TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

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TestAmerica Job ID: 580-80981-2
Client Project/Site: Portland Harbor Pre-Remedial Design

For:
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Authorized for release by:
10/19/2018 5:42:39 PM

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Case Narrative

Job ID: 580-80981-2

Laboratory: TestAmerica Seattle

Narrative

CASE NARRATIVE
Client: AECOM
Project: Portland Harbor Pre-Remedial Design
Report Number: 580-80981-2

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
Two samples were received on 10/10/2018 12:10 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was -3.3º 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.

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-SC-S088-0to2 (580-80981-1) and PDI-SC-S088-2to3.3 (580-80981-2) were analyzed for Dioxin/ Furan in accordance with 1613B. The samples were prepared on 10/11/2018 and analyzed on 10/12/2018 and 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.

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-SC-S088-0to2 (580-80981-1), PDI-SC-S088-2to3.3 (580-80981-2), (CCV 320-251909/30), (LCS 320-251492/2-A), (LCSD 320-251492/3-A), (MB 320-251492/1-A), and (CCV 320-252101/45). 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.

The concentration of one or more analytes associated with the following sample exceeded the instrument calibration range: PDI-SC-S088-0to2 (580-80981-1). These analytes have been qualified; however, the peak(s) did not saturate the instrument detector. Historical data indicate that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported above the calibration range.

Due to the matrix, the initial volumes used for the following samples deviated from the standard procedure: PDI-SC-S088-0to2

Case Narrative

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Laboratory: TestAmerica Seattle (Continued)

(580-80981-1) and PDI-SC-S088-2to3.3 (580-80981-2). The reporting limits (RLs) have been adjusted proportionately.

The following samples were transferred to a new container since the original sample containers were broken: PDI-SC-S088-0to2 (580-80981-1) and PDI-SC-S088-2to3.3 (580-80981-2). The samples were not compromised in any way.

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

Qualifiers

Dioxin

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
E	Result exceeded calibration range.
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.

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)

TestAmerica Seattle

Client Sample Results

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

Client Sample ID: PDI-SC-S088-0to2
Date Collected: 08/01/18 10:30
Date Received: 10/10/18 12:10

Lab Sample ID: 580-80981-1
Matrix: Solid
Percent Solids: 52.6

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	0.46	B	0.0047	0.00094	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
1,2,3,4,6,7,8-HpCDF	1.2	B	0.0047	0.0024	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
1,2,3,4,7,8,9-HpCDF	0.014	B	0.0047	0.0018	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
1,2,3,4,7,8-HxCDD	0.0032	J B	0.0047	0.00030	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
1,2,3,4,7,8-HxCDF	0.027		0.0047	0.0015	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
1,2,3,6,7,8-HxCDD	0.024	B	0.0047	0.00026	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
1,2,3,6,7,8-HxCDF	0.043	B	0.0047	0.0015	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
1,2,3,7,8,9-HxCDD	0.0082	B	0.0047	0.00026	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
1,2,3,7,8,9-HxCDF	ND		0.0047	0.0014	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
1,2,3,7,8-PeCDD	0.0030	J B	0.0047	0.00025	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
1,2,3,7,8-PeCDF	0.025	B	0.0047	0.00078	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
2,3,4,6,7,8-HxCDF	0.0097		0.0047	0.0013	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
2,3,4,7,8-PeCDF	0.0080	B	0.0047	0.00076	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
2,3,7,8-TCDD	0.0016		0.00094	0.000063	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
OCDD	4.5	E B	0.0094	0.00088	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1
OCDF	0.74	B	0.0094	0.00018	ug/Kg	☼	10/11/18 13:38	10/13/18 17:22	1

Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C-1,2,3,4,6,7,8-HpCDD	67		23 - 140				10/11/18 13:38	10/13/18 17:22	1
13C-1,2,3,4,6,7,8-HpCDF	51		28 - 143				10/11/18 13:38	10/13/18 17:22	1
13C-1,2,3,4,7,8,9-HpCDF	65		26 - 138				10/11/18 13:38	10/13/18 17:22	1
13C-1,2,3,4,7,8-HxCDD	67		32 - 141				10/11/18 13:38	10/13/18 17:22	1
13C-1,2,3,4,7,8-HxCDF	84		26 - 152				10/11/18 13:38	10/13/18 17:22	1
13C-1,2,3,6,7,8-HxCDD	66		28 - 130				10/11/18 13:38	10/13/18 17:22	1
13C-1,2,3,6,7,8-HxCDF	76		26 - 123				10/11/18 13:38	10/13/18 17:22	1
13C-1,2,3,7,8,9-HxCDF	64		29 - 147				10/11/18 13:38	10/13/18 17:22	1
13C-1,2,3,7,8-PeCDD	102		25 - 181				10/11/18 13:38	10/13/18 17:22	1
13C-1,2,3,7,8-PeCDF	76		24 - 185				10/11/18 13:38	10/13/18 17:22	1
13C-2,3,4,6,7,8-HxCDF	64		28 - 136				10/11/18 13:38	10/13/18 17:22	1
13C-2,3,4,7,8-PeCDF	98		21 - 178				10/11/18 13:38	10/13/18 17:22	1
13C-2,3,7,8-TCDD	91		25 - 164				10/11/18 13:38	10/13/18 17:22	1
13C-OCDD	68		17 - 157				10/11/18 13:38	10/13/18 17:22	1

Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	123		35 - 197				10/11/18 13:38	10/13/18 17:22	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	0.0064	B	0.00094	0.00053	ug/Kg	☼	10/11/18 13:38	10/12/18 22:19	1

Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDF	96		24 - 169				10/11/18 13:38	10/12/18 22:19	1

Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	70		35 - 197				10/11/18 13:38	10/12/18 22:19	1

TestAmerica Seattle

10/19/2018

Client Sample Results

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

TestAmerica Job ID: 580-80981-2

Client Sample ID: PDI-SC-S088-2to3.3
Date Collected: 08/01/18 10:35
Date Received: 10/10/18 12:10

Lab Sample ID: 580-80981-2
Matrix: Solid
Percent Solids: 60.9

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	0.099	B	0.0041	0.00038	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
1,2,3,4,6,7,8-HpCDF	0.53	B	0.0041	0.0014	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
1,2,3,4,7,8,9-HpCDF	0.0041	B	0.0041	0.0012	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
1,2,3,4,7,8-HxCDD	0.0011	J B	0.0041	0.00018	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
1,2,3,4,7,8-HxCDF	0.0063		0.0041	0.0010	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
1,2,3,6,7,8-HxCDD	0.0074	B	0.0041	0.00019	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
1,2,3,6,7,8-HxCDF	0.018	B	0.0041	0.00097	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
1,2,3,7,8,9-HxCDD	0.0029	J B	0.0041	0.00017	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
1,2,3,7,8,9-HxCDF	ND		0.0041	0.00092	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
1,2,3,7,8-PeCDD	0.0012	J B	0.0041	0.00015	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
1,2,3,7,8-PeCDF	0.0013	J B	0.0041	0.00048	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
2,3,4,6,7,8-HxCDF	0.0055		0.0041	0.00086	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
2,3,4,7,8-PeCDF	0.0022	J B	0.0041	0.00048	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
2,3,7,8-TCDD	0.00029	J	0.00082	0.000058	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
OCDD	1.3	B	0.0082	0.00036	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	1
OCDF	0.18	B	0.0082	0.00016	ug/Kg	☼	10/11/18 13:38	10/13/18 18:08	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 18:08	1
13C-1,2,3,4,6,7,8-HpCDF	49		28 - 143				10/11/18 13:38	10/13/18 18:08	1
13C-1,2,3,4,7,8,9-HpCDF	60		26 - 138				10/11/18 13:38	10/13/18 18:08	1
13C-1,2,3,4,7,8-HxCDD	71		32 - 141				10/11/18 13:38	10/13/18 18:08	1
13C-1,2,3,4,7,8-HxCDF	88		26 - 152				10/11/18 13:38	10/13/18 18:08	1
13C-1,2,3,6,7,8-HxCDD	70		28 - 130				10/11/18 13:38	10/13/18 18:08	1
13C-1,2,3,6,7,8-HxCDF	86		26 - 123				10/11/18 13:38	10/13/18 18:08	1
13C-1,2,3,7,8,9-HxCDF	69		29 - 147				10/11/18 13:38	10/13/18 18:08	1
13C-1,2,3,7,8-PeCDD	92		25 - 181				10/11/18 13:38	10/13/18 18:08	1
13C-1,2,3,7,8-PeCDF	80		24 - 185				10/11/18 13:38	10/13/18 18:08	1
13C-2,3,4,6,7,8-HxCDF	72		28 - 136				10/11/18 13:38	10/13/18 18:08	1
13C-2,3,4,7,8-PeCDF	89		21 - 178				10/11/18 13:38	10/13/18 18:08	1
13C-2,3,7,8-TCDD	78		25 - 164				10/11/18 13:38	10/13/18 18:08	1
13C-OCDD	71		17 - 157				10/11/18 13:38	10/13/18 18:08	1

Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	106		35 - 197				10/11/18 13:38	10/13/18 18:08	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	0.0021	B	0.00082	0.00035	ug/Kg	☼	10/11/18 13:38	10/12/18 22:57	1

Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDF	88		24 - 169				10/11/18 13:38	10/12/18 22:57	1

Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	80		35 - 197				10/11/18 13:38	10/12/18 22:57	1

TestAmerica Seattle

10/19/2018

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	%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

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	%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 %Recovery	LCS Qualifier	Limits
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 %Recovery	LCS Qualifier	Limits
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. Limits	RPD	RPD Limit
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

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

Lab Chronicle

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

TestAmerica Job ID: 580-80981-2

Client Sample ID: PDI-SC-S088-0to2
Date Collected: 08/01/18 10:30
Date Received: 10/10/18 12:10

Lab Sample ID: 580-80981-1
Matrix: Solid
Percent Solids: 52.6

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 17:22	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	10/12/18 22:19	ALM	TAL SAC

Client Sample ID: PDI-SC-S088-2to3.3
Date Collected: 08/01/18 10:35
Date Received: 10/10/18 12:10

Lab Sample ID: 580-80981-2
Matrix: Solid
Percent Solids: 60.9

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 18:08	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	10/12/18 22:57	ALM	TAL SAC

Laboratory References:

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

TestAmerica Seattle

10/19/2018

Accreditation/Certification Summary

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.

TestAmerica Seattle

Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-80981-1	PDI-SC-S088-0to2	Solid	08/01/18 10:30	10/10/18 12:10
580-80981-2	PDI-SC-S088-2to3.3	Solid	08/01/18 10:35	10/10/18 12:10

SUBSURFACE 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: Subsurface Sediment
Sample Type:

Project Contact: Amy Dahl / Chelsey Cook
Tel: (206) 438-2261 / (206) 438-2010

Analysis Turnaround Time

Calendar (C) or Work Days (W) _W_

☐ 21 days

☒ Other ASAP

Site Contact: Jennifer Ray
Laboratory Contact: Elaine-Walker

Date: 10/10/18
Carrier: Courier

COC No: 1
1 of 1 pages

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	PCDD/Fs 1613B	Archive	Grain size ASTM D7928/D6913	PCB Aroclors, PAHs, Total Organic Carbon, Total Solids 8082A, 8270D-SIM, 9060, 160.3	Atterberg Limits ASTM D4318	Sample Specific Notes:
PDI-SC-S088 - 0 to 2	8/1/18	1030	SC		ED	4	x	x	x	x		Frozen 8/1/18 0.1750
PDI-SC-S088 - 2 to 3.3	8/1/18	1035	SC		ED	4	x	x	x	x		'' ''

Fraction: AG, AG, WMG, WMG, WMG, AG

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

Container Type: WMG=Wide Mouth Glass Jar, P=HDPE, PP=Polypropylene, AG=amber glass, G=glass, RC=Resin Col
Preservative: HCl = Hydrochloric Acid, H3PO4 = Phosphoric Acid, HNO3 = Nitric Acid
Fraction: D = Dissolved, PRT = Particulate, T = Total (unfiltered)

Special Instructions/QC Requirements & Comments: **Separate reports for each lab**

