TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

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Tel: (253)922-2310

TestAmerica Job ID: 580-78853-2
Client Project/Site: Portland Harbor Pre-Remedial Design

For:
AECOM
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Seattle, Washington 98101

Attn: Amy Dahl

M. Elaine Walker

Authorized for release by:
7/27/2018 4:21:19 PM

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Table of Contents

Job ID: 580-78853-2

Laboratory: TestAmerica Seattle

Narrative

CASE NARRATIVE
Client: AECOM
Project: Portland Harbor Pre-Remedial Design
Report Number: 580-78853-2

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

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

This report contains results of Dioxins/Furans by Method 1613B, performed by TestAmerica Sacramento.

Client changed sample ID from PDI-RB-VV-20180713 should be PDI-RB-VV-180713

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

Sample PDI-RB-VV-180713 (580-78853-1) was analyzed for Dioxin/ Furan in accordance with 1613B. The sample was prepared on 07/19/2018 and analyzed on 07/21/2018.

Several analytes were detected in method blank MB 320-234863/1-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

TestAmerica Job ID: 580-78853-2

Qualifiers

Dioxin

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

Glossary

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

Client Sample ID: PDI-RB-VV-180713
Date Collected: 07/13/18 15:20
Date Received: 07/16/18 12:50

Lab Sample ID: 580-78853-1
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-HpCDD	ND		47	0.47	pg/L		07/19/18 10:11	07/21/18 06:24	1
1,2,3,4,6,7,8-HpCDF	ND		47	0.53	pg/L		07/19/18 10:11	07/21/18 06:24	1
1,2,3,4,7,8,9-HpCDF	ND		47	0.66	pg/L		07/19/18 10:11	07/21/18 06:24	1
1,2,3,4,7,8-HxCDD	**1.8**	**J q**	47	0.59	pg/L		07/19/18 10:11	07/21/18 06:24	1
1,2,3,4,7,8-HxCDF	ND		47	0.56	pg/L		07/19/18 10:11	07/21/18 06:24	1
1,2,3,6,7,8-HxCDD	ND		47	0.57	pg/L		07/19/18 10:11	07/21/18 06:24	1
1,2,3,6,7,8-HxCDF	ND		47	0.50	pg/L		07/19/18 10:11	07/21/18 06:24	1
1,2,3,7,8,9-HxCDD	ND		47	0.51	pg/L		07/19/18 10:11	07/21/18 06:24	1
1,2,3,7,8,9-HxCDF	**1.1**	**J q B**	47	0.39	pg/L		07/19/18 10:11	07/21/18 06:24	1
1,2,3,7,8-PeCDD	ND		47	1.1	pg/L		07/19/18 10:11	07/21/18 06:24	1
1,2,3,7,8-PeCDF	ND		47	0.76	pg/L		07/19/18 10:11	07/21/18 06:24	1
2,3,4,6,7,8-HxCDF	**0.43**	**J q B**	47	0.41	pg/L		07/19/18 10:11	07/21/18 06:24	1
2,3,4,7,8-PeCDF	ND		47	0.82	pg/L		07/19/18 10:11	07/21/18 06:24	1
2,3,7,8-TCDD	ND		9.5	0.68	pg/L		07/19/18 10:11	07/21/18 06:24	1
2,3,7,8-TCDF	ND		9.5	0.86	pg/L		07/19/18 10:11	07/21/18 06:24	1
OCDD	**3.4**	**J q B**	95	0.85	pg/L		07/19/18 10:11	07/21/18 06:24	1
OCDF	ND		95	1.2	pg/L		07/19/18 10:11	07/21/18 06:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-1,2,3,4,6,7,8-HpCDD	*89*		*23 - 140*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*81*		*28 - 143*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*88*		*26 - 138*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-1,2,3,4,7,8-HxCDD	*77*		*32 - 141*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-1,2,3,4,7,8-HxCDF	*76*		*26 - 152*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-1,2,3,6,7,8-HxCDD	*75*		*28 - 130*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-1,2,3,6,7,8-HxCDF	*75*		*26 - 123*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-1,2,3,7,8,9-HxCDF	*76*		*29 - 147*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-1,2,3,7,8-PeCDD	*78*		*25 - 181*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-1,2,3,7,8-PeCDF	*74*		*24 - 185*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-2,3,4,6,7,8-HxCDF	*77*		*28 - 136*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-2,3,4,7,8-PeCDF	*76*		*21 - 178*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-2,3,7,8-TCDD	*82*		*25 - 164*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-2,3,7,8-TCDF	*84*		*24 - 169*	*07/19/18 10:11*	*07/21/18 06:24*	*1*
13C-OCDD	*88*		*17 - 157*	*07/19/18 10:11*	*07/21/18 06:24*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*83*		*35 - 197*	*07/19/18 10:11*	*07/21/18 06:24*	*1*

