



Environment Testing TestAmerica



ANALYTICAL REPORT

Eurofins TestAmerica, Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-85913-2

Client Project/Site: Portland Harbor Pre-Remedial Design

For:
AECOM
1111 Third Ave
Suite 1600
Seattle, Washington 98101

Attn: Amy Dahl

M. Elaine Walker

Authorized for release by:
5/10/2019 3:56:06 PM
Elaine Walker, Project Manager II
(253)248-4972
elaine.walker@testamericainc.com

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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

Job ID: 580-85913-2

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Laboratory: Eurofins TestAmerica, Seattle

Narrative

CASE NARRATIVE

Client: AECOM

Project: Portland Harbor Pre-Remedial Design

Report Number: 580-85913-2

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

Five samples were received on 5/3/2019 11:05 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.3° C and 4.8° C.

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

This report contains results of Dioxins / Furans by Method 1613B, performed by 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-ST-T07A-1905 (580-85913-1), PDI-ST-T07B-1905 (580-85913-2), PDI-ST-T06A-1905 (580-85913-3) and PDI-ST-T06B-1905 (580-85913-4) were analyzed for Dioxin/ Furan in accordance with 1613B. The samples were prepared on 05/06/2019 and 05/07/2019 and analyzed on 05/09/2019.

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 3C-1,2,3,4-TCDD and/or 13C-1,2,3,7,8,9-HxCDD associated with the following samples run on instrument 10D5 exceeded this criteria: PDI-ST-T07A-1905 (580-85913-1), PDI-ST-T07B-1905 (580-85913-2), PDI-ST-T06A-1905 (580-85913-3), PDI-ST-T06B-1905 (580-85913-4), (CCV 320-293288/2), (LCS 320-292728/2-A), (LCS 320-292878/2-A), (LCSD 320-292728/3-A), (LCSD 320-292878/3-A), (MB 320-292728/1-A) and (MB 320-292878/1-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-ST-T07A-1905 (580-85913-1), PDI-ST-T07B-1905 (580-85913-2), PDI-ST-T06A-1905 (580-85913-3), and PDI-ST-T06B-1905 (580-85913-4). The reporting limits (RLs) have been adjusted proportionately. Samples are associated with preparation batch 320-292728.

OCDD was detected in method blank MB 320-292728/1-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. Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

Case Narrative

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

Job ID: 580-85913-2 (Continued)

Laboratory: Eurofins TestAmerica, Seattle (Continued)

1,2,3,4,6,7,8-HxCDD, 1,2,3,4,6,7,8-HxCDF and OCDF were detected in method blank MB 320-292728/1-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.

1,2,3,7,8,9-HxCDF, OCDD and OCDF were detected in method blank MB 320-292878/1-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.

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

DIOXIN/ FURAN - RINSE BLANK

Sample PDI-RB-ST-190501 (580-85913-5) was analyzed for Dioxin/ Furan in accordance with 1613B. The samples were prepared on 05/07/2019 and analyzed on 05/08/2019.

Elevated reporting limits are provided for the following sample due to insufficient sample provided for 1613B_Sox_Sep_P preparation/analysis: Sample PDI-RB-ST-190501 (580-85913-5) was received in a narrow mouth amber glass.

1,2,3,4,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDF and OCDD were detected in method blank MB 320-292799/1-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.

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

Definitions/Glossary

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

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.
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)

Client Sample Results

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

Client Sample ID: PDI-ST-T07A-1905

Date Collected: 05/01/19 16:45

Date Received: 05/03/19 11:05

Lab Sample ID: 580-85913-1

Matrix: Solid

Percent Solids: 49.7

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	0.023	B	0.0051	0.00043	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
1,2,3,4,6,7,8-HpCDF	0.0047	J B q	0.0051	0.00021	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
1,2,3,4,7,8,9-HpCDF	ND		0.0051	0.00025	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
1,2,3,4,7,8-HxCDD	0.00069	J	0.0051	0.00013	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
1,2,3,4,7,8-HxCDF	0.00045	J	0.0051	0.00014	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
1,2,3,6,7,8-HxCDD	0.0014	J	0.0051	0.00012	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
1,2,3,6,7,8-HxCDF	0.00035	J	0.0051	0.00013	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
1,2,3,7,8,9-HxCDD	0.0014	J	0.0051	0.00012	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
1,2,3,7,8,9-HxCDF	0.00038	J	0.0051	0.00011	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
1,2,3,7,8-PeCDD	0.00042	J	0.0051	0.00015	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
1,2,3,7,8-PeCDF	ND		0.0051	0.00014	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
2,3,4,6,7,8-HxCDF	0.00022	J q	0.0051	0.00010	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
2,3,4,7,8-PeCDF	ND		0.0051	0.00016	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
2,3,7,8-TCDD	0.00028	J q	0.0010	0.00014	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
2,3,7,8-TCDF	0.00037	J	0.0010	0.00012	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
OCDD	0.19	B	0.010	0.00033	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
OCDF	0.014	B	0.010	0.00016	ug/Kg	⊗	05/06/19 16:43	05/09/19 00:18	1
Isotope Dilution	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac
13C-1,2,3,4,6,7,8-HpCDD	57			23 - 140			05/06/19 16:43	05/09/19 00:18	1
13C-1,2,3,4,6,7,8-HpCDF	54			28 - 143			05/06/19 16:43	05/09/19 00:18	1
13C-1,2,3,4,7,8,9-HpCDF	58			26 - 138			05/06/19 16:43	05/09/19 00:18	1
13C-1,2,3,4,7,8-HxCDD	59			32 - 141			05/06/19 16:43	05/09/19 00:18	1
13C-1,2,3,4,7,8-HxCDF	65			26 - 152			05/06/19 16:43	05/09/19 00:18	1
13C-1,2,3,6,7,8-HxCDD	62			28 - 130			05/06/19 16:43	05/09/19 00:18	1
13C-1,2,3,6,7,8-HxCDF	67			26 - 123			05/06/19 16:43	05/09/19 00:18	1
13C-1,2,3,7,8,9-HxCDF	63			29 - 147			05/06/19 16:43	05/09/19 00:18	1
13C-1,2,3,7,8-PeCDD	56			25 - 181			05/06/19 16:43	05/09/19 00:18	1
13C-1,2,3,7,8-PeCDF	60			24 - 185			05/06/19 16:43	05/09/19 00:18	1
13C-2,3,4,6,7,8-HxCDF	64			28 - 136			05/06/19 16:43	05/09/19 00:18	1
13C-2,3,4,7,8-PeCDF	55			21 - 178			05/06/19 16:43	05/09/19 00:18	1
13C-2,3,7,8-TCDD	59			25 - 164			05/06/19 16:43	05/09/19 00:18	1
13C-2,3,7,8-TCDF	59			24 - 169			05/06/19 16:43	05/09/19 00:18	1
13C-OCDD	54			17 - 157			05/06/19 16:43	05/09/19 00:18	1
Surrogate	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	92			35 - 197			05/06/19 16:43	05/09/19 00:18	1