-3.3   25 AM 10/10/18

Relinquished by:	Company: AECOM	Date/Time: 10/10/18 1147	Received by:	Company: M.E.	Date/Time: 10/10/18 1147
Relinquished by:	Company: M.E.	Date/Time: 10/10/18 1210	Received by:	Company: TAPDR	Date/Time: 10/10/18 1210
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

TestAmerica-Seattle
5755-8th-Street-East
Tacoma, WA 98424-1317
Ph: 253-922-2310   Fax: 253-922-5047

SUBSURFACE SEDIMENT
CHAIN OF CUSTODY

Client Contact	Project Contact: Amy Dahl / Chelsey Cook	Site Contact: Jennifer Ray	Date: 10/10/18	COC No: 1
AECOM	Tel: (206) 438-2261 / (206) 438-2010	Laboratory Contact: Elaine-Walker	Carrier: Courier	1 of 1 pages

1111 3rd Ave Suite 1600

Seattle, WA 98101

Analysis Turnaround Time

Calendar (C) or Work Days (W)   W

Phone: (206) 438-2700 Fax: 1+(866) 495-5288
Project Name: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling

☐   21 days

Portland, OR

☒   Other ASAP

Project #: 60566335 Study: Subsurface Sediment

Sample Type

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	Fraction	PCDD/Fs 1613B	Archive	Grain size ASTM D?928/D6913	PCB Aroclors, PAHs, Total Organic Carbon, Total Solids 8082A, 8270D-SIM, 9060, 160.3	Atterberg Limits ASTM D4318								Sample Specific Notes:
PDI-SC-S088 - 0 to 2	8/1/18	1030	SC		ED	4		x	x	x	x									Frozen 8/1/18 @1230
PDI-SC-S088 - 2 to 3.3	8/1/18	1035	SC		ED	4		x	x	x	x									" "

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

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**

-3.3 25 ᴬᴬ 10/10/18

Relinquished by:	Company: AECOM	Date/Time: 10/10/18 1147	Received by: Jessica ...	Company: M.E.	Date/Time: 10/10/18 1147
Relinquished by:	Company: M.E.	Date/Time: 10/10/18 1210	Received by:	Company: TAPOR	Date/Time: 10/10/18 1210
Relinquished by:	Company: TAPOR	Date/Time: 10/10/18 1700	Received by: Tom Black	Company: TASea	Date/Time: 10/11/18 0930

IR4 -3.7 /-3.7   10/19/2018

Chain of Custody Record

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

COC No: 580-60148.1

Page: Page 1 of 1

Job #: 580-80981-2

Client Information (Sub Contract Lab)

Client Contact: Shipping/Receiving	Phone:
Company: TestAmerica Laboratories, Inc.	
Address: 880 Riverside Parkway,	
City: West Sacramento	
State, Zip: CA, 95605	
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	
Email:	
Project Name: Portland Harbor Pre-Remedial Design	
Site:	

Sampler:

Carrier Tracking No(s):

Lab PM: Walker, Elaine M
E-Mail: elaine.walker@testamericainc.com

State of Origin: Oregon

Due Date Requested: 10/15/2018
TAT Requested (days):
PO #:
WO #:
Project #: 58012120
SSOW#:

Accreditations Required (See note):

Analysis Requested

Preservation Codes:

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA

M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	1613B/HRMS_Sox_P (MOD) Full List w/o Totals	AutoDP/ PH Frozen Archive Container billed @ $0.						Total Number of containers	Special Instructions/Note:
PDI-SC-S088-0to2 (580-80981-1)	8/1/18	10:30 Pacific		Solid			X	X						1	
PDI-SC-S088-2to3.3 (580-80981-2)	8/1/18	10:35 Pacific		Solid			X	X						1	

Possible Hazard Identification

Unconfirmed

Deliverable Requested: I, II, III, IV, Other (specify)
Primary Deliverable Rank: 2

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Special Instructions/QC Requirements:

Method of Shipment:

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of data under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica.

