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## Data Validation Report

Project: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling

Laboratory: Test America, West Sacramento, California

Laboratory 580-79019-2

Group:

Analyses/Method: Clean Water Act - Dioxins and Furans / CWA1613B

Validation Level: Stage 2A

AECOM Project 60566335.2.12

Number:

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### SUMMARY

The samples listed below were collected by AECOM in Portland Harbor in Portland, OR on July 18 and 19, 2018.

Sample ID	Matrix/Sample Type
PDI-SC-S033-0TO2	Sediment
PDI-SC-S033-2TO3	Sediment
PDI-SC-S033-3TO4	Sediment
PDI-SC-S034-0TO1.8	Sediment
PDI-SC-S034-1.8TO4	Sediment
PDI-SC-S034-4TO5.2	Sediment

Data validation activities were conducted with reference to:

- EPA Method 1613B: *Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS (October 1994)*,
- USEPA Contract Laboratory Program National Functional Guidelines for High Resolution Superfund Methods Data Review (April 2016),
- Quality Assurance Project Plan, Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling, Portland Harbor Superfund Site (March 2018), and the
- laboratory quality control (QC) limits.

The National Functional Guidelines were modified to accommodate the non-CLP methodologies. In the absence of method-specific information, laboratory QC limits, project-specific requirements and/or AECOM professional judgment were used as appropriate.

### REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody (COC)/sample integrity)
✓	Holding times and sample preservation
✗	Laboratory blanks/equipment blanks
NA	Matrix spike (MS) and/or matrix spike duplicate (MSD) results
✓	Ongoing precision and recovery (OPR) results
NA	Field duplicate results
✗	Labeled compound and clean-up standard recoveries
✗	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. An NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. The symbol (✗) indicates that a QC nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as qualified and may be used for decision making purposes. Select data points were qualified as estimated due to nonconformances of certain QC criteria (see discussion below). Qualified sample results are presented in Table 1.

## RESULTS

### **Data Completeness (COC)/Sample Integrity**

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

### **Holding Times and Sample Preservation**

Sample preservation and preparation/analysis holding times were reviewed for conformance with method criteria. All method QC acceptance criteria were met.

### **Laboratory Blanks/Equipment Blanks**

Laboratory method blanks and equipment blank results are evaluated as to whether there are contaminants detected above the estimated detection limit (EDL).

Target compounds were detected in the method blanks associated with the samples in this data set. No equipment blanks were collected with this laboratory group.

The NFG guidance stipulates that a conservative approach should be taken with regards to qualification of PCDD/PCDFs due to the toxicity of these compounds and the reporting of false negative results should be avoided.

Therefore, in order to avoid the reporting of false negative results, professional judgment was used to qualify the data in the following manner. As allowed in the NFG, a blank action limit (BAL) was determined as 5 times the blank result:

- When the sample results were < the blank result, the sample result was qualified as nondetect (U) at the sample result.
- When the sample result was  $\geq$  the blank result and  $\leq$  the BAL, the sample result was qualified as estimated and potentially biased high (J+).
- When the sample result was > the BAL, sample result was not qualified.

Qualified sample results are summarized in Table 1.

### **MS/MSD Results**

MS/MSD analyses were not performed on a sample in this data set. No data validation actions were taken on this basis.

### **OPR Results**

The OPR %Rs and/or RPDs were reviewed for conformance with the method QC acceptance criteria. All method QC acceptance criteria were met.

### **Field Duplicate Results**

Field duplicate RPDs were reviewed for conformance with the AECOM QC acceptance criteria of  $\leq$  50% [if one or both results were greater than five times the quantitation limit (QL)] for solid matrices and  $\leq$  30% [if one or both results were greater than five times the QL] for aqueous matrices.

A field duplicate was not collected on a sample reported in this laboratory group. Precision was assessed using the LCS and LCSD.

### **Labeled Compound and Clean-up Standard Recoveries**

The labeled compounds and labeled clean-up standard %Rs were reviewed for conformance with the QC acceptance criteria.

Nonconformances are summarized in Attachment A in Table A-1. Samples were qualified as follows:

**Actions:** (Based on NFG 2016)

Criteria <sup>1</sup>	Actions <sup>2</sup>	
	Detected	Nondetected
%R > Upper Acceptance Limit	J	UJ
%R >10% but < Lower Acceptance Limit	J	UJ
%R <10%	See below	
<10% and S/N >10:1	J	R
<10% and S/N <10:1	R	R

Criteria <sup>1</sup>		Actions <sup>2</sup>	
Ion abundance ratio criteria not met	Calibration compliant	J	UJ
	Calibration non-compliant	J	R
Clean-up Standard Recovery < Lower Acceptance Limit		J	UJ
<sup>1</sup> See Table 7 in method 1613B for acceptance criteria <sup>2</sup> The dioxin method is performed using isotope dilution technique; therefore, professional judgment was applied and bias codes were not included in data qualification.			

Qualified sample results are summarized in Table 1.