Eurofins TestAmerica, Seattle

Client Sample Results

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

Client Sample ID: PDI-ST-T07B-1905

Date Collected: 05/01/19 17:00

Date Received: 05/03/19 11:05

Lab Sample ID: 580-85913-2

Matrix: Solid

Percent Solids: 41.9

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	0.067	B	0.0059	0.0010	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
1,2,3,4,6,7,8-HpCDF	0.0085	B q	0.0059	0.00031	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
1,2,3,4,7,8,9-HpCDF	ND		0.0059	0.00036	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
1,2,3,4,7,8-HxCDD	0.00074	J	0.0059	0.00015	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
1,2,3,4,7,8-HxCDF	0.00062	J	0.0059	0.00022	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
1,2,3,6,7,8-HxCDD	0.0020	J	0.0059	0.00015	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
1,2,3,6,7,8-HxCDF	0.00038	J	0.0059	0.00021	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
1,2,3,7,8,9-HxCDD	0.0015	J	0.0059	0.00014	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
1,2,3,7,8,9-HxCDF	ND		0.0059	0.00017	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
1,2,3,7,8-PeCDD	0.00035	J q	0.0059	0.00018	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
1,2,3,7,8-PeCDF	ND		0.0059	0.00013	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
2,3,4,6,7,8-HxCDF	0.00028	J	0.0059	0.00017	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
2,3,4,7,8-PeCDF	ND		0.0059	0.00015	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
2,3,7,8-TCDD	0.00058	J	0.0012	0.00016	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
2,3,7,8-TCDF	0.00044	J	0.0012	0.00012	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
OCDD	0.59	B	0.012	0.00071	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
OCDF	0.034	B	0.012	0.00019	ug/Kg	✉	05/06/19 16:43	05/09/19 01:04	1
Isotope Dilution	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac
13C-1,2,3,4,6,7,8-HpCDD	59			23 - 140			05/06/19 16:43	05/09/19 01:04	1
13C-1,2,3,4,6,7,8-HpCDF	52			28 - 143			05/06/19 16:43	05/09/19 01:04	1
13C-1,2,3,4,7,8,9-HpCDF	60			26 - 138			05/06/19 16:43	05/09/19 01:04	1
13C-1,2,3,4,7,8-HxCDD	61			32 - 141			05/06/19 16:43	05/09/19 01:04	1
13C-1,2,3,4,7,8-HxCDF	68			26 - 152			05/06/19 16:43	05/09/19 01:04	1
13C-1,2,3,6,7,8-HxCDD	63			28 - 130			05/06/19 16:43	05/09/19 01:04	1
13C-1,2,3,6,7,8-HxCDF	70			26 - 123			05/06/19 16:43	05/09/19 01:04	1
13C-1,2,3,7,8,9-HxCDF	65			29 - 147			05/06/19 16:43	05/09/19 01:04	1
13C-1,2,3,7,8-PeCDD	58			25 - 181			05/06/19 16:43	05/09/19 01:04	1
13C-1,2,3,7,8-PeCDF	63			24 - 185			05/06/19 16:43	05/09/19 01:04	1
13C-2,3,4,6,7,8-HxCDF	67			28 - 136			05/06/19 16:43	05/09/19 01:04	1
13C-2,3,4,7,8-PeCDF	61			21 - 178			05/06/19 16:43	05/09/19 01:04	1
13C-2,3,7,8-TCDD	62			25 - 164			05/06/19 16:43	05/09/19 01:04	1
13C-2,3,7,8-TCDF	64			24 - 169			05/06/19 16:43	05/09/19 01:04	1
13C-OCDD	58			17 - 157			05/06/19 16:43	05/09/19 01:04	1
Surrogate	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	95			35 - 197			05/06/19 16:43	05/09/19 01:04	1

Eurofins TestAmerica, Seattle

Client Sample Results

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

Client Sample ID: PDI-ST-T06A-1905

Date Collected: 05/01/19 17:15

Date Received: 05/03/19 11:05

Lab Sample ID: 580-85913-3

Matrix: Solid

Percent Solids: 45.8

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	0.034	B	0.0054	0.00057	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
1,2,3,4,6,7,8-HpCDF	0.0078	B q	0.0054	0.00026	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
1,2,3,4,7,8,9-HpCDF	ND		0.0054	0.00035	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
1,2,3,4,7,8-HxCDD	0.00067	J	0.0054	0.00011	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
1,2,3,4,7,8-HxCDF	0.00056	J	0.0054	0.00015	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
1,2,3,6,7,8-HxCDD	0.0015	J q	0.0054	0.00010	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
1,2,3,6,7,8-HxCDF	0.00031	J	0.0054	0.00013	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
1,2,3,7,8,9-HxCDD	0.0011	J	0.0054	0.000098	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
1,2,3,7,8,9-HxCDF	0.00030	J	0.0054	0.00010	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
1,2,3,7,8-PeCDD	0.00024	J q	0.0054	0.00014	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
1,2,3,7,8-PeCDF	ND		0.0054	0.00011	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
2,3,4,6,7,8-HxCDF	0.00017	J	0.0054	0.00010	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
2,3,4,7,8-PeCDF	ND		0.0054	0.00013	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
2,3,7,8-TCDD	ND		0.0011	0.00014	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
2,3,7,8-TCDF	ND		0.0011	0.00010	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
OCDD	0.32	B	0.011	0.00049	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
OCDF	0.034	B	0.011	0.00013	ug/Kg	✉	05/06/19 16:43	05/09/19 01:50	1
Isotope Dilution	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac
13C-1,2,3,4,6,7,8-HpCDD	57			23 - 140			05/06/19 16:43	05/09/19 01:50	1
13C-1,2,3,4,6,7,8-HpCDF	59			28 - 143			05/06/19 16:43	05/09/19 01:50	1
13C-1,2,3,4,7,8,9-HpCDF	58			26 - 138			05/06/19 16:43	05/09/19 01:50	1
13C-1,2,3,4,7,8-HxCDD	58			32 - 141			05/06/19 16:43	05/09/19 01:50	1
13C-1,2,3,4,7,8-HxCDF	65			26 - 152			05/06/19 16:43	05/09/19 01:50	1
13C-1,2,3,6,7,8-HxCDD	62			28 - 130			05/06/19 16:43	05/09/19 01:50	1
13C-1,2,3,6,7,8-HxCDF	67			26 - 123			05/06/19 16:43	05/09/19 01:50	1
13C-1,2,3,7,8,9-HxCDF	65			29 - 147			05/06/19 16:43	05/09/19 01:50	1
13C-1,2,3,7,8-PeCDD	57			25 - 181			05/06/19 16:43	05/09/19 01:50	1
13C-1,2,3,7,8-PeCDF	62			24 - 185			05/06/19 16:43	05/09/19 01:50	1
13C-2,3,4,6,7,8-HxCDF	66			28 - 136			05/06/19 16:43	05/09/19 01:50	1
13C-2,3,4,7,8-PeCDF	57			21 - 178			05/06/19 16:43	05/09/19 01:50	1
13C-2,3,7,8-TCDD	62			25 - 164			05/06/19 16:43	05/09/19 01:50	1
13C-2,3,7,8-TCDF	65			24 - 169			05/06/19 16:43	05/09/19 01:50	1
13C-OCDD	58			17 - 157			05/06/19 16:43	05/09/19 01:50	1
Surrogate	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	95			35 - 197			05/06/19 16:43	05/09/19 01:50	1

Eurofins TestAmerica, Seattle

Client Sample Results

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

Client Sample ID: PDI-ST-T06B-1905

Date Collected: 05/01/19 17:10

Date Received: 05/03/19 11:05

Lab Sample ID: 580-85913-4

Matrix: Solid

Percent Solids: 40.1

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	0.027		0.0062	0.00045	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
1,2,3,4,6,7,8-HpCDF	0.0047	J q	0.0062	0.00017	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
1,2,3,4,7,8,9-HpCDF	ND		0.0062	0.00022	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
1,2,3,4,7,8-HxCDD	0.00057	J q	0.0062	0.00012	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
1,2,3,4,7,8-HxCDF	0.00047	J	0.0062	0.00010	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
1,2,3,6,7,8-HxCDD	0.0015	J	0.0062	0.00011	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
1,2,3,6,7,8-HxCDF	0.00034	J	0.0062	0.000097	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
1,2,3,7,8,9-HxCDD	0.00090	J	0.0062	0.00010	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
1,2,3,7,8,9-HxCDF	0.00076	J B	0.0062	0.000082	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
1,2,3,7,8-PeCDD	ND		0.0062	0.00014	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
1,2,3,7,8-PeCDF	ND		0.0062	0.00010	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
2,3,4,6,7,8-HxCDF	0.00022	J q	0.0062	0.000076	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
2,3,4,7,8-PeCDF	ND		0.0062	0.00012	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
2,3,7,8-TCDD	ND		0.0012	0.00015	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
2,3,7,8-TCDF	0.00028	J q	0.0012	0.00010	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
OCDD	0.26	B	0.012	0.00033	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
OCDF	0.013	B	0.012	0.00012	ug/Kg	✉	05/07/19 12:13	05/09/19 02:36	1
Isotope Dilution	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac
13C-1,2,3,4,6,7,8-HpCDD	71			23 - 140			05/07/19 12:13	05/09/19 02:36	1
13C-1,2,3,4,6,7,8-HpCDF	73			28 - 143			05/07/19 12:13	05/09/19 02:36	1
13C-1,2,3,4,7,8,9-HpCDF	72			26 - 138			05/07/19 12:13	05/09/19 02:36	1
13C-1,2,3,4,7,8-HxCDD	69			32 - 141			05/07/19 12:13	05/09/19 02:36	1
13C-1,2,3,4,7,8-HxCDF	82			26 - 152			05/07/19 12:13	05/09/19 02:36	1
13C-1,2,3,6,7,8-HxCDD	73			28 - 130			05/07/19 12:13	05/09/19 02:36	1
13C-1,2,3,6,7,8-HxCDF	82			26 - 123			05/07/19 12:13	05/09/19 02:36	1
13C-1,2,3,7,8-HxCDF	75			29 - 147			05/07/19 12:13	05/09/19 02:36	1
13C-1,2,3,7,8-PeCDD	72			25 - 181			05/07/19 12:13	05/09/19 02:36	1
13C-1,2,3,7,8-PeCDF	75			24 - 185			05/07/19 12:13	05/09/19 02:36	1
13C-2,3,4,6,7,8-HxCDF	78			28 - 136			05/07/19 12:13	05/09/19 02:36	1
13C-2,3,4,7,8-PeCDF	71			21 - 178			05/07/19 12:13	05/09/19 02:36	1
13C-2,3,7,8-TCDD	71			25 - 164			05/07/19 12:13	05/09/19 02:36	1
13C-2,3,7,8-TCDF	75			24 - 169			05/07/19 12:13	05/09/19 02:36	1
13C-OCDD	75			17 - 157			05/07/19 12:13	05/09/19 02:36	1
Surrogate	%Recovery	Qualifier		Limits			Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	91			35 - 197			05/07/19 12:13	05/09/19 02:36	1