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

Lab Sample ID: MB 320-234863/1-A
Matrix: Water
Analysis Batch: 235646

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 234863

Analyte	MB Result	MB Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,3,4,6,7,8-HpCDD	2.74	J q	50	0.79	pg/L		07/19/18 10:11	07/20/18 22:33	1
1,2,3,4,6,7,8-HpCDF	3.11	J	50	0.99	pg/L		07/19/18 10:11	07/20/18 22:33	1
1,2,3,4,7,8,9-HpCDF	ND		50	1.3	pg/L		07/19/18 10:11	07/20/18 22:33	1
1,2,3,4,7,8-HxCDD	ND		50	1.2	pg/L		07/19/18 10:11	07/20/18 22:33	1
1,2,3,4,7,8-HxCDF	1.26	J q	50	1.0	pg/L		07/19/18 10:11	07/20/18 22:33	1
1,2,3,6,7,8-HxCDD	ND		50	1.1	pg/L		07/19/18 10:11	07/20/18 22:33	1
1,2,3,6,7,8-HxCDF	ND		50	0.91	pg/L		07/19/18 10:11	07/20/18 22:33	1
1,2,3,7,8,9-HxCDD	ND		50	1.0	pg/L		07/19/18 10:11	07/20/18 22:33	1
1,2,3,7,8,9-HxCDF	4.12	J q	50	0.73	pg/L		07/19/18 10:11	07/20/18 22:33	1
1,2,3,7,8-PeCDD	ND		50	1.6	pg/L		07/19/18 10:11	07/20/18 22:33	1
1,2,3,7,8-PeCDF	ND		50	1.2	pg/L		07/19/18 10:11	07/20/18 22:33	1
2,3,4,6,7,8-HxCDF	1.62	J q	50	0.71	pg/L		07/19/18 10:11	07/20/18 22:33	1
2,3,4,7,8-PeCDF	ND		50	1.2	pg/L		07/19/18 10:11	07/20/18 22:33	1
2,3,7,8-TCDD	ND		10	1.0	pg/L		07/19/18 10:11	07/20/18 22:33	1
2,3,7,8-TCDF	1.88	J q	10	1.1	pg/L		07/19/18 10:11	07/20/18 22:33	1
OCDD	7.16	J	100	1.1	pg/L		07/19/18 10:11	07/20/18 22:33	1
OCDF	3.37	J q	100	1.6	pg/L		07/19/18 10:11	07/20/18 22:33	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-1,2,3,4,6,7,8-HpCDD	*75*		*23 - 140*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*71*		*28 - 143*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*74*		*26 - 138*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-1,2,3,4,7,8-HxCDD	*73*		*32 - 141*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-1,2,3,4,7,8-HxCDF	*68*		*26 - 152*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-1,2,3,6,7,8-HxCDD	*68*		*28 - 130*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-1,2,3,6,7,8-HxCDF	*68*		*26 - 123*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-1,2,3,7,8,9-HxCDF	*68*		*29 - 147*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-1,2,3,7,8-PeCDD	*69*		*25 - 181*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-1,2,3,7,8-PeCDF	*68*		*24 - 185*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-2,3,4,6,7,8-HxCDF	*70*		*28 - 136*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-2,3,4,7,8-PeCDF	*73*		*21 - 178*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-2,3,7,8-TCDD	*72*		*25 - 164*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-2,3,7,8-TCDF	*74*		*24 - 169*	*07/19/18 10:11*	*07/20/18 22:33*	*1*
13C-OCDD	*77*		*17 - 157*	*07/19/18 10:11*	*07/20/18 22:33*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*82*		*35 - 197*	*07/19/18 10:11*	*07/20/18 22:33*	*1*

