

# Data Validation Report

Project: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling  
 Laboratory: Test America, West Sacramento, California  
 Laboratory Group: 580-77717-2  
 Analyses/Method: Clean Water Act - Dioxins and Furans / CWA1613B  
 Validation Level: Stage 2A  
 AECOM Project Number: 60566335.2.12  
 Prepared by: Elissa McDonagh/AECOM Completed on: 08/13/2018  
 Reviewed by: Waverly Braunstein/AECOM File Name: 580-77717-2\_DVR

**SUMMARY**

The samples listed below were collected by AECOM in Portland Harbor in Portland, OR on May 30 and 31, 2018.

Sample ID	Matrix/Sample Type
PDI-RB-VV-180530-1515	Aqueous QC
PDI-RB-VV-180531	Aqueous QC
PDI-SG-B342-BL1-D	Field Duplicate of PDI-SG-B342-BL1
PDI-SG-B188-BL1	Sediment
PDI-SG-B193-BL1	Sediment
PDI-SG-B342-BL1	Sediment
PDI-SG-B344-BL1	Sediment
PDI-SG-B348-BL1	Sediment
PDI-SG-B349-BL1	Sediment
PDI-SG-B355-BL1	Sediment
PDI-SG-B396-BL1	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
- ✓ 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 and/or negated, 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 laboratory method blanks and the equipment blanks associated with the samples in this data set. The equipment blank contamination, after laboratory method blank actions were applied, is summarized below for informational purposes only.

Blank ID	Compound	Result	QL	Units
PDI-RB-VV-180530-1515	1,2,3,4,6,7,8-HpCDF	5.0	51	pg/L
	1,2,3,4,7,8-HxCDD	2.1	51	pg/L
	1,2,3,7,8,9-HxCDF	3.2	51	pg/L
	1,2,3,7,8-PeCDF	0.70	51	pg/L
	OCDF	42	100	pg/L
PDI-RB-VV-180531	1,2,3,4,6,7,8-HpCDD	9.1	57	pg/L
	1,2,3,4,6,7,8-HpCDF	5.1	57	pg/L
	1,2,3,4,7,8,9-HpCDF	5.4	57	pg/L
	1,2,3,4,7,8-HxCDD	3.6	57	pg/L
	1,2,3,4,7,8-HxCDF	2.1	57	pg/L
	1,2,3,6,7,8-HxCDD	3.5	57	pg/L
	1,2,3,6,7,8-HxCDF	1.7	57	pg/L
	1,2,3,7,8,9-HxCDD	3.7	57	pg/L
	1,2,3,7,8,9-HxCDF	5.9	57	pg/L
	1,2,3,7,8-PeCDD	1.6	57	pg/L
	1,2,3,7,8-PeCDF	1.1	57	pg/L
	2,3,4,6,7,8-HxCDF	3.5	57	pg/L
	2,3,7,8-TCDD	0.88	11	pg/L
	OCDD	35	110	pg/L
OCDF	20	110	pg/L	

Detected compounds are summarized in Attachment A in Table A-1.

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, and, 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 < 50% [if one or both results were greater than five times the quantitation limit (QL)] for solid matrices and < 30% [if one or both results were greater than five times the QL] for aqueous matrices. All field duplicate precision criteria were met.

### **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. All method QC acceptance criteria were met.

### **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.

It should be noted that the overall bias is considered to be indeterminate in cases where cumulative nonconformances do not show a consistent bias or in cases of the presence of conflicting high and low biases.

Due to the matrix, the initial volumes used for the sediment samples deviated from the standard procedure. The reporting limits (RLs) have been adjusted proportionately.

### **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.

### **Estimated Maximum Possible Concentrations (EMPCs)**

The data were reviewed to identify sample results that were indicated by the laboratory to be estimated maximum possible concentrations (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. Results qualified with the "q" laboratory qualifier 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.