Eurofins TestAmerica, Seattle

Client Sample Results

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

Client Sample ID: PDI-RB-ST-190501

Date Collected: 05/01/19 17:45

Date Received: 05/03/19 11:05

Lab Sample ID: 580-85913-5

Matrix: Water

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-HxCDD	ND		53	1.4	pg/L		05/07/19 07:48	05/08/19 19:56	1
1,2,3,4,6,7,8-HxCDF	ND		53	1.9	pg/L		05/07/19 07:48	05/08/19 19:56	1
1,2,3,4,7,8,9-HxCDF	ND		53	2.3	pg/L		05/07/19 07:48	05/08/19 19:56	1
1,2,3,4,7,8-HxCDD	ND		53	2.0	pg/L		05/07/19 07:48	05/08/19 19:56	1
1,2,3,4,7,8-HxCDF	ND		53	1.5	pg/L		05/07/19 07:48	05/08/19 19:56	1
1,2,3,6,7,8-HxCDD	ND		53	1.8	pg/L		05/07/19 07:48	05/08/19 19:56	1
1,2,3,6,7,8-HxCDF	ND		53	1.4	pg/L		05/07/19 07:48	05/08/19 19:56	1
1,2,3,7,8,9-HxCDD	ND		53	1.7	pg/L		05/07/19 07:48	05/08/19 19:56	1
1,2,3,7,8,9-HxCDF	7.5 J B		53	1.1	pg/L		05/07/19 07:48	05/08/19 19:56	1
1,2,3,7,8-PeCDD	ND		53	2.6	pg/L		05/07/19 07:48	05/08/19 19:56	1
1,2,3,7,8-PeCDF	ND		53	1.5	pg/L		05/07/19 07:48	05/08/19 19:56	1
2,3,4,6,7,8-HxCDF	2.3 J q		53	1.1	pg/L		05/07/19 07:48	05/08/19 19:56	1
2,3,4,7,8-PeCDD	ND		53	1.9	pg/L		05/07/19 07:48	05/08/19 19:56	1
2,3,7,8-TCDD	ND		11	1.5	pg/L		05/07/19 07:48	05/08/19 19:56	1
2,3,7,8-TCDF	ND		11	1.1	pg/L		05/07/19 07:48	05/08/19 19:56	1
OCDD	15 J q B		110	2.0	pg/L		05/07/19 07:48	05/08/19 19:56	1
OCDF	12 J		110	2.5	pg/L		05/07/19 07:48	05/08/19 19:56	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C-1,2,3,4,6,7,8-HxCDD	108		23 - 140				05/07/19 07:48	05/08/19 19:56	1
13C-1,2,3,4,6,7,8-HxCDF	97		28 - 143				05/07/19 07:48	05/08/19 19:56	1
13C-1,2,3,4,7,8,9-HxCDF	110		26 - 138				05/07/19 07:48	05/08/19 19:56	1
13C-1,2,3,4,7,8-HxCDD	79		32 - 141				05/07/19 07:48	05/08/19 19:56	1
13C-1,2,3,4,7,8-HxCDF	72		26 - 152				05/07/19 07:48	05/08/19 19:56	1
13C-1,2,3,6,7,8-HxCDD	70		28 - 130				05/07/19 07:48	05/08/19 19:56	1
13C-1,2,3,6,7,8-HxCDF	65		26 - 123				05/07/19 07:48	05/08/19 19:56	1
13C-1,2,3,7,8,9-HxCDF	85		29 - 147				05/07/19 07:48	05/08/19 19:56	1
13C-1,2,3,7,8-PeCDD	75		25 - 181				05/07/19 07:48	05/08/19 19:56	1
13C-1,2,3,7,8-PeCDF	87		24 - 185				05/07/19 07:48	05/08/19 19:56	1
13C-2,3,4,6,7,8-HxCDF	78		28 - 136				05/07/19 07:48	05/08/19 19:56	1
13C-2,3,4,7,8-PeCDF	79		21 - 178				05/07/19 07:48	05/08/19 19:56	1
13C-2,3,7,8-TCDD	77		25 - 164				05/07/19 07:48	05/08/19 19:56	1
13C-2,3,7,8-TCDF	80		24 - 169				05/07/19 07:48	05/08/19 19:56	1
13C-OCDD	106		17 - 157				05/07/19 07:48	05/08/19 19:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
37Cl-2,3,7,8-TCDD	91		35 - 197				05/07/19 07:48	05/08/19 19:56	1

Eurofins TestAmerica, Seattle

QC Sample Results

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

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

Lab Sample ID: MB 320-292728/1-A

Matrix: Solid

Analysis Batch: 293288

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 292728

Analyte	MB		RL	EDL	Unit	D	Prepared		Dil Fac
	Result	Qualifier					Prepared	Analyzed	
1,2,3,4,6,7,8-HpCDD	0.00129	J	0.0050	0.000086	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
1,2,3,4,6,7,8-HpCDF	0.000180	J q	0.0050	0.000058	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
1,2,3,4,7,8,9-HpCDF		ND	0.0050	0.000085	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
1,2,3,4,7,8-HxCDD		ND	0.0050	0.000095	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
1,2,3,4,7,8-HxCDF		ND	0.0050	0.000091	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
1,2,3,6,7,8-HxCDD		ND	0.0050	0.000092	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
1,2,3,6,7,8-HxCDF		ND	0.0050	0.000086	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
1,2,3,7,8,9-HxCDD		ND	0.0050	0.000085	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
1,2,3,7,8,9-HxCDF		ND	0.0050	0.000071	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
1,2,3,7,8-PeCDD		ND	0.0050	0.000017	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
1,2,3,7,8-PeCDF		ND	0.0050	0.000012	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
2,3,4,6,7,8-HxCDF		ND	0.0050	0.000064	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
2,3,4,7,8-PeCDF		ND	0.0050	0.000014	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
2,3,7,8-TCDD		ND	0.0010	0.000018	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
2,3,7,8-TCDF		ND	0.0010	0.000014	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
OCDD	0.0210		0.010	0.000013	ug/Kg	05/06/19 16:43	05/08/19 22:00		1
OCDF	0.000973	J	0.010	0.000012	ug/Kg	05/06/19 16:43	05/08/19 22:00		1

