AECOM
257 West Genesee Street, Suite 400
Buffalo, NY 14202

716.856.5636 tel
716.856.2545 fax

Data Validation Report

Project:	Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling	
Laboratory:	Test America, West Sacramento, California	
Laboratory Group:	580-79329-2	
Analyses/Method:	Clean Water Act - Dioxins and Furans / CWA1613B	
Validation Level:	Stage 2A	
AECOM Project Number:	60566335.2.12	
Prepared by:	Peter Fairbanks/AECOM	Completed on: 09/14/2018
Reviewed by:	George Kisluk/AECOM	File Name: 580-79329-2 Stage 2A DVR

SUMMARY

The samples listed below were collected by AECOM in Portland Harbor in Portland, OR on August 1 and 2, 2018.

Sample ID	Matrix/Sample Type
PDI-RB-SS-180801	Equipment Blank
PDI-RB-SS-180802	Equipment Blank
PDI-RB-SS-180802-1645	Equipment Blank
PDI-SC-S032-0TO2	Sediment
PDI-SC-S032-10TO12	Sediment
PDI-SC-S032-12TO14	Sediment
PDI-SC-S032-2TO4	Sediment
PDI-SC-S032-4TO6	Sediment
PDI-SC-S032-6TO8	Sediment
PDI-SC-S032-8TO10	Sediment
PDI-SC-S083-0TO1.6	Sediment
PDI-SC-S083-1.6TO3.5	Sediment
PDI-SC-S083-3.5TO5.0	Sediment
PDI-SC-S083-5TO6.6	Sediment
PDI-SC-S086-0TO2	Sediment
PDI-SC-S086-0TO2D	Field Duplicate of PDI-SC-S086-0TO2
PDI-SC-S086-2TO3.3	Sediment
PDI-SC-S144-0TO2	Sediment
PDI-SC-S144-10TO12.1	Sediment
PDI-SC-S144-2TO4	Sediment

Sample ID	Matrix/Sample Type
PDI-SC-S144-2TO4	Sediment
PDI-SC-S144-4TO6	Sediment
PDI-SC-S144-6TO8	Sediment
PDI-SC-S144-8TO10	Sediment
PDI-SC-S172-0TO2	Sediment
PDI-SC-S172-2TO4	Sediment
PDI-SC-S172-2TO4D	Field Duplicate of PDI-SC-S172-2TO4
PDI-SC-S172-4TO6	Sediment
PDI-SC-S172-6TO8.1	Sediment
PDI-SC-S178-0TO2	Sediment
PDI-SC-S178-10.7TO12.7	Sediment
PDI-SC-S178-12.7TO14	Sediment
PDI-SC-S178-2TO3.7	Sediment
PDI-SC-S178-3.7TO4.7	Sediment
PDI-SC-S178-4.7TO6.7	Sediment
PDI-SC-S178-6.7TO8.7	Sediment
PDI-SC-S178-8.7TO10.7	Sediment
PDI-SC-S218-0TO2	Sediment
PDI-SC-S218-2TO4.5	Sediment
PDI-SC-S218-4.5TO6	Sediment
PDI-SC-S218-6TO8	Sediment
PDI-SC-S218-8TO10	Sediment
PDI-SC-S228-0TO2.3	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 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.

It should be noted that lids for four sample containers were cracked upon receipt at the laboratory, whereupon, the laboratory immediately replaced the damaged lids. Since dioxins/furans do not readily volatilize, this issue does not affect the usability of the sample data.

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 and 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. Equipment blank contamination was not used to qualify field samples.

Blank ID	Compound	Result	EDL	Units
PDI-RB-SS-180801	1,2,3,4,6,7,8-HpCDF	1.3	0.55	pg/L
	OCDD	13	0.83	pg/L
PDI-RB-SS-180802	1,2,3,4,6,7,8-HpCDD	1.7	0.26	pg/L
	1,2,3,4,6,7,8-HpCDF	0.87	0.20	pg/L
	1,2,3,4,7,8,9-HpCDF	0.61	0.24	pg/L
	OCDD	17	0.29	pg/L
	OCDF	2.7	0.43	pg/L
PDI-RB-SS-180802-1645	OCDD	14	2.2	pg/L

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.

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

Actions: (Based on AECOM professional judgment)

Criteria	RPD	Action	
		Detect	Nondetect
Sample and duplicate are nondetect results (<EDL)	Not calculable (NC)	No qualification	No qualification
Sample and duplicate results <PQL	Not applicable	No qualification	No qualification
Sample and duplicate results ≥5xPQL	>30% Aqueous >50% All other sample types	J	Not Applicable
Sample and duplicate results are >PQL and <5xPQL	>60% Aqueous >100% All other sample types	J	Not Applicable
If sample or duplicate result is >PQL and the other is >5xPQL	>30% Aqueous >50% All other sample types	J	Not Applicable
If sample or duplicate result is <PQL and the other is >PQL, but <5xPQL	>60% Aqueous >100% All other sample types	J	Not Applicable
If sample or duplicate result is >5xPQL and the other is not detected	NC	J	UJ
If sample or duplicate result is <PQL and the other is not detected	NC	No qualification	No qualification

It should be noted that professional judgement is used when evaluating precision in cases where the parent or field duplicate is diluted and the other is not diluted.