#### **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-RB-VV-180530-1515	WQ	1,2,3,4,6,7,8-HpCDD		1.5	pg/L	U	bl
PDI-RB-VV-180530-1515	WQ	1,2,3,4,6,7,8-HpCDF	5.0	0.30	pg/L	J+	bl
PDI-RB-VV-180530-1515	WQ	1,2,3,4,7,8,9-HpCDF		2.8	pg/L	U	bl
PDI-RB-VV-180530-1515	WQ	1,2,3,4,7,8-HxCDD	2.1	0.42	pg/L	J+	bl
PDI-RB-VV-180530-1515	WQ	1,2,3,7,8,9-HxCDF	3.2	0.24	pg/L	JN	bl,k
PDI-RB-VV-180530-1515	WQ	1,2,3,7,8-PeCDF	0.70	0.32	pg/L	JN	k
PDI-RB-VV-180530-1515	WQ	2,3,7,8-TCDF		0.80	pg/L	U	bl
PDI-RB-VV-180530-1515	WQ	OCDD		9.5	pg/L	U	bl
PDI-RB-VV-180530-1515	WQ	OCDF	42	0.53	pg/L	J+	bl
PDI-RB-VV-180531	WQ	1,2,3,4,6,7,8-HpCDD	9.1	0.28	pg/L	J+	bl
PDI-RB-VV-180531	WQ	1,2,3,4,6,7,8-HpCDF	5.1	0.29	pg/L	J+	bl
PDI-RB-VV-180531	WQ	1,2,3,4,7,8,9-HpCDF	5.4	0.34	pg/L	J+	bl
PDI-RB-VV-180531	WQ	1,2,3,4,7,8-HxCDD	3.6	0.43	pg/L	J+	bl
PDI-RB-VV-180531	WQ	1,2,3,6,7,8-HxCDD	3.5	0.39	pg/L	J+	bl
PDI-RB-VV-180531	WQ	1,2,3,6,7,8-HxCDF	1.7	0.63	pg/L	JN	k
PDI-RB-VV-180531	WQ	1,2,3,7,8,9-HxCDD	3.7	0.38	pg/L	JN	bl,k
PDI-RB-VV-180531	WQ	1,2,3,7,8,9-HxCDF	5.9	0.28	pg/L	J+	bl
PDI-RB-VV-180531	WQ	2,3,4,6,7,8-HxCDF	3.5	0.34	pg/L	J+	bl
PDI-RB-VV-180531	WQ	2,3,7,8-TCDD	0.88	0.27	pg/L	JN	k
PDI-RB-VV-180531	WQ	2,3,7,8-TCDF		0.94	pg/L	U	bl
PDI-RB-VV-180531	WQ	OCDD	35	0.39	pg/L	J+	bl
PDI-RB-VV-180531	WQ	OCDF	20	0.36	pg/L	J+	bl
PDI-SG-B188-BL1	SE	1,2,3,4,6,7,8-HpCDF	0.00071	0.000035	ug/kg	JN	bl,k
PDI-SG-B188-BL1	SE	1,2,3,4,7,8,9-HpCDF		0.00049	ug/kg	U	bl
PDI-SG-B188-BL1	SE	1,2,3,4,7,8-HxCDD		0.00013	ug/kg	U	bl
PDI-SG-B188-BL1	SE	1,2,3,4,7,8-HxCDF	0.00017	0.000045	ug/kg	JN	bl,k
PDI-SG-B188-BL1	SE	1,2,3,6,7,8-HxCDD	0.00020	0.000023	ug/kg	J+	bl
PDI-SG-B188-BL1	SE	1,2,3,7,8,9-HxCDD	0.00019	0.000022	ug/kg	J+	bl
PDI-SG-B188-BL1	SE	1,2,3,7,8,9-HxCDF		0.00062	ug/kg	U	bl
PDI-SG-B188-BL1	SE	1,2,3,7,8-PeCDD		0.000044	ug/kg	U	bl
PDI-SG-B188-BL1	SE	1,2,3,7,8-PeCDF		0.00011	ug/kg	U	bl
PDI-SG-B188-BL1	SE	2,3,4,6,7,8-HxCDF		0.000056	ug/kg	U	bl
PDI-SG-B188-BL1	SE	2,3,4,7,8-PeCDF		0.000048	ug/kg	U	bl
PDI-SG-B188-BL1	SE	2,3,7,8-TCDD		0.000098	ug/kg	U	bl
PDI-SG-B188-BL1	SE	2,3,7,8-TCDF		0.000085	ug/kg	U	bl
PDI-SG-B193-BL1	SE	1,2,3,4,7,8-HxCDD	0.00048	0.000048	ug/kg	J+	bl
PDI-SG-B193-BL1	SE	1,2,3,6,7,8-HxCDD	0.0015	0.000045	ug/kg	JN	k
PDI-SG-B193-BL1	SE	1,2,3,7,8,9-HxCDF	0.0011	0.000093	ug/kg	J+	bl