### **Sample Results/Reporting Issues**

All sample results detected at concentrations less than the lowest calibration standard but greater than the EDL are qualified by the laboratory as estimated (J). This "J" qualifier is retained during data validation.

### **Quantitation**

Sample results detected at concentrations greater than the highest calibration standard, qualified by the laboratory with an "E", require secondary dilutions in order to bring the concentrations down within the linear range of calibration, per Method 1613B. This was not done by the laboratory.

It should be noted that according to Section 12.1.7 of the laboratory's SOP, unless the affected peak saturates the instrument detector, secondary dilutions are not performed. Furthermore, *"Historic data indicates that for the isotope dilution method, dilution and re-injection will not produce significantly different results from those reported with the "E" qualifier."*

Despite the laboratory's SOP, NFG guidance stipulates that if a sample is not properly diluted to bring the results within the linear range of calibration, then the results are qualified "J".

Qualified sample results are summarized in Table 1.

### **Second Column Confirmation (2,3,7,8-TCDF)**

The sample data were reviewed to ensure that results for 2,3,7,8-TCDF when analyzed on a DB-5 (or equivalent) column were confirmed on a second column ( i.e., DB-225 or equivalent) when isomer specificity is not achieved. All sample results requiring confirmation were confirmed and results were reported from the confirmation column.

It should be noted that according to Section 11.3.5 of the laboratory's SOP, *"Any sample which 2,3,7,8-TCDF is identified above the lower calibration limit must be confirmed on a DB-225 column, SP-2331, or equivalent GC column."* This suggests that 2,3,7,8-TCDF results detected below the lower calibration limit (i.e., "J" values) are not confirmed on a secondary column by the laboratory. Professional judgment was used to take no action in instances where 2,3,7,8-TCDF was detected as "J" values on the primary column (i.e., DB-5).

### Estimated Maximum Possible Concentrations (EMPCs)

The data were reviewed to to identify sample results that were indicated by the laboratory to be EMPCs because of identification criteria not being met.

The laboratory qualified all sample results with a "q" laboratory qualifier to indicate that the ion ratio criterion was not met. All ion ratios were verified and affected sample results which did not meet the ion ratio criteria were qualified as estimated and tentatively identified (JN). Qualified sample results are shown in Table 1.

It should be noted that the "JN" qualifier was retained rather than replacement with the conventional overall "J" qualifier in instances where sample results were qualified for multiple quality control nonconformances.

### Percent Solids Content

The percent solids data were reviewed since the amount of moisture in a solid sample may have an impact on data representativeness. Due to the extremely low solubility of dioxins and furans in water, these analytes should be contained in the solid phase. Consequently, the NFG guidance does not stipulate a percent solids criterion. If applicable, EPA Regional guidance is used when assessing percent solids content. In the absence of EPA Regional guidance, AECOM uses 30% solids (from the NFG semivolatile guidance) as a benchmark to evaluate the percent solids content and professional judgment is used to determine the necessity to qualify data. Qualification on this basis was not required.

Verification of calculations was performed on a subset of the data as deemed appropriate. No discrepancies were noted.

## **QUALIFICATION ACTIONS**

Sample results qualified as a result of validation actions are summarized in Table 1. All actions are described above.

