TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

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TestAmerica Job ID: 580-78604-2
Client Project/Site: Portland Harbor Pre-Remedial Design

For:
AECOM
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Attn: Amy Dahl

M. Elaine Walker

Authorized for release by:
7/31/2018 6:24:57 PM

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Job ID: 580-78604-2

Laboratory: TestAmerica Seattle

Narrative

CASE NARRATIVE
Client: AECOM
Project: Portland Harbor Pre-Remedial Design
Report Number: 580-78604-2

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

The samples were received on 7/5/2018 3:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 0.3º C, 0.7º C and 2.2º C.

Client changed sample ID for the RB from RB-VV-180703-1720 should be PDI-RB-VV-180703

This report contains results of the Dioxins rinse blank sample only, performed at TestAmerica Sacramento. All other analyses are currently on hold.

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-180703 (580-78604-11) was analyzed for Dioxin/ Furan in accordance with 1613B. The samples were prepared on 07/09/2018 and analyzed on 07/15/2018.

Several analytes were detected in method blank MB 320-232980/1-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: 580-78604-2

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 ID: PDI-RB-VV-180703
Date Collected: 07/03/18 17:20
Date Received: 07/05/18 14:59

Lab Sample ID: 580-78604-11
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	2.7	J B	48	0.19	pg/L		07/09/18 09:34	07/15/18 22:51	1
1,2,3,4,6,7,8-HpCDF	1.0	J q B	48	0.34	pg/L		07/09/18 09:34	07/15/18 22:51	1
1,2,3,4,7,8,9-HpCDF	ND		48	0.42	pg/L		07/09/18 09:34	07/15/18 22:51	1
1,2,3,4,7,8-HxCDD	1.7	J B	48	0.29	pg/L		07/09/18 09:34	07/15/18 22:51	1
1,2,3,4,7,8-HxCDF	0.67	J q	48	0.19	pg/L		07/09/18 09:34	07/15/18 22:51	1
1,2,3,6,7,8-HxCDD	0.70	J B	48	0.28	pg/L		07/09/18 09:34	07/15/18 22:51	1
1,2,3,6,7,8-HxCDF	0.47	J	48	0.18	pg/L		07/09/18 09:34	07/15/18 22:51	1
1,2,3,7,8,9-HxCDD	1.0	J B	48	0.25	pg/L		07/09/18 09:34	07/15/18 22:51	1
1,2,3,7,8,9-HxCDF	1.6	J B	48	0.16	pg/L		07/09/18 09:34	07/15/18 22:51	1
1,2,3,7,8-PeCDD	ND		48	0.41	pg/L		07/09/18 09:34	07/15/18 22:51	1
1,2,3,7,8-PeCDF	0.96	J B	48	0.28	pg/L		07/09/18 09:34	07/15/18 22:51	1
2,3,4,6,7,8-HxCDF	0.62	J q	48	0.15	pg/L		07/09/18 09:34	07/15/18 22:51	1
2,3,4,7,8-PeCDF	ND		48	0.31	pg/L		07/09/18 09:34	07/15/18 22:51	1
2,3,7,8-TCDD	3.5	J q B	9.5	0.20	pg/L		07/09/18 09:34	07/15/18 22:51	1
2,3,7,8-TCDF	0.72	J B	9.5	0.14	pg/L		07/09/18 09:34	07/15/18 22:51	1
OCDD	23	J B	95	0.35	pg/L		07/09/18 09:34	07/15/18 22:51	1
OCDF	2.5	J B	95	0.20	pg/L		07/09/18 09:34	07/15/18 22:51	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-1,2,3,4,6,7,8-HpCDD	*99*		*23 - 140*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*92*		*28 - 143*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*93*		*26 - 138*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-1,2,3,4,7,8-HxCDD	*84*		*32 - 141*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-1,2,3,4,7,8-HxCDF	*87*		*26 - 152*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-1,2,3,6,7,8-HxCDD	*88*		*28 - 130*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-1,2,3,6,7,8-HxCDF	*88*		*26 - 123*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-1,2,3,7,8,9-HxCDF	*87*		*29 - 147*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-1,2,3,7,8-PeCDD	*84*		*25 - 181*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-1,2,3,7,8-PeCDF	*82*		*24 - 185*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-2,3,4,6,7,8-HxCDF	*89*		*28 - 136*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-2,3,4,7,8-PeCDF	*81*		*21 - 178*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-2,3,7,8-TCDD	*86*		*25 - 164*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-2,3,7,8-TCDF	*86*		*24 - 169*	*07/09/18 09:34*	*07/15/18 22:51*	*1*
13C-OCDD	*98*		*17 - 157*	*07/09/18 09:34*	*07/15/18 22:51*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*94*		*35 - 197*	*07/09/18 09:34*	*07/15/18 22:51*	*1*