Lab Sample ID: LCS 320-234863/2-A
Matrix: Water
Analysis Batch: 235646

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 234863

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,3,4,6,7,8-HpCDD	1000	1030		pg/L		103	70 - 140
1,2,3,4,6,7,8-HpCDF	1000	1060		pg/L		106	82 - 122
1,2,3,4,7,8,9-HpCDF	1000	1050		pg/L		105	78 - 138
1,2,3,4,7,8-HxCDD	1000	1020		pg/L		102	70 - 164
1,2,3,4,7,8-HxCDF	1000	1070		pg/L		107	72 - 134

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

Lab Sample ID: LCS 320-234863/2-A
Matrix: Water
Analysis Batch: 235646

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 234863

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,2,3,6,7,8-HxCDD			1000	1060		pg/L		106	76 - 134		
1,2,3,6,7,8-HxCDF			1000	1040		pg/L		104	84 - 130		
1,2,3,7,8,9-HxCDD			1000	1060		pg/L		106	64 - 162		
1,2,3,7,8,9-HxCDF			1000	1020		pg/L		102	78 - 130		
1,2,3,7,8-PeCDD			1000	1040		pg/L		104	70 - 142		
1,2,3,7,8-PeCDF			1000	1110		pg/L		111	80 - 134		
2,3,4,6,7,8-HxCDF			1000	1040		pg/L		104	70 - 156		
2,3,4,7,8-PeCDF			1000	1080		pg/L		108	68 - 160		
2,3,7,8-TCDD			200	209		pg/L		104	67 - 158		
2,3,7,8-TCDF			200	206		pg/L		103	75 - 158		
OCDD			2000	2200		pg/L		110	78 - 144		
OCDF			2000	2010		pg/L		101	63 - 170		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C-1,2,3,4,6,7,8-HpCDD	*64*		*26 - 166*
13C-1,2,3,4,6,7,8-HpCDF	*62*		*21 - 158*
13C-1,2,3,4,7,8,9-HpCDF	*62*		*20 - 186*
13C-1,2,3,4,7,8-HxCDD	*61*		*21 - 193*
13C-1,2,3,4,7,8-HxCDF	*60*		*19 - 202*
13C-1,2,3,6,7,8-HxCDD	*65*		*25 - 163*
13C-1,2,3,6,7,8-HxCDF	*62*		*21 - 159*
13C-1,2,3,7,8,9-HxCDF	*61*		*17 - 205*
13C-1,2,3,7,8-PeCDD	*59*		*21 - 227*
13C-1,2,3,7,8-PeCDF	*56*		*21 - 192*
13C-2,3,4,6,7,8-HxCDF	*62*		*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	*65*		*22 - 152*
13C-OCDD	*60*		*13 - 199*

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
37Cl4-2,3,7,8-TCDD	*79*		*31 - 191*

Lab Sample ID: LCSD 320-234863/3-A
Matrix: Water
Analysis Batch: 235646

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 234863

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,3,4,6,7,8-HpCDD			1000	1010		pg/L		101	70 - 140	2	50
1,2,3,4,6,7,8-HpCDF			1000	1070		pg/L		107	82 - 122	0	50
1,2,3,4,7,8,9-HpCDF			1000	1050		pg/L		105	78 - 138	1	50
1,2,3,4,7,8-HxCDD			1000	1030		pg/L		103	70 - 164	1	50
1,2,3,4,7,8-HxCDF			1000	1060		pg/L		106	72 - 134	1	50
1,2,3,6,7,8-HxCDD			1000	1050		pg/L		105	76 - 134	1	50
1,2,3,6,7,8-HxCDF			1000	1080		pg/L		108	84 - 130	3	50
1,2,3,7,8,9-HxCDD			1000	1060		pg/L		106	64 - 162	0	50
1,2,3,7,8,9-HxCDF			1000	1050		pg/L		105	78 - 130	2	50
1,2,3,7,8-PeCDD			1000	1050		pg/L		105	70 - 142	1	50

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

Lab Sample ID: LCSD 320-234863/3-A
Matrix: Water
Analysis Batch: 235646

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 234863

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,3,7,8-PeCDF			1000	1090		pg/L		109	80 - 134	2	50
2,3,4,6,7,8-HxCDF			1000	1040		pg/L		104	70 - 156	0	50
2,3,4,7,8-PeCDF			1000	1090		pg/L		109	68 - 160	0	50
2,3,7,8-TCDD			200	197		pg/L		99	67 - 158	6	50
2,3,7,8-TCDF			200	199		pg/L		100	75 - 158	4	50
OCDD			2000	2100		pg/L		105	78 - 144	5	50
OCDF			2000	1940		pg/L		97	63 - 170	4	50