	Date:	Time:		
Empty Kit Relinquished by:				
Relinquished by:	Date/Time: 8/10/18 1650	Company	Received by:	Date/Time: 10/18 935	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.: Seal
Cooler Temperature(s) °C and Other Remarks: -2.0

Ver: 09/20/2016

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-80981-2

Login Number: 80981

List Source: TestAmerica Seattle

List Number: 1
Creator: Antonson, Angeline D

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	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	

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-80981-2

Login Number: 80981
List Number: 2
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento
List Creation: 10/11/18 11:25 AM

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	Seal
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	-20.1C
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 <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica Seattle

10/19/2018

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Sacramento
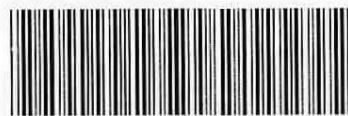
Job: _____

Tracking # __4611 5676 7955__ SO / (PO) / FO / 2-Day / SAT / Ground / UPS / Courier / Drop Off / GSO / OnTrac / Goldstreak / USPS / Other _____

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations. File in the job folder with the COC.

Notes: _____
_____
_____
_____

Frozen

_____

1 ~ D
2 ~ 1)

Recv'd With Cracks
Put into Secondary Cont

Therm. ID: AK-2 / (AK-3) / AK-5 / AK-6 / HACCP / Other_____
(+0.7°C)

Ice_____ Wet_____ Gel_____ Other DRY ICE

Cooler Custody Seal: _____See_____

Sample Custody Seal: _____

Cooler ID: _____

Temp: Observed __20.1__ Corrected __20.1__

From: Temp Blank ☐   Sample ☒

NCM Filed: Yes ☐   No ☐

	Yes	No	NA
Perchlorate has headspace?	☐	☐	☒
Alkalinity has no headspace?	☐	☐	☒
CoC is complete w/o discrepancies?	☒	☐	☐
Samples received within holding time?	☒	☐	☐
Sample preservatives verified?	☐	☐	☒
Cooler compromised/tampered with?	☐	☒	☐
Samples compromised/tampered with?	☐	☒	☐
Samples w/o discrepancies?	☒	☐	☐
Sample containers have legible labels?	☒	☐	☐
Containers are not broken or leaking?	☒	☒	☐
Sample date/times are provided.	☒	☐	☐
Appropriate containers are used?	☒	☐	☐
Sample bottles are completely filled?	☒	☐	☐
Zero headspace?*	☐	☐	☒
Multiphasic samples are not present?	☒	☐	☐
Sample temp OK?	☒	☐	☐
Sample out of temp?	☐	☒	☐

Initials: _____   Date: __10/11/10__   833

*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

F D C

Isotope Dilution Summary

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

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		HpCDD (23-140)	HpCDF (28-143)	HpCDF2 (26-138)	HxCDD (32-141)	HxCDF (26-152)	HxDD (28-130)	HxDF (26-123)	HxCF (29-147)
580-80981-1	PDI-SC-S088-0to2	67	51	65	67	84	66	76	64
580-80981-2	PDI-SC-S088-2to3.3	64	49	60	71	88	70	86	69

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)					
		PeCDD (25-181)	PeCDF (24-185)	13CHxCF (28-136)	PeCF (21-178)	TCDD (25-164)	OCDD (17-157)
580-80981-1	PDI-SC-S088-0to2	102	76	64	98	91	68
580-80981-2	PDI-SC-S088-2to3.3	92	80	72	89	78	71

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
OCDD = 13C-OCDD

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

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)
		TCDF (24-169)
580-80981-1 - RA	PDI-SC-S088-0to2	96
580-80981-2 - RA	PDI-SC-S088-2to3.3	88

Surrogate Legend

TCDF = 13C-2,3,7,8-TCDF

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

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		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

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)						
		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

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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)							
		HpCDD	HpCDF	HpCDF2	HxCDD	HxCDF	HxDD	HxDF	HxCF
Lab Sample ID	Client Sample ID	(23-140)	(28-143)	(26-138)	(32-141)	(26-152)	(28-130)	(26-123)	(29-147)
MB 320-251492/1-A	Method Blank	78	75	75	70	68	77	72	75

		Percent Isotope Dilution Recovery (Acceptance Limits)						
		PeCDD	PeCDF	13CHxCF	PeCF	TCDD	TCDF	OCDD
Lab Sample ID	Client Sample ID	(25-181)	(24-185)	(28-136)	(21-178)	(25-164)	(24-169)	(17-157)
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

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