## **ATTACHMENTS**

Attachment A: Nonconformance Summary Tables

Attachment B: Qualifier Codes and Explanations

Attachment C: Reason Codes and Explanations

**Table 1 - Data Validation Summary of Qualified Data**

Sample ID	Matrix	Compound	Result	EDL	Units	Validation Qualifiers	Validation Reason
PDI-SC-S033-0TO2	SE	1,2,3,7,8,9-HxCDF	0.0014	0.00084	ug/kg	J+	bl
PDI-SC-S033-0TO2	SE	2,3,7,8-TCDF	0.0071	0.00060	ug/kg	JN	k
PDI-SC-S033-0TO2	SE	OCDD	8.6	0.0018	ug/kg	J	q
PDI-SC-S033-2TO3	SE	1,2,3,6,7,8-HxCDF	0.0097	0.00086	ug/kg	J	lc
PDI-SC-S033-2TO3	SE	1,2,3,7,8,9-HxCDF	0.0017	0.00081	ug/kg	J+	bl
PDI-SC-S033-2TO3	SE	1,2,3,7,8-PeCDD	0.0038	0.00079	ug/kg	JN	k
PDI-SC-S033-2TO3	SE	OCDD	8.1	0.0018	ug/kg	J	q
PDI-SC-S033-3TO4	SE	1,2,3,7,8,9-HxCDF	0.0021	0.00095	ug/kg	J+	bl
PDI-SC-S033-3TO4	SE	OCDD	11	0.0028	ug/kg	J	q
PDI-SC-S034-0TO1.8	SE	1,2,3,4,6,7,8-HpCDF	0.0067	0.000080	ug/kg	JN	k
PDI-SC-S034-0TO1.8	SE	1,2,3,4,7,8,9-HpCDF	0.00040	0.00011	ug/kg	J+	bl
PDI-SC-S034-0TO1.8	SE	1,2,3,4,7,8-HxCDD	0.00051	0.000038	ug/kg	J+	bl
PDI-SC-S034-0TO1.8	SE	1,2,3,6,7,8-HxCDF	0.00040	0.00012	ug/kg	J+	bl
PDI-SC-S034-0TO1.8	SE	1,2,3,7,8,9-HxCDF	0.00064	0.000055	ug/kg	J+	bl
PDI-SC-S034-0TO1.8	SE	1,2,3,7,8-PeCDD	0.00030	0.000047	ug/kg	J+	bl
PDI-SC-S034-0TO1.8	SE	1,2,3,7,8-PeCDF	0.00038	0.000047	ug/kg	J+	bl
PDI-SC-S034-0TO1.8	SE	2,3,4,6,7,8-HxCDF	0.00023	0.000067	ug/kg	J+	bl
PDI-SC-S034-1.8TO4	SE	1,2,3,4,6,7,8-HpCDF	0.00050	0.00010	ug/kg	JN	k
PDI-SC-S034-1.8TO4	SE	1,2,3,4,7,8-HxCDD		0.00015	ug/kg	U	bl
PDI-SC-S034-1.8TO4	SE	1,2,3,6,7,8-HxCDD	0.00016	0.000038	ug/kg	JN	bl,k
PDI-SC-S034-1.8TO4	SE	1,2,3,6,7,8-HxCDF	0.00015	0.000077	ug/kg	J+	bl
PDI-SC-S034-1.8TO4	SE	1,2,3,7,8,9-HxCDD	0.00032	0.000035	ug/kg	J+	bl
PDI-SC-S034-1.8TO4	SE	1,2,3,7,8,9-HxCDF	0.00085	0.000031	ug/kg	J+	bl
PDI-SC-S034-1.8TO4	SE	1,2,3,7,8-PeCDD	0.000099	0.000032	ug/kg	J+	bl
PDI-SC-S034-1.8TO4	SE	1,2,3,7,8-PeCDF	0.00034	0.000041	ug/kg	J+	bl
PDI-SC-S034-1.8TO4	SE	2,3,4,6,7,8-HxCDF	0.000081	0.000038	ug/kg	JN	bl,k
PDI-SC-S034-1.8TO4	SE	2,3,7,8-TCDF	0.000088	0.000038	ug/kg	J+	bl
PDI-SC-S034-1.8TO4	SE	OCDF	0.0012	0.000057	ug/kg	J+	bl
PDI-SC-S034-4TO5.2	SE	1,2,3,4,6,7,8-HpCDF	0.00017	0.000073	ug/kg	JN	lc,bl,k
PDI-SC-S034-4TO5.2	SE	1,2,3,4,7,8,9-HpCDF	0.00018	0.000076	ug/kg	JN	bl,k
PDI-SC-S034-4TO5.2	SE	1,2,3,4,7,8-HxCDD		0.00012	ug/kg	U	bl
PDI-SC-S034-4TO5.2	SE	1,2,3,6,7,8-HxCDD	0.00010	0.000058	ug/kg	JN	bl,k
PDI-SC-S034-4TO5.2	SE	1,2,3,7,8,9-HxCDD	0.00024	0.000054	ug/kg	J+	bl
PDI-SC-S034-4TO5.2	SE	1,2,3,7,8,9-HxCDF	0.00076	0.000042	ug/kg	J+	bl
PDI-SC-S034-4TO5.2	SE	1,2,3,7,8-PeCDF	0.00026	0.000030	ug/kg	J+	bl
PDI-SC-S034-4TO5.2	SE	2,3,7,8-TCDD	0.000097	0.000030	ug/kg	JN	k
PDI-SC-S034-4TO5.2	SE	2,3,7,8-TCDF	0.000041	0.000020	ug/kg	J+	bl
PDI-SC-S034-4TO5.2	SE	OCDF	0.00065	0.00014	ug/kg	JN	bl,k

**Attachment A****Nonconformance Summary Tables****Table A-1 - Labeled Compound Recoveries**

<b>Sample ID</b>	<b>Labeled Compound</b>	<b>% Recovery</b>	<b>Lower Limit</b>	<b>Upper Limit</b>
PDI-SC-S033-2TO3	13C-1,2,3,6,7,8-HxCDF	125	26	123
PDI-SC-S034-4TO5.2	13C-1,2,3,4,6,7,8-HpCDF	24	28	143

**Attachment B****Qualifier Codes and Explanations**

<b>Qualifier</b>	<b>Explanation</b>
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J-	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a potential low bias.
J+	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a potential high bias.
JN	The analyte was tentatively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.



## Attachment C

### Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
c	Calibration issue
cl	Clean-up standard recovery
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate RPDs
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration (EMPC)
l	LCS or OPR recoveries
lc	Labeled compound recovery
ld	Laboratory duplicate RPDs
lp	Laboratory control sample/laboratory control sample duplicate RPDs
m	Matrix spike recovery
ma	Multiple analyses, sample analyzed more than once, a value from another analysis should be used
md	Matrix spike/matrix spike duplicate RPDs
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column RPD
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	ICS results