-HxCDD	70		32 - 141	10/11/18 13:38	10/13/18 13:32	1
13C-1,2,3,4,7,8-HxCDF	68		26 - 152	10/11/18 13:38	10/13/18 13:32	1
13C-1,2,3,6,7,8-HxCDD	77		28 - 130	10/11/18 13:38	10/13/18 13:32	1
13C-1,2,3,6,7,8-HxCDF	72		26 - 123	10/11/18 13:38	10/13/18 13:32	1
13C-1,2,3,7,8,9-HxCDF	75		29 - 147	10/11/18 13:38	10/13/18 13:32	1
13C-1,2,3,7,8-PeCDD	71		25 - 181	10/11/18 13:38	10/13/18 13:32	1
13C-1,2,3,7,8-PeCDF	68		24 - 185	10/11/18 13:38	10/13/18 13:32	1
13C-2,3,4,6,7,8-HxCDF	69		28 - 136	10/11/18 13:38	10/13/18 13:32	1
13C-2,3,4,7,8-PeCDF	69		21 - 178	10/11/18 13:38	10/13/18 13:32	1
13C-2,3,7,8-TCDD	72		25 - 164	10/11/18 13:38	10/13/18 13:32	1
13C-2,3,7,8-TCDF	69		24 - 169	10/11/18 13:38	10/13/18 13:32	1
13C-OCDD	76		17 - 157	10/11/18 13:38	10/13/18 13:32	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	92		35 - 197	10/11/18 13:38	10/13/18 13:32	1

Lab Sample ID: LCS 320-251492/2-A
Matrix: Solid
Analysis Batch: 251909

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 251492

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
1,2,3,4,6,7,8-HpCDD	0.100	0.0990		ug/Kg		99	70 - 140
1,2,3,4,6,7,8-HpCDF	0.100	0.0997		ug/Kg		100	82 - 122
1,2,3,4,7,8,9-HpCDF	0.100	0.100		ug/Kg		100	78 - 138
1,2,3,4,7,8-HxCDD	0.100	0.0987		ug/Kg		99	70 - 164
1,2,3,4,7,8-HxCDF	0.100	0.0985		ug/Kg		98	72 - 134

TestAmerica Seattle

QC Sample Results

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

TestAmerica Job ID: 580-80635-2

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: LCS 320-251492/2-A
Matrix: Solid
Analysis Batch: 251909

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 251492

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
1,2,3,6,7,8-HxCDD	0.100	0.101		ug/Kg		101	76 - 134
1,2,3,6,7,8-HxCDF	0.100	0.0989		ug/Kg		99	84 - 130
1,2,3,7,8,9-HxCDD	0.100	0.103		ug/Kg		103	64 - 162
1,2,3,7,8,9-HxCDF	0.100	0.103		ug/Kg		103	78 - 130
1,2,3,7,8-PeCDD	0.100	0.0998		ug/Kg		100	70 - 142
1,2,3,7,8-PeCDF	0.100	0.0997		ug/Kg		100	80 - 134
2,3,4,6,7,8-HxCDF	0.100	0.0979		ug/Kg		98	70 - 156
2,3,4,7,8-PeCDF	0.100	0.100		ug/Kg		100	68 - 160
2,3,7,8-TCDD	0.0200	0.0195		ug/Kg		98	67 - 158
2,3,7,8-TCDF	0.0200	0.0198		ug/Kg		99	75 - 158
OCDD	0.200	0.199		ug/Kg		99	78 - 144
OCDF	0.200	0.195		ug/Kg		97	63 - 170

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
13C-1,2,3,4,6,7,8-HpCDD	79		26 - 166
13C-1,2,3,4,6,7,8-HpCDF	75		21 - 158
13C-1,2,3,4,7,8,9-HpCDF	77		20 - 186
13C-1,2,3,4,7,8-HxCDD	72		21 - 193
13C-1,2,3,4,7,8-HxCDF	71		19 - 202
13C-1,2,3,6,7,8-HxCDD	76		25 - 163
13C-1,2,3,6,7,8-HxCDF	71		21 - 159
13C-1,2,3,7,8,9-HxCDF	77		17 - 205
13C-1,2,3,7,8-PeCDD	74		21 - 227
13C-1,2,3,7,8-PeCDF	73		21 - 192
13C-2,3,4,6,7,8-HxCDF	72		22 - 176
13C-2,3,4,7,8-PeCDF	72		13 - 328
13C-2,3,7,8-TCDD	74		20 - 175
13C-2,3,7,8-TCDF	73		22 - 152
13C-OCDD	77		13 - 199

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
37Cl4-2,3,7,8-TCDD	92		31 - 191