Sample ID	Matrix	Compound	Result	EDL	Units	Validation Qualifiers	Validation Reason
PDI-SG-B193-BL1	SE	1,2,3,7,8-PeCDD	0.00032	0.000040	ug/kg	J+	bl
PDI-SG-B193-BL1	SE	2,3,7,8-TCDD	0.00023	0.000039	ug/kg	JN	bl,k
PDI-SG-B342-BL1	SE	1,2,3,4,6,7,8-HpCDF	0.012	0.00017	ug/kg	JN	k
PDI-SG-B342-BL1	SE	1,2,3,4,7,8,9-HpCDF	0.0016	0.00018	ug/kg	J+	bl
PDI-SG-B342-BL1	SE	1,2,3,7,8,9-HxCDF	0.0015	0.00011	ug/kg	J+	bl
PDI-SG-B342-BL1	SE	2,3,7,8-TCDD	0.00018	0.00010	ug/kg	JN	k
PDI-SG-B342-BL1	SE	2,3,7,8-TCDF	0.00048	0.000089	ug/kg	J+	bl
PDI-SG-B342-BL1-D	SE	1,2,3,4,6,7,8-HpCDF	0.010	0.00015	ug/kg	JN	k
PDI-SG-B342-BL1-D	SE	1,2,3,4,7,8,9-HpCDF	0.0017	0.00017	ug/kg	J+	bl
PDI-SG-B342-BL1-D	SE	1,2,3,7,8,9-HxCDF	0.0012	0.000097	ug/kg	J+	bl
PDI-SG-B342-BL1-D	SE	2,3,4,7,8-PeCDF	0.00029	0.000088	ug/kg	JN	k
PDI-SG-B342-BL1-D	SE	2,3,7,8-TCDD	0.00027	0.000098	ug/kg	JN	k
PDI-SG-B342-BL1-D	SE	2,3,7,8-TCDF	0.00049	0.000075	ug/kg	J+	bl
PDI-SG-B344-BL1	SE	1,2,3,4,6,7,8-HpCDF	0.016	0.00074	ug/kg	JN	k
PDI-SG-B344-BL1	SE	1,2,3,4,7,8,9-HpCDF	0.0022	0.00098	ug/kg	J+	bl
PDI-SG-B344-BL1	SE	1,2,3,4,7,8-HxCDD	0.00083	0.00043	ug/kg	JN	k
PDI-SG-B344-BL1	SE	1,2,3,4,7,8-HxCDF	0.0015	0.00025	ug/kg	JN	k
PDI-SG-B344-BL1	SE	1,2,3,6,7,8-HxCDF	0.00097	0.00024	ug/kg	JN	k
PDI-SG-B344-BL1	SE	1,2,3,7,8,9-HxCDD	0.0020	0.00036	ug/kg	JN	k
PDI-SG-B344-BL1	SE	1,2,3,7,8,9-HxCDF	0.0021	0.00021	ug/kg	JN	bl,k
PDI-SG-B344-BL1	SE	1,2,3,7,8-PeCDD	0.00043	0.00026	ug/kg	JN	k
PDI-SG-B344-BL1	SE	1,2,3,7,8-PeCDF	0.00035	0.00019	ug/kg	JN	k
PDI-SG-B344-BL1	SE	2,3,7,8-TCDD	0.00060	0.00020	ug/kg	JN	k
PDI-SG-B344-BL1	SE	2,3,7,8-TCDF	0.00077	0.00018	ug/kg	J+	bl
PDI-SG-B348-BL1	SE	1,2,3,4,6,7,8-HpCDF	0.017	0.00075	ug/kg	JN	k
PDI-SG-B348-BL1	SE	1,2,3,4,7,8,9-HpCDF	0.0023	0.00090	ug/kg	J+	bl
PDI-SG-B348-BL1	SE	1,2,3,4,7,8-HxCDD	0.0013	0.00044	ug/kg	JN	k
PDI-SG-B348-BL1	SE	1,2,3,4,7,8-HxCDF	0.0018	0.00035	ug/kg	JN	k
PDI-SG-B348-BL1	SE	1,2,3,7,8,9-HxCDF	0.0019	0.00027	ug/kg	J+	bl
PDI-SG-B348-BL1	SE	1,2,3,7,8-PeCDD	0.00055	0.00021	ug/kg	JN	k
PDI-SG-B348-BL1	SE	2,3,4,7,8-PeCDF	0.00037	0.00019	ug/kg	JN	k
PDI-SG-B348-BL1	SE	2,3,7,8-TCDD	0.00054	0.00019	ug/kg	JN	k
PDI-SG-B348-BL1	SE	2,3,7,8-TCDF	0.00065	0.00018	ug/kg	J+	bl
PDI-SG-B349-BL1	SE	1,2,3,4,6,7,8-HpCDF	0.014	0.00025	ug/kg	JN	k
PDI-SG-B349-BL1	SE	1,2,3,4,7,8,9-HpCDF	0.0014	0.00027	ug/kg	J+	bl
PDI-SG-B349-BL1	SE	1,2,3,4,7,8-HxCDD	0.00075	0.000082	ug/kg	JN	bl,k
PDI-SG-B349-BL1	SE	1,2,3,7,8,9-HxCDF	0.0010	0.000080	ug/kg	J+	bl
PDI-SG-B349-BL1	SE	1,2,3,7,8-PeCDF	0.00034	0.00013	ug/kg	J+	bl
PDI-SG-B349-BL1	SE	2,3,4,7,8-PeCDF	0.00045	0.00014	ug/kg	J+	bl
PDI-SG-B355-BL1	SE	1,2,3,4,6,7,8-HpCDF	0.0096	0.00019	ug/kg	JN	k