Isotope Dilution	MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C-1,2,3,4,6,7,8-HpCDD	64		23 - 140	05/06/19 16:43	05/08/19 22:00	1
13C-1,2,3,4,6,7,8-HpCDF	71		28 - 143	05/06/19 16:43	05/08/19 22:00	1
13C-1,2,3,4,7,8,9-HpCDF	62		26 - 138	05/06/19 16:43	05/08/19 22:00	1
13C-1,2,3,4,7,8-HxCDD	66		32 - 141	05/06/19 16:43	05/08/19 22:00	1
13C-1,2,3,4,7,8-HxCDF	71		26 - 152	05/06/19 16:43	05/08/19 22:00	1
13C-1,2,3,6,7,8-HxCDD	66		28 - 130	05/06/19 16:43	05/08/19 22:00	1
13C-1,2,3,6,7,8-HxCDF	73		26 - 123	05/06/19 16:43	05/08/19 22:00	1
13C-1,2,3,7,8,9-HxCDF	67		29 - 147	05/06/19 16:43	05/08/19 22:00	1
13C-1,2,3,7,8-PeCDD	64		25 - 181	05/06/19 16:43	05/08/19 22:00	1
13C-1,2,3,7,8-PeCDF	72		24 - 185	05/06/19 16:43	05/08/19 22:00	1
13C-2,3,4,6,7,8-HxCDF	73		28 - 136	05/06/19 16:43	05/08/19 22:00	1
13C-2,3,4,7,8-PeCDF	63		21 - 178	05/06/19 16:43	05/08/19 22:00	1
13C-2,3,7,8-TCDD	63		25 - 164	05/06/19 16:43	05/08/19 22:00	1
13C-2,3,7,8-TCDF	67		24 - 169	05/06/19 16:43	05/08/19 22:00	1
13C-OCDD	65		17 - 157	05/06/19 16:43	05/08/19 22:00	1

Surrogate	MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
37Cl-2,3,7,8-TCDD	98		35 - 197	05/06/19 16:43	05/08/19 22:00	1

Lab Sample ID: LCS 320-292728/2-A

Matrix: Solid

Analysis Batch: 293288

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 292728

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec.	
	Added	Result						Limits	
1,2,3,4,6,7,8-HpCDD	0.100	0.118	ug/Kg	118	70 - 140				
1,2,3,4,6,7,8-HpCDF	0.100	0.114	ug/Kg	114	82 - 122				
1,2,3,4,7,8,9-HpCDF	0.100	0.116	ug/Kg	116	78 - 138				
1,2,3,4,7,8-HxCDD	0.100	0.120	ug/Kg	120	70 - 164				
1,2,3,4,7,8-HxCDF	0.100	0.114	ug/Kg	114	72 - 134				

Eurofins TestAmerica, Seattle

QC Sample Results

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

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

Lab Sample ID: LCS 320-292728/2-A

Matrix: Solid

Analysis Batch: 293288

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 292728

%Rec.

Limits

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
1,2,3,6,7,8-HxCDD	0.100	0.115		ug/Kg		115	76 - 134
1,2,3,6,7,8-HxCDF	0.100	0.117		ug/Kg		117	84 - 130
1,2,3,7,8,9-HxCDD	0.100	0.117		ug/Kg		117	64 - 162
1,2,3,7,8,9-HxCDF	0.100	0.118		ug/Kg		118	78 - 130
1,2,3,7,8-PeCDD	0.100	0.122		ug/Kg		122	70 - 142
1,2,3,7,8-PeCDF	0.100	0.114		ug/Kg		114	80 - 134
2,3,4,6,7,8-HxCDF	0.100	0.116		ug/Kg		116	70 - 156
2,3,4,7,8-PeCDF	0.100	0.122		ug/Kg		122	68 - 160
2,3,7,8-TCDD	0.0200	0.0228		ug/Kg		114	67 - 158
2,3,7,8-TCDF	0.0200	0.0233		ug/Kg		117	75 - 158
OCDD	0.200	0.225		ug/Kg		113	78 - 144
OCDF	0.200	0.227		ug/Kg		113	63 - 170

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
13C-1,2,3,4,6,7,8-HxCDD	64		26 - 166
13C-1,2,3,4,6,7,8-HxCDF	66		21 - 158
13C-1,2,3,4,7,8,9-HpCDF	63		20 - 186
13C-1,2,3,4,7,8-HxCDD	61		21 - 193
13C-1,2,3,4,7,8-HxCDF	70		19 - 202
13C-1,2,3,6,7,8-HxCDD	66		25 - 163
13C-1,2,3,6,7,8-HxCDF	69		21 - 159
13C-1,2,3,7,8,9-HxCDF	65		17 - 205
13C-1,2,3,7,8-PeCDD	59		21 - 227
13C-1,2,3,7,8-PeCDF	70		21 - 192
13C-2,3,4,6,7,8-HxCDF	71		22 - 176
13C-2,3,4,7,8-PeCDF	64		13 - 328
13C-2,3,7,8-TCDD	63		20 - 175
13C-2,3,7,8-TCDF	65		22 - 152
13C-OCDD	67		13 - 199

LCS LCS

Surrogate	%Recovery	Qualifier	Limits
37Cl4-2,3,7,8-TCDD	99		31 - 191

Lab Sample ID: LCSD 320-292728/3-A

Matrix: Solid

Analysis Batch: 293288

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 292728

%Rec.

RPD

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
1,2,3,4,6,7,8-HpCDD	0.100	0.118		ug/Kg		118	70 - 140	0	50
1,2,3,4,6,7,8-HpCDF	0.100	0.113		ug/Kg		113	82 - 122	0	50
1,2,3,4,7,8,9-HpCDF	0.100	0.117		ug/Kg		117	78 - 138	1	50
1,2,3,4,7,8-HxCDD	0.100	0.118		ug/Kg		118	70 - 164	2	50
1,2,3,4,7,8-HxCDF	0.100	0.113		ug/Kg		113	72 - 134	1	50
1,2,3,6,7,8-HxCDD	0.100	0.116		ug/Kg		116	76 - 134	1	50
1,2,3,6,7,8-HxCDF	0.100	0.118		ug/Kg		118	84 - 130	2	50
1,2,3,7,8,9-HxCDD	0.100	0.112		ug/Kg		112	64 - 162	4	50
1,2,3,7,8,9-HxCDF	0.100	0.118		ug/Kg		118	78 - 130	0	50
1,2,3,7,8-PeCDD	0.100	0.121		ug/Kg		121	70 - 142	0	50

Eurofins TestAmerica, Seattle

QC Sample Results

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

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

Lab Sample ID: LCSD 320-292728/3-A

Matrix: Solid

Analysis Batch: 293288

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 292728

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
1,2,3,7,8-PeCDF	0.100	0.114		ug/Kg	114	80 - 134		0	50
2,3,4,6,7,8-HxCDF	0.100	0.120		ug/Kg	120	70 - 156		3	50
2,3,4,7,8-PeCDF	0.100	0.122		ug/Kg	122	68 - 160		0	50
2,3,7,8-TCDD	0.0200	0.0229		ug/Kg	115	67 - 158		1	50
2,3,7,8-TCDF	0.0200	0.0234		ug/Kg	117	75 - 158		1	50
OCDD	0.200	0.223		ug/Kg	111	78 - 144		1	50
OCDF	0.200	0.223		ug/Kg	111	63 - 170		2	50

Isotope Dilution	LCSD	LCSD	Limits
	%Recovery	Qualifier	
13C-1,2,3,4,6,7,8-HpCDD	64		26 - 166
13C-1,2,3,4,6,7,8-HpCDF	69		21 - 158
13C-1,2,3,4,7,8,9-HpCDF	63		20 - 186
13C-1,2,3,4,7,8-HxCDD	65		21 - 193
13C-1,2,3,4,7,8-HxCDF	71		19 - 202
13C-1,2,3,6,7,8-HxCDD	70		25 - 163
13C-1,2,3,6,7,8-HxCDF	71		21 - 159
13C-1,2,3,7,8,9-HxCDF	66		17 - 205
13C-1,2,3,7,8-PeCDD	58		21 - 227
13C-1,2,3,7,8-PeCDF	66		21 - 192
13C-2,3,4,6,7,8-HxCDF	69		22 - 176
13C-2,3,4,7,8-PeCDF	59		13 - 328
13C-2,3,7,8-TCDD	63		20 - 175
13C-2,3,7,8-TCDF	66		22 - 152
13C-OCDD	67		13 - 199
Surrogate	LCSD	LCSD	Limits
	%Recovery	Qualifier	
37Cl4-2,3,7,8-TCDD	96		31 - 191