Lab Sample ID: LCSD 320-251492/3-A
Matrix: Solid
Analysis Batch: 251909

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 251492

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec.		RPD
							Limits	RPD	
1,2,3,4,6,7,8-HpCDD	0.100	0.102		ug/Kg		102	70 - 140	3	50
1,2,3,4,6,7,8-HpCDF	0.100	0.101		ug/Kg		101	82 - 122	2	50
1,2,3,4,7,8,9-HpCDF	0.100	0.101		ug/Kg		101	78 - 138	0	50
1,2,3,4,7,8-HxCDD	0.100	0.0989		ug/Kg		99	70 - 164	0	50
1,2,3,4,7,8-HxCDF	0.100	0.0999		ug/Kg		100	72 - 134	1	50
1,2,3,6,7,8-HxCDD	0.100	0.103		ug/Kg		103	76 - 134	2	50
1,2,3,6,7,8-HxCDF	0.100	0.100		ug/Kg		100	84 - 130	1	50
1,2,3,7,8,9-HxCDD	0.100	0.103		ug/Kg		103	64 - 162	0	50
1,2,3,7,8,9-HxCDF	0.100	0.104		ug/Kg		104	78 - 130	1	50
1,2,3,7,8-PeCDD	0.100	0.100		ug/Kg		100	70 - 142	1	50

TestAmerica Seattle

QC Sample Results

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

TestAmerica Job ID: 580-80635-2

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: LCSD 320-251492/3-A
Matrix: Solid
Analysis Batch: 251909

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 251492

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,3,7,8-PeCDF	0.100	0.102		ug/Kg		102	80 - 134	2	50
2,3,4,6,7,8-HxCDF	0.100	0.0999		ug/Kg		100	70 - 156	2	50
2,3,4,7,8-PeCDF	0.100	0.100		ug/Kg		100	68 - 160	0	50
2,3,7,8-TCDD	0.0200	0.0196		ug/Kg		98	67 - 158	0	50
2,3,7,8-TCDF	0.0200	0.0201		ug/Kg		100	75 - 158	1	50
OCDD	0.200	0.201		ug/Kg		101	78 - 144	1	50
OCDF	0.200	0.195		ug/Kg		97	63 - 170	0	50

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C-1,2,3,4,6,7,8-HpCDD	82		26 - 166
13C-1,2,3,4,6,7,8-HpCDF	77		21 - 158
13C-1,2,3,4,7,8,9-HpCDF	81		20 - 186
13C-1,2,3,4,7,8-HxCDD	75		21 - 193
13C-1,2,3,4,7,8-HxCDF	72		19 - 202
13C-1,2,3,6,7,8-HxCDD	76		25 - 163
13C-1,2,3,6,7,8-HxCDF	73		21 - 159
13C-1,2,3,7,8,9-HxCDF	79		17 - 205
13C-1,2,3,7,8-PeCDD	74		21 - 227
13C-1,2,3,7,8-PeCDF	73		21 - 192
13C-2,3,4,6,7,8-HxCDF	73		22 - 176
13C-2,3,4,7,8-PeCDF	73		13 - 328
13C-2,3,7,8-TCDD	75		20 - 175
13C-2,3,7,8-TCDF	72		22 - 152
13C-OCDD	83		13 - 199

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
37Cl4-2,3,7,8-TCDD	94		31 - 191

Lab Chronicle

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

TestAmerica Job ID: 580-80635-2

Client Sample ID: PDI-SG-B436

Date Collected: 08/16/18 11:40

Date Received: 09/27/18 12:55

Lab Sample ID: 580-80635-1

Matrix: Solid

Percent Solids: 53.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	HRMS-Sox			251492	10/11/18 13:38	SR1	TAL SAC
Total/NA	Analysis	1613B		1	251909	10/13/18 15:50	ALM	TAL SAC

Client Sample ID: PDI-SG-B481

Date Collected: 07/27/18 13:30

Date Received: 09/27/18 12:55

Lab Sample ID: 580-80635-4

Matrix: Solid

Percent Solids: 55.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	HRMS-Sox			251492	10/11/18 13:38	SR1	TAL SAC
Total/NA	Analysis	1613B		1	251909	10/13/18 16:36	ALM	TAL SAC
Total/NA	Prep	HRMS-Sox	RA		251492	10/11/18 13:38	SR1	TAL SAC
Total/NA	Analysis	1613B	RA	1	252094	10/13/18 00:12	ALM	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: AECOM

TestAmerica Job ID: 580-80635-2

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

Laboratory: TestAmerica Sacramento

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	17-020	01-20-21
ANAB	DoD ELAP		L2468	01-20-21
Arizona	State Program	9	AZ0708	08-11-19
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-19
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-19
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-19
Kansas	NELAP	7	E-10375	10-31-18 *
Louisiana	NELAP	6	30612	06-30-19
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-19
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	03-31-19
Oregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-19
Texas	NELAP	6	T104704399	05-31-19
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	12-31-20
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
Virginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-19
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