Sample ID	Matrix	Compound	Result	EDL	Units	Validation Qualifiers	Validation Reason
PDI-SG-B355-BL1	SE	1,2,3,4,7,8,9-HpCDF	0.0012	0.00021	ug/kg	J+	bl
PDI-SG-B355-BL1	SE	1,2,3,4,7,8-HxCDD	0.00073	0.000070	ug/kg	J+	bl
PDI-SG-B355-BL1	SE	1,2,3,7,8,9-HxCDF	0.00095	0.000051	ug/kg	J+	bl
PDI-SG-B355-BL1	SE	1,2,3,7,8-PeCDF	0.00039	0.000051	ug/kg	J+	bl
PDI-SG-B355-BL1	SE	2,3,4,7,8-PeCDF	0.00027	0.000054	ug/kg	J+	bl
PDI-SG-B355-BL1	SE	2,3,7,8-TCDD	0.00019	0.000054	ug/kg	JN	bl,k
PDI-SG-B355-BL1	SE	2,3,7,8-TCDF	0.00048	0.000038	ug/kg	J+	bl
PDI-SG-B396-BL1	SE	1,2,3,4,7,8,9-HpCDF	0.00058	0.000030	ug/kg	J+	bl
PDI-SG-B396-BL1	SE	1,2,3,4,7,8-HxCDD	0.00017	0.000014	ug/kg	J+	bl
PDI-SG-B396-BL1	SE	1,2,3,4,7,8-HxCDF	0.00020	0.000026	ug/kg	JN	bl,k
PDI-SG-B396-BL1	SE	1,2,3,6,7,8-HxCDD	0.00026	0.000015	ug/kg	JN	k
PDI-SG-B396-BL1	SE	1,2,3,6,7,8-HxCDF	0.000094	0.000024	ug/kg	JN	bl,k
PDI-SG-B396-BL1	SE	1,2,3,7,8,9-HxCDD	0.00019	0.000013	ug/kg	JN	k
PDI-SG-B396-BL1	SE	1,2,3,7,8,9-HxCDF		0.00054	ug/kg	U	bl
PDI-SG-B396-BL1	SE	1,2,3,7,8-PeCDD	0.000066	0.000027	ug/kg	JN	k
PDI-SG-B396-BL1	SE	1,2,3,7,8-PeCDF	0.00014	0.000019	ug/kg	J+	bl
PDI-SG-B396-BL1	SE	2,3,4,6,7,8-HxCDF	0.000084	0.000020	ug/kg	J+	bl
PDI-SG-B396-BL1	SE	2,3,4,7,8-PeCDF	0.000088	0.000021	ug/kg	J+	bl
PDI-SG-B396-BL1	SE	2,3,7,8-TCDD		0.000072	ug/kg	U	bl
PDI-SG-B396-BL1	SE	2,3,7,8-TCDF		0.00014	ug/kg	U	bl