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C-1,2,3,4,6,7,8-HpCDD	*71*		*26 - 166*
13C-1,2,3,4,6,7,8-HpCDF	*67*		*21 - 158*
13C-1,2,3,4,7,8,9-HpCDF	*68*		*20 - 186*
13C-1,2,3,4,7,8-HxCDD	*65*		*21 - 193*
13C-1,2,3,4,7,8-HxCDF	*64*		*19 - 202*
13C-1,2,3,6,7,8-HxCDD	*67*		*25 - 163*
13C-1,2,3,6,7,8-HxCDF	*64*		*21 - 159*
13C-1,2,3,7,8,9-HxCDF	*63*		*17 - 205*
13C-1,2,3,7,8-PeCDD	*62*		*21 - 227*
13C-1,2,3,7,8-PeCDF	*60*		*21 - 192*
13C-2,3,4,6,7,8-HxCDF	*63*		*22 - 176*
13C-2,3,4,7,8-PeCDF	*61*		*13 - 328*
13C-2,3,7,8-TCDD	*69*		*20 - 175*
13C-2,3,7,8-TCDF	*69*		*22 - 152*
13C-OCDD	*70*		*13 - 199*

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
37Cl4-2,3,7,8-TCDD	*79*		*31 - 191*

Lab Chronicle

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

TestAmerica Job ID: 580-78853-2

Client Sample ID: PDI-RB-VV-180713
Date Collected: 07/13/18 15:20
Date Received: 07/16/18 12:50

Lab Sample ID: 580-78853-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			234863	07/19/18 10:11	A1A	TAL SAC
Total/NA	Analysis	1613B		1	235646	07/21/18 06:24	AS	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: AECOM
TestAmerica Job ID: 580-78853-2
Project/Site: Portland Harbor Pre-Remedial Design

Laboratory: TestAmerica Seattle

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-024	01-19-19
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	11-05-18
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
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	08-11-18
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	07-31-18 *
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	07-31-18 *
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
Virginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-19
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

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

Sample Summary

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

TestAmerica Job ID: 580-78853-2

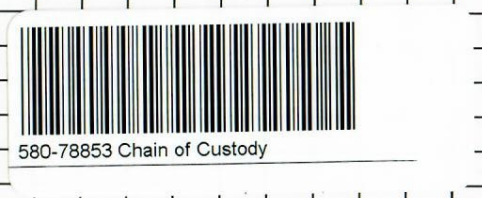
Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-78853-1	PDI-RB-VV-180713	Water	07/13/18 15:20	07/16/18 12:50

SURFACE SEDIMENT
CHAIN OF CUSTODY

TestAmerica-Seattle 5755-8th-Street-East Tacoma, WA 98424-1317 **Ph: 253-922-2310 Fax: 253-922-5047**	**Project Contact: Amy Dahl / Chelsey Cook** **Tel: (206) 438-2261 / (206) 438-2010** **Analysis Turnaround Time** Calendar (C) or Work Days (W) _____ [x] 21 days [ ] Other _ASAP_____	**Site Contact: Jennifer Ray** **Laboratory Contact: Elaine-Walker**	**7/16/2018** **Carrier: Courier**	COC No: 2 1 of 1 pages

Client Contact
AECOM
1111 3rd Ave Suite 1600
Seattle, WA 98101
Phone: (206) 438-2700 Fax: 1+(866) 495-5288
Project Name: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling
Portland, OR
Project #: 60566335 Study: Surface Sediment
Sample Type: D/U

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	Fraction	PCB Congeners 1668A	PCDD/Fs 1613B	TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A	Grain size ASTM D7928/D6913	Total organic carbon, Total solids 9060 (104C & 70C)	Archive Archive -20 C	PAHs, BEHP, Tributyltin, 8270-SIM, 8270-LL, Kron/Unger	Atterberg Limits ASTM D4318	WQ - PCB Congeners 1668A	WQ - PCDD/Fs 1613B	TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A	WQ - Total Organic Carbon SM5310B	WQ - PAHs 8270-SIM	WQ - BEHP EPA 8270D-LL	WQ - Tributyltin Krone/Unger		Sample Specific Notes:
PDI-RB-VV-20180713	7/13/2018	15:20	W		MT	14										x	x	x	x	x	x	x		