Qualified sample results are summarized in Table 1.

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-2. Samples were qualified as follows:

Actions: (Based on NFG 2016)

Criteria[1]	Actions[2]	
	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[1]		Actions[2]	
Ion abundance ratio criteria not met	Calibration compliant	J	UJ
	Calibration non-compliant	J	R
Clean-up Standard Recovery < Lower Acceptance Limit		J	UJ

[1]See Table 7 in method 1613B for acceptance criteria

[2]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.

Chromatographic Interference

Samples exhibiting elevated background noise or matrix interference resulting in elevation of EDLs are qualified with a "G" by the laboratory. Professional judgement was used to qualify affected results "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" and "J+" qualifiers 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.

Dilutions

Sample	Compound	Dilution
PDI-SC-S083-1.6TO3.5	All results	10
PDI-SC-S083-3.5TO5.0	All results	10
PDI-SC-S086-0TO2	All results	20

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-SS-180801	WQ	1,2,3,4,6,7,8-HpCDF	1.3	0.55	pg/L	JN	bl,k
PDI-RB-SS-180801	WQ	OCDD	13	0.83	pg/L	J+	bl
PDI-RB-SS-180802	WQ	1,2,3,4,6,7,8-HpCDD	1.7	0.26	pg/L	J+	bl
PDI-RB-SS-180802	WQ	1,2,3,4,6,7,8-HpCDF	0.87	0.20	pg/L	JN	bl,k
PDI-RB-SS-180802	WQ	1,2,3,4,7,8,9-HpCDF	0.61	0.24	pg/L	J+	bl
PDI-RB-SS-180802	WQ	1,2,3,4,7,8-HxCDD		1.4	pg/L	U	bl
PDI-RB-SS-180802	WQ	1,2,3,6,7,8-HxCDD	0.43	0.31	pg/L	JN	k
PDI-RB-SS-180802	WQ	OCDD	17	0.29	pg/L	J+	bl
PDI-RB-SS-180802	WQ	OCDF	2.7	0.43	pg/L	J+	bl
PDI-RB-SS-180802-1645	WQ	OCDD	14	2.2	pg/L	J+	bl
PDI-SC-S032-0TO2	SE	1,2,3,4,7,8-HxCDD	0.00030	0.000072	ug/kg	J+	bl
PDI-SC-S032-0TO2	SE	1,2,3,7,8-PeCDF	0.00020	0.000065	ug/kg	JN	k
PDI-SC-S032-10TO12	SE	1,2,3,4,6,7,8-HpCDD	0.00030	0.000045	ug/kg	JN	bl,k
PDI-SC-S032-10TO12	SE	1,2,3,4,6,7,8-HpCDF		0.000033	ug/kg	U	bl
PDI-SC-S032-12TO14	SE	1,2,3,4,6,7,8-HpCDF	0.00024	0.000047	ug/kg	JN	bl,k
PDI-SC-S032-12TO14	SE	OCDF	0.00026	0.000079	ug/kg	J+	bl
PDI-SC-S032-2TO4	SE	1,2,3,4,7,8-HxCDD	0.00028	0.00013	ug/kg	J+	bl
PDI-SC-S032-2TO4	SE	1,2,3,7,8-PeCDD	0.00010	0.000083	ug/kg	JN	k
PDI-SC-S032-4TO6	SE	1,2,3,4,6,7,8-HpCDF	0.00072	0.000083	ug/kg	JN	k
PDI-SC-S032-4TO6	SE	1,2,3,4,7,8-HxCDD	0.00026	0.000074	ug/kg	J+	bl
PDI-SC-S032-8TO10	SE	1,2,3,4,6,7,8-HpCDD	0.00037	0.000073	ug/kg	J+	bl
PDI-SC-S032-8TO10	SE	1,2,3,4,6,7,8-HpCDF	0.00023	0.000069	ug/kg	JN	bl,k
PDI-SC-S032-8TO10	SE	OCDF	0.00013	0.00011	ug/kg	J+	bl
PDI-SC-S083-0TO1.6	SE	1,2,3,4,7,8,9-HpCDF	0.0035	0.00082	ug/kg	JN	k
PDI-SC-S083-0TO1.6	SE	2,3,7,8-TCDD	0.00039	0.00017	ug/kg	JN	k
PDI-SC-S083-1.6TO3.5	SE	1,2,3,4,7,8-HxCDD	0.00045	0.00032	ug/kg	JN	bl,k
PDI-SC-S083-1.6TO3.5	SE	1,2,3,7,8-PeCDF	0.00053	0.00024	ug/kg	JN	k
PDI-SC-S083-3.5TO5.0	SE	1,2,3,4,7,8-HxCDD	0.00073	0.00049	ug/kg	J+	bl
PDI-SC-S083-3.5TO5.0	SE	1,2,3,7,8-PeCDF	0.0013	0.00032	ug/kg	JN	k
PDI-SC-S083-3.5TO5.0	SE	2,3,7,8-TCDF	0.00096	0.00025	ug/kg	JN	k
PDI-SC-S083-5TO6.6	SE	1,2,3,4,6,7,8-HpCDD	0.25	0.0059	ug/kg	J	d
PDI-SC-S083-5TO6.6	SE	1,2,3,4,7,8-HxCDD	0.00074	0.00016	ug/kg	J+	bl
PDI-SC-S083-5TO6.6	SE	1,2,3,6,7,8-HxCDD	0.0032	0.00015	ug/kg	JN	k
PDI-SC-S083-5TO6.6	SE	2,3,4,6,7,8-HxCDF	0.00033	0.000098	ug/kg	JN	k
PDI-SC-S083-5TO6.6	SE	OCDD	2.0	0.0021	ug/kg	J	lc
PDI-SC-S086-0TO2	SE	1,2,3,4,6,7,8-HpCDD	0.11	0.0029	ug/kg	J	fd
PDI-SC-S086-0TO2	SE	1,2,3,4,7,8-HxCDF	0.0031	0.0011	ug/kg	JN	k
PDI-SC-S086-0TO2	SE	OCDD	0.89	0.0034	ug/kg	J	fd