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

Lab Sample ID: MB 320-232980/1-A
Matrix: Water
Analysis Batch: 234157

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 232980

Analyte	MB Result	MB Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,3,4,6,7,8-HpCDD	1.83	J	50	0.25	pg/L		07/09/18 09:34	07/15/18 19:04	1
1,2,3,4,6,7,8-HpCDF	0.936	J q	50	0.22	pg/L		07/09/18 09:34	07/15/18 19:04	1
1,2,3,4,7,8,9-HpCDF	0.465	J	50	0.28	pg/L		07/09/18 09:34	07/15/18 19:04	1
1,2,3,4,7,8-HxCDD	1.02	J q	50	0.29	pg/L		07/09/18 09:34	07/15/18 19:04	1
1,2,3,4,7,8-HxCDF	ND		50	0.28	pg/L		07/09/18 09:34	07/15/18 19:04	1
1,2,3,6,7,8-HxCDD	0.603	J q	50	0.28	pg/L		07/09/18 09:34	07/15/18 19:04	1
1,2,3,6,7,8-HxCDF	ND		50	0.27	pg/L		07/09/18 09:34	07/15/18 19:04	1
1,2,3,7,8,9-HxCDD	0.868	J q	50	0.24	pg/L		07/09/18 09:34	07/15/18 19:04	1
1,2,3,7,8,9-HxCDF	1.31	J	50	0.24	pg/L		07/09/18 09:34	07/15/18 19:04	1
1,2,3,7,8-PeCDD	ND		50	0.46	pg/L		07/09/18 09:34	07/15/18 19:04	1
1,2,3,7,8-PeCDF	0.665	J q	50	0.33	pg/L		07/09/18 09:34	07/15/18 19:04	1
2,3,4,6,7,8-HxCDF	ND		50	0.23	pg/L		07/09/18 09:34	07/15/18 19:04	1
2,3,4,7,8-PeCDF	ND		50	0.36	pg/L		07/09/18 09:34	07/15/18 19:04	1
2,3,7,8-TCDD	2.98	J q	10	0.24	pg/L		07/09/18 09:34	07/15/18 19:04	1
2,3,7,8-TCDF	1.33	J	10	0.22	pg/L		07/09/18 09:34	07/15/18 19:04	1
OCDD	21.2	J	100	0.42	pg/L		07/09/18 09:34	07/15/18 19:04	1
OCDF	1.96	J	100	0.24	pg/L		07/09/18 09:34	07/15/18 19:04	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-1,2,3,4,6,7,8-HpCDD	*87*		*23 - 140*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*84*		*28 - 143*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*85*		*26 - 138*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-1,2,3,4,7,8-HxCDD	*77*		*32 - 141*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-1,2,3,4,7,8-HxCDF	*80*		*26 - 152*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-1,2,3,6,7,8-HxCDD	*80*		*28 - 130*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-1,2,3,6,7,8-HxCDF	*80*		*26 - 123*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-1,2,3,7,8,9-HxCDF	*80*		*29 - 147*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-1,2,3,7,8-PeCDD	*72*		*25 - 181*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-1,2,3,7,8-PeCDF	*71*		*24 - 185*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-2,3,4,6,7,8-HxCDF	*83*		*28 - 136*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-2,3,4,7,8-PeCDF	*72*		*21 - 178*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-2,3,7,8-TCDD	*74*		*25 - 164*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-2,3,7,8-TCDF	*75*		*24 - 169*	*07/09/18 09:34*	*07/15/18 19:04*	*1*
13C-OCDD	*88*		*17 - 157*	*07/09/18 09:34*	*07/15/18 19:04*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*95*		*35 - 197*	*07/09/18 09:34*	*07/15/18 19:04*	*1*