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

Sample Disposal
[ ] Return To Client [X] Disposal By Lab [X] Archive For 12 Months

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

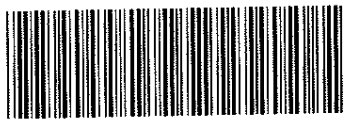
	Company:	Date/Time:		Company:	Date/Time:
Relinquished by:	AECOM	7/16/18 1210	Received by:	M.E.	7/16/18 1210
Relinquished by:	M.E.	7/16/18 1250	Received by:	CARR	7/16/18 1250
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

SURFACE SEDIMENT
CHAIN OF CUSTODY

TestAmerica-Seattle 5755-8th-Street-East Tacoma, WA 98424-1317 **Ph: 253-922-2310 Fax: 253-922-5047**	**Project Contact: Amy Dahl / Chelsey Cook** **Tel: (206) 438-2261 / (206) 438-2010**	**Site Contact: Jennifer Ray** **Laboratory Contact: Elaine-Walker**	**7/16/2018** **Carrier: Courier**	COC No: 2 1 of 1 pages

Client Contact	Analysis Turnaround Time
AECOM 1111 3rd Ave Suite 1600 Seattle, WA 98101 Phone: (206) 438-2700 Fax: 1+(866) 495-5288 Project Name: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling Portland, OR Project #: 60566335 Study: **Surface Sediment** Sample Type: D/U	Calendar (C) or Work Days (W) [x] 21 days [ ] Other _ASAP_____

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	Fraction	PCB Congeners 1668A	PCDD/Fs 1613B	TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A	Grain size ASTM D7928/D6913	Total organic carbon, Total solids 9060 (104C & 70C)	Archive Archive -20 C	PAHs, BEHP, Tributyltin, 8270-SIM, 8270-LL, Kron/Unger	Atterberg Limits ASTM D4318	WQ - PCB Congeners 1668A	WQ - PCDD/Fs 1613B	TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A	WQ - Total Organic Carbon SM5310B	WQ - PAHs 8270-SIM	WQ - BEHP EPA 8270D-LL	WQ - Tributyltin Krone/Unger		Sample Specific Notes:
PDI-RB-VV-20180713	7/13/2018	15:20	W		MT	14										x	x	x	x	x	x	x		



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

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

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

Sample Disposal
[ ] Return To Client [X] Disposal By Lab [X] Archive For 12 Months

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

1.1

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

IRS = 0.7/0.7 w/c.s.

Revised COC

SURFACE SEDIMENT
CHAIN OF CUSTODY

TestAmerica-Seattle 5755-8th-Street-East Tacoma, WA 98424-1317 Ph: 253-922-2310 Fax: 253-922-5047	Project Contact: Amy Dahl / Chelsey Cook Tel: (206) 438-2261 / (206) 438-2010	Site Contact: Jennifer Ray Laboratory Contact: Elaine-Walker	7/16/2018 COC No: 2 ___ of ___ pages
Client Contact AECOM 1111 3rd Ave Suite 1600 Seattle, WA 98101 Phone: (206) 438-2700 Fax: 1+(866) 495-5288 Project Name: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling Portland, OR Project #: 60566335 Study: Surface Sediment Sample Type: D/U	Analysis Turnaround Time Calendar (C) or Work Days (W) ☑ 21 days ☐ Other _ASAP_____	Carrier: Courier	

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	PCB Congeners 1668A	PCDD/Fs 1613B	TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A	Grain size ASTM D7928/D6913	Total organic carbon, Total solids 9060 (18AC & 70C)	Archive Archive -20 C	PAHs, BEHP, Tributyltin, 8270-SIM, 8270-LL, Krone/Unger	Atterberg Limits ASTM D4318	WQ - PCB Congeners 1668A	WQ - PCDD/Fs 1613B	TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A	WQ - Total Organic Carbon SM5310B	WQ - PAHs 8270-SIM	WQ - BEHP EPA 8270D-LL	WQ - Tributyltin Krone/Unger	Sample Specific Notes:
PDI-RB-VV-20180713	7/13/2018	15:20	W		MT	14									x	x	x	x	x	x	x	
Per Aecom KN 7/22/18																						