Lab Sample ID: MB 320-292799/1-A

Matrix: Water

Analysis Batch: 293238

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 292799

Analyte	MB Result	MB Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,3,4,6,7,8-HpCDD	2.70	J	50	1.1	pg/L	05/07/19 07:48	05/08/19 17:34		1
1,2,3,4,6,7,8-HpCDF	ND		50	2.0	pg/L	05/07/19 07:48	05/08/19 17:34		1
1,2,3,4,7,8,9-HpCDF	ND		50	2.5	pg/L	05/07/19 07:48	05/08/19 17:34		1
1,2,3,4,7,8-HxCDD	ND		50	1.8	pg/L	05/07/19 07:48	05/08/19 17:34		1
1,2,3,4,7,8-HxCDF	ND		50	1.5	pg/L	05/07/19 07:48	05/08/19 17:34		1
1,2,3,6,7,8-HxCDD	ND		50	1.6	pg/L	05/07/19 07:48	05/08/19 17:34		1
1,2,3,6,7,8-HxCDF	ND		50	1.4	pg/L	05/07/19 07:48	05/08/19 17:34		1
1,2,3,7,8,9-HxCDD	ND		50	1.6	pg/L	05/07/19 07:48	05/08/19 17:34		1
1,2,3,7,8,9-HxCDF	3.68	J q	50	0.98	pg/L	05/07/19 07:48	05/08/19 17:34		1
1,2,3,7,8-PeCDD	ND		50	3.0	pg/L	05/07/19 07:48	05/08/19 17:34		1
1,2,3,7,8-PeCDF	ND		50	1.7	pg/L	05/07/19 07:48	05/08/19 17:34		1
2,3,4,6,7,8-HxCDF	ND		50	1.0	pg/L	05/07/19 07:48	05/08/19 17:34		1
2,3,4,7,8-PeCDF	ND		50	1.9	pg/L	05/07/19 07:48	05/08/19 17:34		1
2,3,7,8-TCDD	ND		10	2.0	pg/L	05/07/19 07:48	05/08/19 17:34		1
2,3,7,8-TCDF	ND		10	1.1	pg/L	05/07/19 07:48	05/08/19 17:34		1

Eurofins TestAmerica, Seattle

QC Sample Results

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

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

Lab Sample ID: MB 320-292799/1-A

Matrix: Water

Analysis Batch: 293238

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 292799

Analyte	MB		RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
OCDD	11.5	J q	100	1.8	pg/L		05/07/19 07:48	05/08/19 17:34	1
OCDF	ND		100	2.5	pg/L		05/07/19 07:48	05/08/19 17:34	1
Isotope Dilution									
13C-1,2,3,4,6,7,8-HpCDD	87		23 - 140				05/07/19 07:48	05/08/19 17:34	1
13C-1,2,3,4,6,7,8-HpCDF	82		28 - 143				05/07/19 07:48	05/08/19 17:34	1
13C-1,2,3,4,7,8,9-HpCDF	90		26 - 138				05/07/19 07:48	05/08/19 17:34	1
13C-1,2,3,4,7,8-HxCDD	64		32 - 141				05/07/19 07:48	05/08/19 17:34	1
13C-1,2,3,4,7,8-HxCDF	50		26 - 152				05/07/19 07:48	05/08/19 17:34	1
13C-1,2,3,6,7,8-HxCDD	58		28 - 130				05/07/19 07:48	05/08/19 17:34	1
13C-1,2,3,6,7,8-HxCDF	44		26 - 123				05/07/19 07:48	05/08/19 17:34	1
13C-1,2,3,7,8,9-HxCDF	72		29 - 147				05/07/19 07:48	05/08/19 17:34	1
13C-1,2,3,7,8-PeCDD	71		25 - 181				05/07/19 07:48	05/08/19 17:34	1
13C-1,2,3,7,8-PeCDF	79		24 - 185				05/07/19 07:48	05/08/19 17:34	1
13C-2,3,4,6,7,8-HxCDF	63		28 - 136				05/07/19 07:48	05/08/19 17:34	1
13C-2,3,4,7,8-PeCDF	73		21 - 178				05/07/19 07:48	05/08/19 17:34	1
13C-2,3,7,8-TCDD	68		25 - 164				05/07/19 07:48	05/08/19 17:34	1
13C-2,3,7,8-TCDF	72		24 - 169				05/07/19 07:48	05/08/19 17:34	1
13C-OCDD	83		17 - 157				05/07/19 07:48	05/08/19 17:34	1
Surrogate									
37Cl4-2,3,7,8-TCDD	91		35 - 197				05/07/19 07:48	05/08/19 17:34	1

Lab Sample ID: LCS 320-292799/2-A

Matrix: Water

Analysis Batch: 293238

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 292799

%Rec.

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	
	Added	Result							
1,2,3,4,6,7,8-HpCDD	1000	1100	pg/L			110	70 - 140		
1,2,3,4,6,7,8-HpCDF	1000	1130	pg/L			113	82 - 122		
1,2,3,4,7,8,9-HpCDF	1000	1140	pg/L			114	78 - 138		
1,2,3,4,7,8-HxCDD	1000	1100	pg/L			110	70 - 164		
1,2,3,4,7,8-HxCDF	1000	1040	pg/L			104	72 - 134		
1,2,3,6,7,8-HxCDD	1000	1100	pg/L			110	76 - 134		
1,2,3,6,7,8-HxCDF	1000	1100	pg/L			110	84 - 130		
1,2,3,7,8,9-HxCDD	1000	1140	pg/L			114	64 - 162		
1,2,3,7,8,9-HxCDF	1000	1070	pg/L			107	78 - 130		
1,2,3,7,8-PeCDD	1000	1150	pg/L			115	70 - 142		
1,2,3,7,8-PeCDF	1000	1160	pg/L			116	80 - 134		
2,3,4,6,7,8-HxCDF	1000	1060	pg/L			106	70 - 156		
2,3,4,7,8-PeCDF	1000	1210	pg/L			121	68 - 160		
2,3,7,8-TCDD	200	223	pg/L			112	67 - 158		
2,3,7,8-TCDF	200	206	pg/L			103	75 - 158		
OCDD	2000	2170	pg/L			109	78 - 144		
OCDF	2000	2460	pg/L			123	63 - 170		
Isotope Dilution									
13C-1,2,3,4,6,7,8-HpCDD	100		26 - 166						

Eurofins TestAmerica, Seattle

QC Sample Results

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

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

Lab Sample ID: LCS 320-292799/2-A

Matrix: Water

Analysis Batch: 293238

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 292799

<i>Isotope Dilution</i>	<i>LCS</i>	<i>LCS</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
13C-1,2,3,4,6,7,8-HpCDD	89				21 - 158
13C-1,2,3,4,7,8,9-HpCDF	99				20 - 186
13C-1,2,3,4,7,8-HxCDD	71				21 - 193
13C-1,2,3,4,7,8-HxCDF	61				19 - 202
13C-1,2,3,6,7,8-HxCDD	65				25 - 163
13C-1,2,3,6,7,8-HxCDF	56				21 - 159
13C-1,2,3,7,8,9-HxCDF	78				17 - 205
13C-1,2,3,7,8-PeCDD	73				21 - 227
13C-1,2,3,7,8-PeCDF	82				21 - 192
13C-2,3,4,6,7,8-HxCDF	71				22 - 176
13C-2,3,4,7,8-PeCDF	75				13 - 328
13C-2,3,7,8-TCDD	71				20 - 175
13C-2,3,7,8-TCDF	74				22 - 152
13C-OCDD	97				13 - 199
<i>Surrogate</i>	<i>LCS</i>	<i>LCS</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
37Cl4-2,3,7,8-TCDD	92				31 - 191