Lab Sample ID: LCS 320-232980/2-A
Matrix: Water
Analysis Batch: 234157

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 232980

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,3,4,6,7,8-HpCDD	1000	847		pg/L		85	70 - 140
1,2,3,4,6,7,8-HpCDF	1000	863		pg/L		86	82 - 122
1,2,3,4,7,8,9-HpCDF	1000	845		pg/L		84	78 - 138
1,2,3,4,7,8-HxCDD	1000	881		pg/L		88	70 - 164
1,2,3,4,7,8-HxCDF	1000	901		pg/L		90	72 - 134

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

Lab Sample ID: LCS 320-232980/2-A
Matrix: Water
Analysis Batch: 234157

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 232980

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,2,3,6,7,8-HxCDD			1000	859		pg/L		86	76 - 134		
1,2,3,6,7,8-HxCDF			1000	878		pg/L		88	84 - 130		
1,2,3,7,8,9-HxCDD			1000	871		pg/L		87	64 - 162		
1,2,3,7,8,9-HxCDF			1000	900		pg/L		90	78 - 130		
1,2,3,7,8-PeCDD			1000	915		pg/L		92	70 - 142		
1,2,3,7,8-PeCDF			1000	926		pg/L		93	80 - 134		
2,3,4,6,7,8-HxCDF			1000	890		pg/L		89	70 - 156		
2,3,4,7,8-PeCDF			1000	936		pg/L		94	68 - 160		
2,3,7,8-TCDD			200	174		pg/L		87	67 - 158		
2,3,7,8-TCDF			200	187		pg/L		93	75 - 158		
OCDD			2000	1610		pg/L		80	78 - 144		
OCDF			2000	1560		pg/L		78	63 - 170		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C-1,2,3,4,6,7,8-HpCDD	*80*		*26 - 166*
13C-1,2,3,4,6,7,8-HpCDF	*77*		*21 - 158*
13C-1,2,3,4,7,8,9-HpCDF	*78*		*20 - 186*
13C-1,2,3,4,7,8-HxCDD	*72*		*21 - 193*
13C-1,2,3,4,7,8-HxCDF	*74*		*19 - 202*
13C-1,2,3,6,7,8-HxCDD	*75*		*25 - 163*
13C-1,2,3,6,7,8-HxCDF	*75*		*21 - 159*
13C-1,2,3,7,8,9-HxCDF	*75*		*17 - 205*
13C-1,2,3,7,8-PeCDD	*71*		*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	*71*		*13 - 328*
13C-2,3,7,8-TCDD	*76*		*20 - 175*
13C-2,3,7,8-TCDF	*76*		*22 - 152*
13C-OCDD	*81*		*13 - 199*

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
37Cl4-2,3,7,8-TCDD	*97*		*31 - 191*

Lab Sample ID: LCSD 320-232980/3-A
Matrix: Water
Analysis Batch: 234157

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 232980

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,3,4,6,7,8-HpCDD			1000	966		pg/L		97	70 - 140	13	50
1,2,3,4,6,7,8-HpCDF			1000	981		pg/L		98	82 - 122	13	50
1,2,3,4,7,8,9-HpCDF			1000	975		pg/L		98	78 - 138	14	50
1,2,3,4,7,8-HxCDD			1000	985		pg/L		99	70 - 164	11	50
1,2,3,4,7,8-HxCDF			1000	973		pg/L		97	72 - 134	8	50
1,2,3,6,7,8-HxCDD			1000	951		pg/L		95	76 - 134	10	50
1,2,3,6,7,8-HxCDF			1000	998		pg/L		100	84 - 130	13	50
1,2,3,7,8,9-HxCDD			1000	977		pg/L		98	64 - 162	12	50
1,2,3,7,8,9-HxCDF			1000	975		pg/L		97	78 - 130	8	50
1,2,3,7,8-PeCDD			1000	980		pg/L		98	70 - 142	7	50