## Attachment A

## Nonconformance Summary Tables

Table A-1 - Lab Blanks

Blank ID	Compound	Result	QL	BAL	Units	Associated Samples
MB 320-227727/1-A	1,2,3,4,6,7,8-HpCDD	3.66	50	18.3	pg/L	PDI-RB-VV-180530-1515 PDI-RB-VV-180531
	1,2,3,4,6,7,8-HpCDF	2.21	50	11.05	pg/L	
	1,2,3,4,7,8,9-HpCDF	3.35	50	16.75	pg/L	
	1,2,3,4,7,8-HxCDD	1.61	50	8.05	pg/L	
	1,2,3,6,7,8-HxCDD	0.920	50	4.6	pg/L	
	1,2,3,7,8,9-HxCDD	1.13	50	5.65	pg/L	
	1,2,3,7,8,9-HxCDF	3.12	50	15.6	pg/L	
	2,3,4,6,7,8-HxCDF	0.889	50	4.445	pg/L	
	2,3,7,8-TCDF	0.976	10	4.88	pg/L	
	OCDD	14.5	100	72.5	pg/L	
OCDF	8.46	100	42.3	pg/L		
MB 320-228845/1-A	1,2,3,4,6,7,8-HpCDD	0.000207	0.0050	0.001035	ug/kg	PDI-SG-B188-BL1 PDI-SG-B193-BL1 PDI-SG-B349-BL1 PDI-SG-B355-BL1
	1,2,3,4,6,7,8-HpCDF	0.000210	0.0050	0.00105	ug/kg	
	1,2,3,4,7,8,9-HpCDF	0.000642	0.0050	0.00321	ug/kg	
	1,2,3,4,7,8-HxCDD	0.000181	0.0050	0.000905	ug/kg	
	1,2,3,4,7,8-HxCDF	0.000170	0.0050	0.00085	ug/kg	
	1,2,3,6,7,8-HxCDD	0.000105	0.0050	0.000525	ug/kg	
	1,2,3,6,7,8-HxCDF	0.0000830	0.0050	0.000415	ug/kg	
	1,2,3,7,8,9-HxCDD	0.000123	0.0050	0.000615	ug/kg	
	1,2,3,7,8,9-HxCDF	0.000799	0.0050	0.003995	ug/kg	
	1,2,3,7,8-PeCDD	0.0000809	0.0050	0.0004045	ug/kg	
	1,2,3,7,8-PeCDF	0.000188	0.0050	0.00094	ug/kg	
	2,3,4,6,7,8-HxCDF	0.0000677	0.0050	0.0003385	ug/kg	
	2,3,4,7,8-PeCDF	0.0000902	0.0050	0.000451	ug/kg	
	2,3,7,8-TCDD	0.000145	0.0010	0.000725	ug/kg	
	2,3,7,8-TCDF	0.000115	0.0010	0.000575	ug/kg	
OCDD	0.000817	0.010	0.004085	ug/kg		
OCDF	0.000378	0.010	0.00189	ug/kg		
MB 320-228869/1-A	1,2,3,4,7,8,9-HpCDF	0.000638	0.0050	0.00319	ug/kg	PDI-SG-B342-BL1 PDI-SG-B342-BL1-D PDI-SG-B344-BL1 PDI-SG-B348-BL1
	1,2,3,4,7,8-HxCDF	0.000161	0.0050	0.000805	ug/kg	
	1,2,3,7,8,9-HxCDF	0.00103	0.0050	0.00515	ug/kg	
	2,3,7,8-TCDF	0.000348	0.0010	0.00174	ug/kg	
MB 320-229025/1-A	1,2,3,4,6,7,8-HpCDD	0.0000946	0.0050	0.000473	ug/kg	PDI-SG-B396-BL1
	1,2,3,4,6,7,8-HpCDF	0.000140	0.0050	0.0007	ug/kg	
	1,2,3,4,7,8,9-HpCDF	0.000579	0.0050	0.002895	ug/kg	
	1,2,3,4,7,8-HxCDD	0.000140	0.0050	0.0007	ug/kg	

Blank ID	Compound	Result	QL	BAL	Units	Associated Samples
	1,2,3,4,7,8-HxCDF	0.000102	0.0050	0.00051	ug/kg	
	1,2,3,6,7,8-HxCDD	0.0000407	0.0050	0.0002035	ug/kg	
	1,2,3,6,7,8-HxCDF	0.0000470	0.0050	0.000235	ug/kg	
	1,2,3,7,8,9-HxCDD	0.0000275	0.0050	0.0001375	ug/kg	
	1,2,3,7,8,9-HxCDF	0.000599	0.0050	0.002995	ug/kg	
	1,2,3,7,8-PeCDF	0.0000769	0.0050	0.0003845	ug/kg	
	2,3,4,6,7,8-HxCDF	0.0000312	0.0050	0.000156	ug/kg	
	2,3,4,7,8-PeCDF	0.0000360	0.0050	0.00018	ug/kg	
	2,3,7,8-TCDD	0.0000987	0.0010	0.0004935	ug/kg	
	2,3,7,8-TCDF	0.000152	0.0010	0.00076	ug/kg	
	OCDD	0.000338	0.010	0.00169	ug/kg	
	OCDF	0.000280	0.010	0.0014	ug/kg	

**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
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