Lab Sample ID: LCSD 320-292799/3-A

Matrix: Water

Analysis Batch: 293238

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 292799

<i>Analyte</i>	<i>Spike Added</i>	<i>LCSD</i>	<i>LCSD</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>Limits</i>	<i>RPD</i>	<i>Limit</i>
		<i>Result</i>	<i>Qualifier</i>						
1,2,3,4,6,7,8-HpCDD	1000	1160		pg/L		116	70 - 140	5	50
1,2,3,4,6,7,8-HpCDF	1000	1160		pg/L		116	82 - 122	3	50
1,2,3,4,7,8,9-HpCDF	1000	1150		pg/L		115	78 - 138	1	50
1,2,3,4,7,8-HxCDD	1000	1180		pg/L		118	70 - 164	8	50
1,2,3,4,7,8-HxCDF	1000	1100		pg/L		110	72 - 134	6	50
1,2,3,6,7,8-HxCDD	1000	1100		pg/L		110	76 - 134	0	50
1,2,3,6,7,8-HxCDF	1000	1100		pg/L		110	84 - 130	0	50
1,2,3,7,8,9-HxCDD	1000	1180		pg/L		118	64 - 162	3	50
1,2,3,7,8,9-HxCDF	1000	1120		pg/L		112	78 - 130	5	50
1,2,3,7,8-PeCDD	1000	1180		pg/L		118	70 - 142	3	50
1,2,3,7,8-PeCDF	1000	1150		pg/L		115	80 - 134	0	50
2,3,4,6,7,8-HxCDF	1000	1100		pg/L		110	70 - 156	4	50
2,3,4,7,8-PeCDF	1000	1240		pg/L		124	68 - 160	2	50
2,3,7,8-TCDD	200	230		pg/L		115	67 - 158	3	50
2,3,7,8-TCDF	200	206		pg/L		103	75 - 158	0	50
OCDD	2000	2280		pg/L		114	78 - 144	5	50
OCDF	2000	2560		pg/L		128	63 - 170	4	50

<i>Isotope Dilution</i>	<i>LCS</i>	<i>LCS</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
13C-1,2,3,4,6,7,8-HpCDD	105				26 - 166
13C-1,2,3,4,6,7,8-HpCDF	95				21 - 158
13C-1,2,3,4,7,8,9-HpCDF	108				20 - 186
13C-1,2,3,4,7,8-HxCDD	74				21 - 193
13C-1,2,3,4,7,8-HxCDF	68				19 - 202
13C-1,2,3,6,7,8-HxCDD	70				25 - 163

Eurofins TestAmerica, Seattle

QC Sample Results

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

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

Lab Sample ID: LCSD 320-292799/3-A

Matrix: Water

Analysis Batch: 293238

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 292799

<i>Isotope Dilution</i>	<i>LCSD</i>	<i>LCSD</i>	<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C-1,2,3,6,7,8-HxCDF	62		21 - 159
13C-1,2,3,7,8,9-HxCDF	84		17 - 205
13C-1,2,3,7,8-PeCDD	75		21 - 227
13C-1,2,3,7,8-PeCDF	85		21 - 192
13C-2,3,4,6,7,8-HxCDF	76		22 - 176
13C-2,3,4,7,8-PeCDF	78		13 - 328
13C-2,3,7,8-TCDD	73		20 - 175
13C-2,3,7,8-TCDF	75		22 - 152
13C-OCDD	100		13 - 199
<hr/>			
<i>Surrogate</i>	<i>LCSD</i>	<i>LCSD</i>	<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
37Cl4-2,3,7,8-TCDD	91		31 - 191

Lab Sample ID: MB 320-292878/1-A

Matrix: Solid

Analysis Batch: 293288

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 292878

<i>Analyte</i>	<i>MB</i>	<i>MB</i>	<i>Result</i>	<i>Qualifier</i>	<i>RL</i>	<i>EDL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
1,2,3,4,6,7,8-HxCDD			ND		0.0050	0.000044	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
1,2,3,4,6,7,8-HpCDF			ND		0.0050	0.000055	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
1,2,3,4,7,8,9-HpCDF			ND		0.0050	0.000077	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
1,2,3,4,7,8-HxCDD			ND		0.0050	0.000077	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
1,2,3,4,7,8-HxCDF			ND		0.0050	0.000070	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
1,2,3,6,7,8-HxCDD			ND		0.0050	0.000074	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
1,2,3,6,7,8-HxCDF			ND		0.0050	0.000068	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
1,2,3,7,8,9-HxCDD			ND		0.0050	0.000069	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
1,2,3,7,8,9-HxCDF	0.000463	J			0.0050	0.000053	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
1,2,3,7,8-PeCDD			ND		0.0050	0.000091	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
1,2,3,7,8-PeCDF			ND		0.0050	0.000087	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
2,3,4,6,7,8-HxCDF			ND		0.0050	0.000051	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
2,3,4,7,8-PeCDF			ND		0.0050	0.000096	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
2,3,7,8-TCDD			ND		0.0010	0.00011	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
2,3,7,8-TCDF			ND		0.0010	0.000055	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
OCDD	0.00122	J			0.010	0.000063	ug/Kg		05/07/19 12:13	05/09/19 04:54	1
OCDF	0.000392	J			0.010	0.000075	ug/Kg		05/07/19 12:13	05/09/19 04:54	1

<i>Isotope Dilution</i>	<i>MB</i>	<i>MB</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>	
13C-1,2,3,4,6,7,8-HpCDD			72		23 - 140		05/07/19 12:13	05/09/19 04:54	1
13C-1,2,3,4,6,7,8-HpCDF			75		28 - 143		05/07/19 12:13	05/09/19 04:54	1
13C-1,2,3,4,7,8,9-HpCDF			71		26 - 138		05/07/19 12:13	05/09/19 04:54	1
13C-1,2,3,4,7,8-HxCDD			69		32 - 141		05/07/19 12:13	05/09/19 04:54	1
13C-1,2,3,4,7,8-HxCDF			78		26 - 152		05/07/19 12:13	05/09/19 04:54	1
13C-1,2,3,6,7,8-HxCDD			74		28 - 130		05/07/19 12:13	05/09/19 04:54	1
13C-1,2,3,6,7,8-HxCDF			78		26 - 123		05/07/19 12:13	05/09/19 04:54	1
13C-1,2,3,7,8,9-HxCDF			74		29 - 147		05/07/19 12:13	05/09/19 04:54	1
13C-1,2,3,7,8-PeCDD			69		25 - 181		05/07/19 12:13	05/09/19 04:54	1
13C-1,2,3,7,8-PeCDF			71		24 - 185		05/07/19 12:13	05/09/19 04:54	1
13C-2,3,4,6,7,8-HxCDF			76		28 - 136		05/07/19 12:13	05/09/19 04:54	1

Eurofins TestAmerica, Seattle

QC Sample Results

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

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

Lab Sample ID: MB 320-292878/1-A

Matrix: Solid

Analysis Batch: 293288

Isotope Dilution	MB	MB	Limits
	%Recovery	Qualifier	
13C-2,3,4,7,8-PeCDF	69		21 - 178
13C-2,3,7,8-TCDD	72		25 - 164
13C-2,3,7,8-TCDF	74		24 - 169
13C-OCDD	73		17 - 157

Surrogate	MB	MB	Limits
	%Recovery	Qualifier	
37Cl-2,3,7,8-TCDD	98		35 - 197

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 292878

Prepared	Analyzed	Dil Fac
05/07/19 12:13	05/09/19 04:54	1
05/07/19 12:13	05/09/19 04:54	1
05/07/19 12:13	05/09/19 04:54	1
05/07/19 12:13	05/09/19 04:54	1

Lab Sample ID: LCS 320-292878/2-A

Matrix: Solid

Analysis Batch: 293288

Analyte	Spike	LCS	LCS	%Rec.	Limits
	Added	Result	Qualifier		
1,2,3,4,6,7,8-HpCDD	0.100	0.107		107	70 - 140
1,2,3,4,6,7,8-HpCDF	0.100	0.104		104	82 - 122
1,2,3,4,7,8,9-HpCDF	0.100	0.105		105	78 - 138
1,2,3,4,7,8-HxCDD	0.100	0.109		109	70 - 164
1,2,3,4,7,8-HxCDF	0.100	0.105		105	72 - 134
1,2,3,6,7,8-HxCDD	0.100	0.107		107	76 - 134
1,2,3,6,7,8-HxCDF	0.100	0.109		109	84 - 130
1,2,3,7,8,9-HxCDD	0.100	0.106		106	64 - 162
1,2,3,7,8,9-HxCDF	0.100	0.110		110	78 - 130
1,2,3,7,8-PeCDD	0.100	0.110		110	70 - 142
1,2,3,7,8-PeCDF	0.100	0.105		105	80 - 134
2,3,4,6,7,8-HxCDF	0.100	0.108		108	70 - 156
2,3,4,7,8-PeCDF	0.100	0.112		112	68 - 160
2,3,7,8-TCDD	0.0200	0.0210		105	67 - 158
2,3,7,8-TCDF	0.0200	0.0217		108	75 - 158
OCDD	0.200	0.209		104	78 - 144
OCDF	0.200	0.210		105	63 - 170