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

Lab Sample ID: LCSD 320-232980/3-A
Matrix: Water
Analysis Batch: 234157

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 232980

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,3,7,8-PeCDF			1000	983		pg/L		98	80 - 134	6	50
2,3,4,6,7,8-HxCDF			1000	985		pg/L		99	70 - 156	10	50
2,3,4,7,8-PeCDF			1000	993		pg/L		99	68 - 160	6	50
2,3,7,8-TCDD			200	190		pg/L		95	67 - 158	9	50
2,3,7,8-TCDF			200	197		pg/L		98	75 - 158	5	50
OCDD			2000	1850		pg/L		93	78 - 144	14	50
OCDF			2000	1830		pg/L		92	63 - 170	16	50

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C-1,2,3,4,6,7,8-HpCDD	*90*		*26 - 166*
13C-1,2,3,4,6,7,8-HpCDF	*87*		*21 - 158*
13C-1,2,3,4,7,8,9-HpCDF	*88*		*20 - 186*
13C-1,2,3,4,7,8-HxCDD	*83*		*21 - 193*
13C-1,2,3,4,7,8-HxCDF	*86*		*19 - 202*
13C-1,2,3,6,7,8-HxCDD	*83*		*25 - 163*
13C-1,2,3,6,7,8-HxCDF	*84*		*21 - 159*
13C-1,2,3,7,8,9-HxCDF	*86*		*17 - 205*
13C-1,2,3,7,8-PeCDD	*78*		*21 - 227*
13C-1,2,3,7,8-PeCDF	*79*		*21 - 192*
13C-2,3,4,6,7,8-HxCDF	*87*		*22 - 176*
13C-2,3,4,7,8-PeCDF	*79*		*13 - 328*
13C-2,3,7,8-TCDD	*84*		*20 - 175*
13C-2,3,7,8-TCDF	*84*		*22 - 152*
13C-OCDD	*90*		*13 - 199*

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
37Cl4-2,3,7,8-TCDD	*96*		*31 - 191*

Lab Chronicle

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

TestAmerica Job ID: 580-78604-2

Client Sample ID: PDI-RB-VV-180703
Date Collected: 07/03/18 17:20
Date Received: 07/05/18 14:59

Lab Sample ID: 580-78604-11
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			232980	07/09/18 09:34	ITH	TAL SAC
Total/NA	Analysis	1613B		1	234157	07/15/18 22:51	KSS	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: 580-78604-2
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	07-31-19
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD ELAP		L2468	01-20-21
Arizona	State Program	9	AZ0708	08-11-18
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	07-31-19
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	03-31-19
Oregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-19
Texas	NELAP	6	T104704399	05-31-19
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	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

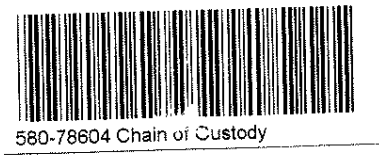
Sample Summary

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

TestAmerica Job ID: 580-78604-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-78604-11	PDI-RB-VV-180703	Water	07/03/18 17:20	07/05/18 14:59

580-78604



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)	**Site Contact: Jennifer Ray** **Laboratory Contact: Elaine-Walker**	**Carrier: Courier** 7/5/2018 COC No: 1 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	☐ 21 days ☒ Other _ASAP_(sediments only)_____		

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, 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-SG-B458	7/2/2018	11:00	SS		AC	7		H	H	H	x	H	H	H										
PDI-SG-B470	7/2/2018	15:20	SS		AC	B		H	H	H	x	H	H	H	H									
PDI-SG-B469	7/2/2018	16:30	SS		AC	B		H	H	H	x	H	H	H	H									
PDI-SG-B456	7/2/2018	10:19	SS		SH	7		H	H	H	x	H	H	H										
PDI-SG-B462	7/2/2018	11:56	SS		SH	B		H	H	H	x	H	H	H	H									
PDI-SG-B463	7/2/2018	12:58	SS	MS/MSD	SH	14		H	H	H	x	H	H	H	H									
PDI-SG-B464	7/2/2018	14:39	SS		SH	8		H	H	H	x	H	H	H	H									
PDI-SG-B466	7/2/2018	15:34	SS		SH	8		H	H	x*	x*	x*	H	H	H									
PDI-SG-B468	7/2/2018	14:02 16:35	SS		SH	8		H	H	H	x	H	H	H	H									
PDI-SG-B429	7/3/2018	10:15	SS		SH	7		H	H	H	x	H	H	H										
RB-VV-180703-1720	7/3/2018	17:20	W		SH	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 ☒ Disposal By Lab ☒ Archive For **12** Months

Special Instructions/QC Requirements & Comments:

Separate reports for each lab.

x*- Analyze for grain size, metals (6020B analytes only), and TOC (9060 @ 104C & 70C) ASAP. Rush TAT for these take precedent over remaining rush grain size analyses requested ASAP.