580-78853 Chain of Custody

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

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

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

1.1

Relinquished by:	Company: AECOM	Date/Time: 7/16/18/1210	Received by:	Company: M.E.	Date/Time: 7/16/18 1210
Relinquished by:	Company: M.E.	Date/Time: 7/16/18 1250	Received by:	Company: ARM	Date/Time: 7/16/18 1250
Relinquished by:	Company: TRPOR	Date/Time: 7/16/18 1700	Received by: B. Lowe	Company: SEA TA	Date/Time: 7/17/18 0930

** Sample Id Change 7/22/18 Per Aecom
WS-20180713 to -180713 (KN)

IRS = 0.7/0.7 w/c.s.

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Walker, Elaine M	Carrier Tracking No(s):	COC No: 580-57212.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: elaine.walker@testamericainc.com	State of Origin: Oregon	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 580-78853-2
Address: 880 Riverside Parkway, ,	Due Date Requested: 8/1/2018			
City: West Sacramento	TAT Requested (days):			
State, Zip: CA, 95605				
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	PO #:			
Email:	WO #:			
Project Name: Portland Harbor Pre-Remedial Design	Project #: 58012120			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	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/1613B_Sox_Sep_P (MOD) Full List w/o Totals	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
PDI-RB-VV-20180713 (580-78853-1)	7/13/18	15:20 Pacific		Water			X	2	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded 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 complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	7/16/18 1700	TAPOR	[signature]	7/17/18 910	TA-Sac
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact:	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
Yes △ No		4.5

Ver: 09/20/2016

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-78853-2

Login Number: 78853
List Number: 1
Creator: O'Connell, Jason I

List Source: TestAmerica Seattle

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

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-78853-2

Login Number: 78853
List Number: 3
Creator: Her, David A

List Source: TestAmerica Sacramento
List Creation: 07/17/18 12:26 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
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	4.5c
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").	N/A	
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

580-78853 Field Sheet

Job:_

Tracking # 4423 0750 6995 SO / PO / FO / UPS / 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:_____

Therm. ID: AK-2 / AK-3 / AK-5 / AK-6 / HACCP / Other____

Ice MG Wet MG Gel ☒ Other _____

Cooler Custody Seal: Seal

Sample Custody Seal: —

Cooler ID: —

Temp: Observed 4.6

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: MG Date: 7/17/18 Time 910

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

W18C

Isotope Dilution Summary

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

TestAmerica Job ID: 580-78853-2

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

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	HpCDD (23-140)	HpCDF (28-143)	HpCDF2 (26-138)	HxCDD (32-141)	HxCDF (26-152)	HxDD (28-130)	HxDF (26-123)	HxCF (29-147)
580-78853-1	PDI-RB-VV-180713	89	81	88	77	76	75	75	76
MB 320-234863/1-A	Method Blank	75	71	74	73	68	68	68	68

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PeCDD (25-181)	PeCDF (24-185)	13CHxCF (28-136)	PeCF (21-178)	TCDD (25-164)	TCDF (24-169)	OCDD (17-157)	
580-78853-1	PDI-RB-VV-180713	78	74	77	76	82	84	88	
MB 320-234863/1-A	Method Blank	69	68	70	73	72	74	77	

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: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	HpCDD (26-166)	HpCDF (21-158)	HpCDF2 (20-186)	HxCDD (21-193)	HxCDF (19-202)	HxDD (25-163)	HxDF (21-159)	HxCF (17-205)
LCS 320-234863/2-A	Lab Control Sample	64	62	62	61	60	65	62	61
LCSD 320-234863/3-A	Lab Control Sample Dup	71	67	68	65	64	67	64	63

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PeCDD (21-227)	PeCDF (21-192)	13CHxCF (22-176)	PeCF (13-328)	TCDD (20-175)	TCDF (22-152)	OCDD (13-199)	
LCS 320-234863/2-A	Lab Control Sample	59	56	62	59	63	65	60	
LCSD 320-234863/3-A	Lab Control Sample Dup	62	60	63	61	69	69	70	

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

Isotope Dilution Summary

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

TestAmerica Job ID: 580-78853-2

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