Isotope Dilution	LCS	LCS	Limits
	%Recovery	Qualifier	
13C-1,2,3,4,6,7,8-HpCDD	76		26 - 166
13C-1,2,3,4,6,7,8-HpCDF	78		21 - 158
13C-1,2,3,4,7,8,9-HpCDF	73		20 - 186
13C-1,2,3,4,7,8-HxCDD	70		21 - 193
13C-1,2,3,4,7,8-HxCDF	79		19 - 202
13C-1,2,3,6,7,8-HxCDD	74		25 - 163
13C-1,2,3,6,7,8-HxCDF	80		21 - 159
13C-1,2,3,7,8,9-HxCDF	74		17 - 205
13C-1,2,3,7,8-PeCDD	66		21 - 227
13C-1,2,3,7,8-PeCDF	68		21 - 192
13C-2,3,4,6,7,8-HxCDF	77		22 - 176
13C-2,3,4,7,8-PeCDF	65		13 - 328
13C-2,3,7,8-TCDD	69		20 - 175
13C-2,3,7,8-TCDF	73		22 - 152
13C-OCDD	78		13 - 199

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 292878

QC Sample Results

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

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

Lab Sample ID: LCS 320-292878/2-A

Matrix: Solid

Analysis Batch: 293288

Surrogate	LCS	LCS	
	%Recovery	Qualifier	Limits
37Cl4-2,3,7,8-TCDD	93		31 - 191

Lab Sample ID: LCSD 320-292878/3-A

Matrix: Solid

Analysis Batch: 293288

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	Limits	RPD	Limit
		Result	Qualifier						
1,2,3,4,6,7,8-HxCDD	0.100	0.107		ug/Kg		107	70 - 140	0	50
1,2,3,4,6,7,8-HxCDF	0.100	0.0992		ug/Kg		99	82 - 122	4	50
1,2,3,4,7,8,9-HxCDF	0.100	0.101		ug/Kg		101	78 - 138	4	50
1,2,3,4,7,8-HxCDD	0.100	0.107		ug/Kg		107	70 - 164	2	50
1,2,3,4,7,8-HxCDF	0.100	0.0992		ug/Kg		99	72 - 134	6	50
1,2,3,6,7,8-HxCDD	0.100	0.102		ug/Kg		102	76 - 134	4	50
1,2,3,6,7,8-HxCDF	0.100	0.103		ug/Kg		103	84 - 130	5	50
1,2,3,7,8,9-HxCDD	0.100	0.105		ug/Kg		105	64 - 162	1	50
1,2,3,7,8,9-HxCDF	0.100	0.106		ug/Kg		106	78 - 130	4	50
1,2,3,7,8-PeCDD	0.100	0.106		ug/Kg		106	70 - 142	4	50
1,2,3,7,8-PeCDF	0.100	0.102		ug/Kg		102	80 - 134	3	50
2,3,4,6,7,8-HxCDF	0.100	0.105		ug/Kg		105	70 - 156	3	50
2,3,4,7,8-PeCDF	0.100	0.107		ug/Kg		107	68 - 160	5	50
2,3,7,8-TCDD	0.0200	0.0203		ug/Kg		101	67 - 158	3	50
2,3,7,8-TCDF	0.0200	0.0208		ug/Kg		104	75 - 158	4	50
OCDD	0.200	0.207		ug/Kg		103	78 - 144	1	50
OCDF	0.200	0.202		ug/Kg		101	63 - 170	4	50

Isotope Dilution	LCSD	LCSD	
	%Recovery	Qualifier	Limits
13C-1,2,3,4,6,7,8-HpCDD	73		26 - 166
13C-1,2,3,4,6,7,8-HpCDF	73		21 - 158
13C-1,2,3,4,7,8,9-HpCDF	73		20 - 186
13C-1,2,3,4,7,8-HxCDD	71		21 - 193
13C-1,2,3,4,7,8-HxCDF	82		19 - 202
13C-1,2,3,6,7,8-HxCDD	74		25 - 163
13C-1,2,3,6,7,8-HxCDF	80		21 - 159
13C-1,2,3,7,8,9-HxCDF	75		17 - 205
13C-1,2,3,7,8-PeCDD	70		21 - 227
13C-1,2,3,7,8-PeCDF	71		21 - 192
13C-2,3,4,6,7,8-HxCDF	78		22 - 176
13C-2,3,4,7,8-PeCDF	70		13 - 328
13C-2,3,7,8-TCDD	71		20 - 175
13C-2,3,7,8-TCDF	69		22 - 152
13C-OCDD	75		13 - 199

Surrogate	LCSD	LCSD	
	%Recovery	Qualifier	Limits
37Cl4-2,3,7,8-TCDD	95		31 - 191

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 292878

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 292878

%Rec.

RPD

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12

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Lab Chronicle

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

Client Sample ID: PDI-ST-T07A-1905

Date Collected: 05/01/19 16:45

Date Received: 05/03/19 11:05

Lab Sample ID: 580-85913-1

Matrix: Solid

Percent Solids: 49.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	HRMS-Sox			292728	05/06/19 16:43	SR1	TAL SAC
Total/NA	Analysis	1613B		1	293288	05/09/19 00:18	AS	TAL SAC

Client Sample ID: PDI-ST-T07B-1905

Date Collected: 05/01/19 17:00

Date Received: 05/03/19 11:05

Lab Sample ID: 580-85913-2

Matrix: Solid

Percent Solids: 41.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	HRMS-Sox			292728	05/06/19 16:43	SR1	TAL SAC
Total/NA	Analysis	1613B		1	293288	05/09/19 01:04	AS	TAL SAC

Client Sample ID: PDI-ST-T06A-1905

Date Collected: 05/01/19 17:15

Date Received: 05/03/19 11:05

Lab Sample ID: 580-85913-3

Matrix: Solid

Percent Solids: 45.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	HRMS-Sox			292728	05/06/19 16:43	SR1	TAL SAC
Total/NA	Analysis	1613B		1	293288	05/09/19 01:50	AS	TAL SAC

Client Sample ID: PDI-ST-T06B-1905

Date Collected: 05/01/19 17:10

Date Received: 05/03/19 11:05

Lab Sample ID: 580-85913-4

Matrix: Solid

Percent Solids: 40.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	HRMS-Sox			292878	05/07/19 12:13	CJU	TAL SAC
Total/NA	Analysis	1613B		1	293288	05/09/19 02:36	AS	TAL SAC

Client Sample ID: PDI-RB-ST-190501

Date Collected: 05/01/19 17:45

Date Received: 05/03/19 11:05

Lab Sample ID: 580-85913-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			292799	05/07/19 07:48	A1A	TAL SAC
Total/NA	Analysis	1613B		1	293238	05/08/19 19:56	ALM	TAL SAC

Laboratory References:

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

Eurofins TestAmerica, Seattle

Accreditation/Certification Summary

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

Laboratory: Eurofins 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	01-19-20
ANAB	DoD		L2236	01-19-22
ANAB	ISO/IEC 17025		L2236	01-19-22
California	State Program	9	2901	11-05-19
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-19
US Fish & Wildlife	Federal		LE058448-0	07-31-19
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-20

Laboratory: Eurofins 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		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	01-31-20
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	01-29-20
Illinois	NELAP	5	200060	03-17-19 *
Kansas	NELAP	7	E-10375	10-31-19
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	04-20-20
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	04-01-20
Oregon	NELAP	10	4040	01-29-20
Pennsylvania	NELAP	3	68-01272	03-31-20
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	02-29-20
Vermont	State Program	1	VT-4040	04-16-20
Virginia	NELAP	3	460278	03-14-20 *
Washington	State Program	10	C581	05-05-19 *
West Virginia (DW)	State Program	3	9930C	12-31-19
Wyoming	State Program	8	8TMS-L	01-28-19 *