H - Hold analyses pending further instruction.

0.7, 2.2, 0.3

Relinquished by:	Company: AECOM	Date/Time: 7/5/18 1234	Received by:	Company: M.E.	Date/Time: 7/5/18 1235
Relinquished by:	Company: M.E.	Date/Time: 7/5/18 1500	Received by:	Company: TAPOR	Date/Time: 7/5/18 1500
Relinquished by:	Company: TAPOR	Date/Time: 7/5/18 1700	Received by:	Company: SFA TA	Date/Time: 7/6/18 0930

= 0.8 / 0.8 w/cs

IRS = 0.7 / 0.7 w/cs.

= -1.9 / -1.9 w/cs

Revised COC

580-78604

580-78604 Chain of Custody

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) ☐ 21 days ☒ Other _ASAP_(sediments only)_____	Site Contact: Jennifer Ray Laboratory Contact: Elaine-Walker	7/5/2018 Carrier: Courier	COC No: 1 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.	PCB Congeners 1668A	PCDD/Fs 1613B	TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A	Grain size ASTM D7928/D4913	Total organic carbon, Total solids 9060 (104C & 70C)	Archive Archive -30 C	PAHs, BEHP, Tributyltin, 8270-SIM, 8270-LL, Kreosl/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 Kreosl/Unger	Sample Specific Notes:
PDI-SG-B458	7/2/2018	11:00	SS		AC	7	H	H	H	x	H	H	H									
PDI-SG-B470	7/2/2018	15:20	SS		AC	B	H	H	H	x	H	H	H	H								
PDI-SG-B469	7/2/2018	16:30	SS		AC	B	H	H	H	x	H	H	H	H								
PDI-SG-B456	7/2/2018	10:19	SS		SH	7	H	H	H	x	H	H	H									
PDI-SG-B462	7/2/2018	11:56	SS		SH	B	H	H	H	x	H	H	H	H								
PDI-SG-B463	7/2/2018	12:58	SS	MS/MSD	SH	14	H	H	H	x	H	H	H	H								
PDI-SG-B464	7/2/2018	14:39	SS		SH	8	H	H	H	x	H	H	H	H								
PDI-SG-B466	7/2/2018	15:34	SS		SH	8	H	H	x*	x*	x*	H	H	H								
PDI-SG-B468	7/2/2018	14:02/16:33	SS		SH	8	H	H	H	x	H	H	H	H								
PDI-SG-B429	7/3/2018	10:15	SS		SH	7	H	H	HX	x	X	X	H									
PDI-RB-VV-180703-1720 (KP 7/22/18 Per Amec)	7/3/2018	17:20	W		SH	14									x	x	x	x	x	x	x	Added analysis 7/19 (KP) Per Amec

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.
x*- Analyze for grain size, metals (6020B analytes only), and TOC (9060 @ 104C & 70C) ASAP. Rush TAT for these take precedent over remaining rush grain size analyses requested ASAP.
H - Hold analyses pending further instruction.

0.7, 2.2, 0.3

	Company	Date/Time		Company	Date/Time
Relinquished by:	AECOM	7/5/18 1234	Received by:	M.E.	7/5/18 1235
Relinquished by:	M.E.	7/5/18 1500	Received by:	TAPOR	7/5/18 1500
Relinquished by:	TAPOR	7/5/18 1700	Received by:	SFPTA	7/6/18 0930