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

TestAmerica Job ID: 580-80635-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-80635-1	PDI-SG-B436	Solid	08/16/18 11:40	09/27/18 12:55
580-80635-4	PDI-SG-B481	Solid	07/27/18 13:30	09/27/18 12:55

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Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-80635-2

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	

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-80635-2

Login Number: 80635

List Number: 2

Creator: Her, David A

List Source: TestAmerica Sacramento

List Creation: 10/04/18 02:33 PM

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
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?	False	Received project as a subcontract.
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 <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Isotope Dilution Summary

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

TestAmerica Job ID: 580-80635-2

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Matrix: Solid

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	HpCDD (23-140)	HpCDF (28-143)	HpCDF2 (26-138)	HxCDD (32-141)	HxCDF (26-152)	HxDD (28-130)	HxDF (26-123)	HxCF (29-147)
580-80635-1	PDI-SG-B436	60	48	56	62	58	61	59	66
580-80635-4	PDI-SG-B481	64	53	63	64	62	64	62	71
580-80635-4 - RA	PDI-SG-B481								
MB 320-251492/1-A	Method Blank	78	75	75	70	68	77	72	75

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PeCDD (25-181)	PeCDF (24-185)	13CHxCF (28-136)	PeCF (21-178)	TCDD (25-164)	TCDF (24-169)	OCDD (17-157)
580-80635-1	PDI-SG-B436	65	64	60	63	69	67	57
580-80635-4	PDI-SG-B481	68	67	63	68	72		59
580-80635-4 - RA	PDI-SG-B481						69	
MB 320-251492/1-A	Method Blank	71	68	69	69	72	69	76

Surrogate Legend

HpCDD = 13C-1,2,3,4,6,7,8-HpCDD
 HpCDF = 13C-1,2,3,4,6,7,8-HpCDF
 HpCDF2 = 13C-1,2,3,4,7,8,9-HpCDF
 HxCDD = 13C-1,2,3,4,7,8-HxCDD
 HxCDF = 13C-1,2,3,4,7,8-HxCDF
 HxDD = 13C-1,2,3,6,7,8-HxCDD
 HxDF = 13C-1,2,3,6,7,8-HxCDF
 HxCF = 13C-1,2,3,7,8,9-HxCDF
 PeCDD = 13C-1,2,3,7,8-PeCDD
 PeCDF = 13C-1,2,3,7,8-PeCDF
 13CHxCF = 13C-2,3,4,6,7,8-HxCDF
 PeCF = 13C-2,3,4,7,8-PeCDF
 TCDD = 13C-2,3,7,8-TCDD
 TCDF = 13C-2,3,7,8-TCDF
 OCDD = 13C-OCDD

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Matrix: Solid

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	HpCDD (26-166)	HpCDF (21-158)	HpCDF2 (20-186)	HxCDD (21-193)	HxCDF (19-202)	HxDD (25-163)	HxDF (21-159)	HxCF (17-205)
LCS 320-251492/2-A	Lab Control Sample	79	75	77	72	71	76	71	77
LCSD 320-251492/3-A	Lab Control Sample Dup	82	77	81	75	72	76	73	79

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PeCDD (21-227)	PeCDF (21-192)	13CHxCF (22-176)	PeCF (13-328)	TCDD (20-175)	TCDF (22-152)	OCDD (13-199)
LCS 320-251492/2-A	Lab Control Sample	74	73	72	72	74	73	77
LCSD 320-251492/3-A	Lab Control Sample Dup	74	73	73	73	75	72	83

Surrogate Legend

HpCDD = 13C-1,2,3,4,6,7,8-HpCDD
 HpCDF = 13C-1,2,3,4,6,7,8-HpCDF
 HpCDF2 = 13C-1,2,3,4,7,8,9-HpCDF
 HxCDD = 13C-1,2,3,4,7,8-HxCDD
 HxCDF = 13C-1,2,3,4,7,8-HxCDF

TestAmerica Seattle

Isotope Dilution Summary

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-80635-2

HxDD = 13C-1,2,3,6,7,8-HxCDD
HxDF = 13C-1,2,3,6,7,8-HxCDF
HxCF = 13C-1,2,3,7,8,9-HxCDF
PeCDD = 13C-1,2,3,7,8-PeCDD
PeCDF = 13C-1,2,3,7,8-PeCDF
13CHxCF = 13C-2,3,4,6,7,8-HxCDF
PeCF = 13C-2,3,4,7,8-PeCDF
TCDD = 13C-2,3,7,8-TCDD
TCDF = 13C-2,3,7,8-TCDF
OCDD = 13C-OCDD

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