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

Eurofins TestAmerica, Seattle

Sample Summary

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-85913-1	PDI-ST-T07A-1905	Solid	05/01/19 16:45	05/03/19 11:05
580-85913-2	PDI-ST-T07B-1905	Solid	05/01/19 17:00	05/03/19 11:05
580-85913-3	PDI-ST-T06A-1905	Solid	05/01/19 17:15	05/03/19 11:05
580-85913-4	PDI-ST-T06B-1905	Solid	05/01/19 17:10	05/03/19 11:05
580-85913-5	PDI-RB-ST-190501	Water	05/01/19 17:45	05/03/19 11:05

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580-85913 Chain of Custody

45.1.3

$$5=3.4$$

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-85913-2

Login Number: 85913

List Source: Eurofins TestAmerica, Seattle

List Number: 1

Creator: O'Connell, Jason I

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

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-85913-2

Login Number: 85913

List Source: Eurofins TestAmerica, Sacramento

List Number: 2

List Creation: 05/06/19 03:31 PM

Creator: Nelson, Kym D

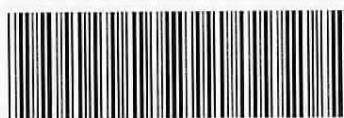
Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.3C
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

THE LEADER IN ENVIRONMENTAL TESTING

Sacramento



580-85913 Field Sheet

JOURNAL OF

Tracking # 4772 7014 2871 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: Double checked 4-C 4-1	Therm. ID: AK-2 / <u>AK-3</u> / AK-5 / AK-7 / HACCP / Other (-1.0°C)																																																																				
	Ice <input checked="" type="checkbox"/> Wet <input checked="" type="checkbox"/> Gel _____ Other _____																																																																				
	Cooler Custody Seal: _____																																																																				
	Sample Custody Seal: _____																																																																				
	Cooler ID: _____																																																																				
#4 was not on the COC. other samples were ok! 5/1/19	Temp: Observed <u>3.3</u> Corrected <u>3.3</u> From: Temp Blank <input type="checkbox"/> Sample <input checked="" type="checkbox"/> NCM Filed: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>																																																																				
	<table border="0"><tr><td>Perchlorate has headspace(1/3 bottle¹)?</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>Alkalinity has no headspace?</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>CoC is complete w/o discrepancies?</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Samples received within holding time?</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Sample preservatives verified?</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>Cooler compromised/tampered with?</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Samples compromised/tampered with?</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Samples w/o discrepancies?</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Sample containers have legible labels?</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Containers are not broken or leaking?</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Sample date/times are provided.</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Appropriate containers are used?</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Sample bottles are completely filled?</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Zero headspace?²</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>Multiphasic samples are not present?</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Sample temp OK?</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Sample out of temp?</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr></table>	Perchlorate has headspace(1/3 bottle ¹)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Alkalinity has no headspace?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	CoC is complete w/o discrepancies?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample preservatives verified?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Cooler compromised/tampered with?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Samples compromised/tampered with?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Samples w/o discrepancies?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample containers have legible labels?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Containers are not broken or leaking?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample date/times are provided.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Appropriate containers are used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample bottles are completely filled?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Zero headspace? ²	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Multiphasic samples are not present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample temp OK?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample out of temp?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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Multiphasic samples are not present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																		
Sample temp OK?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																		
Sample out of temp?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																		
Initials: <u>EC</u>	Date: <u>5/14/19</u>																																																																				

¹For a 250mL polyethylene container, filled no higher than the 200mL mark on the bottle.
²Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4").

Isotope Dilution Summary

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

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)
580-85913-1	PDI-ST-T07A-1905	57	54	58	59	65	62	67	63
580-85913-2	PDI-ST-T07B-1905	59	52	60	61	68	63	70	65
580-85913-3	PDI-ST-T06A-1905	57	59	58	58	65	62	67	65
580-85913-4	PDI-ST-T06B-1905	71	73	72	69	82	73	82	75
MB 320-292728/1-A	Method Blank	64	71	62	66	71	66	73	67
MB 320-292878/1-A	Method Blank	72	75	71	69	78	74	78	74
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)	TCDF (24-169)	OCDD (17-157)	
580-85913-1	PDI-ST-T07A-1905	56	60	64	55	59	59	54	
580-85913-2	PDI-ST-T07B-1905	58	63	67	61	62	64	58	
580-85913-3	PDI-ST-T06A-1905	57	62	66	57	62	65	58	
580-85913-4	PDI-ST-T06B-1905	72	75	78	71	71	75	75	
MB 320-292728/1-A	Method Blank	64	72	73	63	63	67	65	
MB 320-292878/1-A	Method Blank	69	71	76	69	72	74	73	

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-HpCDF2

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-HxDD

HxDF = 13C-1,2,3,6,7,8-HxDF

HxCF = 13C-1,2,3,7,8-HxCF

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-PeCF

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

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 320-292728/2-A	Lab Control Sample	64	66	63	61	70	66	69	65
LCS 320-292878/2-A	Lab Control Sample	76	78	73	70	79	74	80	74
LCSD 320-292728/3-A	Lab Control Sample Dup	64	69	63	65	71	70	71	66
LCSD 320-292878/3-A	Lab Control Sample Dup	73	73	73	71	82	74	80	75
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 320-292728/2-A	Lab Control Sample	59	70	71	64	63	65	67	
LCS 320-292878/2-A	Lab Control Sample	66	68	77	65	69	73	78	
LCSD 320-292728/3-A	Lab Control Sample Dup	58	66	69	59	63	66	67	
LCSD 320-292878/3-A	Lab Control Sample Dup	70	71	78	70	71	69	75	

Eurofins TestAmerica, Seattle

Isotope Dilution Summary

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

Surrogate Legend

HxCDD = 13C-1,2,3,4,6,7,8-HxCDD

HxCDF = 13C-1,2,3,4,6,7,8-HxCDF

HxCDF2 = 13C-1,2,3,4,7,8,9-HxCDF

HxCDD = 13C-1,2,3,4,7,8-HxCDD

HxCDF = 13C-1,2,3,4,7,8-HxCDF

HxDL = 13C-1,2,3,6,7,8-HxDL

HxDL = 13C-1,2,3,6,7,8-HxDL

HxCDF = 13C-1,2,3,7,8,9-HxCDF

PeCDD = 13C-1,2,3,7,8-PeCDD

PeCDF = 13C-1,2,3,7,8-PeCDF

13CHxCDF = 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: Water

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)	HxDL (28-130)	HxDL (26-123)	HxCF (29-147)
580-85913-5	PDI-RB-ST-190501	108	97	110	79	72	70	65	85
MB 320-292799/1-A	Method Blank	87	82	90	64	50	58	44	72
Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		PeCDD (25-181)	PeCDF (24-185)	13CHxCDF (28-136)	PeCF (21-178)	TCDD (25-164)	TCDF (24-169)	OCDD (17-157)	
580-85913-5	PDI-RB-ST-190501	75	87	78	79	77	80	106	
MB 320-292799/1-A	Method Blank	71	79	63	73	68	72	83	

Surrogate Legend

HxCDD = 13C-1,2,3,4,6,7,8-HxCDD

HxCDF = 13C-1,2,3,4,6,7,8-HxCDF

HxCDF2 = 13C-1,2,3,4,7,8,9-HxCDF

HxCDD = 13C-1,2,3,4,7,8-HxCDD

HxCDF = 13C-1,2,3,4,7,8-HxCDF

HxDL = 13C-1,2,3,6,7,8-HxDL

HxDL = 13C-1,2,3,6,7,8-HxDL

HxCDF = 13C-1,2,3,7,8,9-HxCDF

PeCDD = 13C-1,2,3,7,8-PeCDD

PeCDF = 13C-1,2,3,7,8-PeCDF

13CHxCDF = 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: Water

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)	HxDL (25-163)	HxDL (21-159)	HxCF (17-205)
LCS 320-292799/2-A	Lab Control Sample	100	89	99	71	61	65	56	78
LCSD 320-292799/3-A	Lab Control Sample Dup	105	95	108	74	68	70	62	84

Eurofins TestAmerica, Seattle

Isotope Dilution Summary

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-85913-2

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

Matrix: Water

Prep Type: Total/NA

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 320-292799/2-A	Lab Control Sample	73	82	71	75	71	74	97
LCSD 320-292799/3-A	Lab Control Sample Dup	75	85	76	78	73	75	100
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-HxDD								
HxDF = 13C-1,2,3,6,7,8-HxDF								
HxCF = 13C-1,2,3,7,8,9-HxCF								
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								