*** Metals, TOC, Solids activated
In On Hold Samples Per Amec
7/19/18 (KP)

*** Revised ~~Corrected~~ Changed Sample Id! Add PDI-HD Remove -1720 (KP) Per Amec 7/22/18

= 0.8/0.8 w/cs
IRS = 0.7/0.7 w/cs.
= -1.9/-1.9 w/cs

Page 13 of 21

7/31/2018

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: 580-56927.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: elaine.walker@testamericainc.com	State of Origin: Oregon	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 580-78604-1
Address: 880 Riverside Parkway, .	Due Date Requested: 7/23/2018			
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, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	1613B/HRMS_Sox_P (MOD) Full List w/o Totals	AutoOP/ PH Frozen Archive Container billed @ $0.	1613B/1613B_Sox_Sep_P (MOD) Full List w/o Totals	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
PDI-SG-B458 (580-78604-1)	7/2/18	11:00 Pacific		Solid			X	X		2	
PDI-SG-B470 (580-78604-2)	7/2/18	15:20 Pacific		Solid			X	X		2	
PDI-SG-B469 (580-78604-3)	7/2/18	16:30 Pacific		Solid			X	X		2	
PDI-SG-B456 (580-78604-4)	7/2/18	10:19 Pacific		Solid			X	X		2	
PDI-SG-B462 (580-78604-5)	7/2/18	11:56 Pacific		Solid			X	X		2	
PDI-SG-B463 (580-78604-6)	7/2/18	12:58 Pacific		Solid			X	X		2	
PDI-SG-B464 (580-78604-7)	7/2/18	14:39 Pacific		Solid			X	X		2	
PDI-SG-B466 (580-78604-8)	7/2/18	15:34 Pacific		Solid			X	X		2	
PDI-SG-B468 (580-78604-9)	7/2/18	16:33 Pacific		Solid			X	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
[signature]	7/6/18	TAOR	[signature]	7-7-18 905	[signature]
Relinquished by:	Date/Time: 7/6/18	Company	Received by: [signature]	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 4.3

Ver: 09/20/2016

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: 580-56927.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: elaine.walker@testamericainc.com	State of Origin: Oregon	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 580-78604-1
Address: 880 Riverside Parkway,	Due Date Requested: 7/23/2018			
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/HRMS_Sox_P (MOD) Full List w/o Totals	AutoOP/ PH Frozen Archive Container billed @ $0.	1613B/1613B_Sox_Sep_P (MOD) Full List w/o Totals	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
PDI-SG-B429 (580-78604-10)	7/3/18	10:15 Pacific		Solid			X	X		2	
RB-VV-180703-1720 (580-78604-11)	7/3/18	17:20 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. I

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:

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	7/6/18 1700	TAOR		7-7-18 905	TA SRC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 4.3

Ver: 09/20/2016

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-78604-2

Login Number: 78604
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: 580-78604-2

Login Number: 78604
List Number: 5
Creator: Hytrek, Cheryl

List Source: TestAmerica Sacramento
List Creation: 07/07/18 05:08 PM

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.	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	4.3
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	

Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-78604-2

Login Number: 78604
List Number: 6
Creator: Hytrek, Cheryl

List Source: TestAmerica Sacramento
List Creation: 07/07/18 05:10 PM

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.	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	4.3
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

Sa

580-78604 Field Sheet

Job:___

Tracking # 442307506425 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 X Wet X Gel _____ Other _____

Cooler Custody Seal: Seal

Sample Custody Seal: —

Cooler ID: 1 of 3

Temp: Observed 4.3

From: Temp Blank ☐ Sample ☑

NCM Filed: Yes ☐ No ☐

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

Initials: _____ Date: 7-7-18 Time _____

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

WFIA, OD

Isotope Dilution Summary

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

TestAmerica Job ID: 580-78604-2

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)
580-78604-11	PDI-RB-VV-180703	99	92	93	84	87	88	88	87
MB 320-232980/1-A	Method Blank	87	84	85	77	80	80	80	80

		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)	
580-78604-11	PDI-RB-VV-180703	84	82	89	81	86	86	98	
MB 320-232980/1-A	Method Blank	72	71	83	72	74	75	88	

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 320-232980/2-A	Lab Control Sample	80	77	78	72	74	75	75	75
LCSD 320-232980/3-A	Lab Control Sample Dup	90	87	88	83	86	83	84	86

		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 320-232980/2-A	Lab Control Sample	71	71	78	71	76	76	81	
LCSD 320-232980/3-A	Lab Control Sample Dup	78	79	87	79	84	84	90	

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: 580-78604-2

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