Sample ID	Matrix	Compound	Result	EDL	Units	Validation Qualifiers	Validation Reason
PDI-SC-S086-0TO2	SE	OCDF	0.038	0.0018	ug/kg	J	fd
PDI-SC-S086-0TO2D	SE	1,2,3,4,6,7,8-HpCDD	0.019	0.00020	ug/kg	J	fd
PDI-SC-S086-0TO2D	SE	1,2,3,4,7,8-HxCDD		0.00022	ug/kg	U	bl
PDI-SC-S086-0TO2D	SE	1,2,3,6,7,8-HxCDD	0.00054	0.00018	ug/kg	JN	k
PDI-SC-S086-0TO2D	SE	2,3,4,7,8-PeCDF	0.00031	0.000071	ug/kg	JN	k
PDI-SC-S086-0TO2D	SE	2,3,7,8-TCDF	0.00043	0.00015	ug/kg	JN	k
PDI-SC-S086-0TO2D	SE	OCDD	0.17	0.00045	ug/kg	J	fd
PDI-SC-S086-0TO2D	SE	OCDF	0.0070	0.00042	ug/kg	J	fd
PDI-SC-S086-2TO3.3	SE	1,2,3,4,7,8-HxCDD	0.00023	0.00015	ug/kg	JN	bl,k
PDI-SC-S086-2TO3.3	SE	2,3,7,8-TCDF	0.00064	0.000065	ug/kg	JN	k
PDI-SC-S144-0TO2	SE	1,2,3,4,6,7,8-HpCDD	1.1	0.018	ug/kg	J	d
PDI-SC-S144-0TO2	SE	OCDD	10	0.031	ug/kg	J	q,d
PDI-SC-S144-10TO12.1	SE	1,2,3,4,6,7,8-HpCDF	0.0011	0.00021	ug/kg	JN	k
PDI-SC-S144-10TO12.1	SE	1,2,3,4,7,8-HxCDD	0.00028	0.00015	ug/kg	JN	bl,k
PDI-SC-S144-10TO12.1	SE	1,2,3,4,7,8-HxCDF	0.00029	0.00013	ug/kg	JN	k
PDI-SC-S144-10TO12.1	SE	1,2,3,6,7,8-HxCDD	0.00047	0.00015	ug/kg	JN	k
PDI-SC-S144-10TO12.1	SE	1,2,3,6,7,8-HxCDF	0.00024	0.00012	ug/kg	JN	k
PDI-SC-S144-10TO12.1	SE	2,3,4,6,7,8-HxCDF	0.00056	0.00012	ug/kg	JN	k
PDI-SC-S144-2TO4	SE	1,2,3,4,6,7,8-HpCDD	0.82	0.012	ug/kg	J	d
PDI-SC-S144-2TO4	SE	OCDD	8.2	0.020	ug/kg	J	q,d
PDI-SC-S144-4TO6	SE	1,2,3,4,6,7,8-HpCDD	0.78	0.012	ug/kg	J	d
PDI-SC-S144-4TO6	SE	1,2,3,4,6,7,8-HpCDF	0.21	0.0058	ug/kg	J	d
PDI-SC-S144-4TO6	SE	1,2,3,4,7,8,9-HpCDF	0.021	0.0064	ug/kg	J	d
PDI-SC-S144-4TO6	SE	2,3,4,6,7,8-HxCDF	0.0039	0.0023	ug/kg	JN	k
PDI-SC-S144-4TO6	SE	2,3,7,8-TCDD	0.00084	0.00013	ug/kg	JN	k
PDI-SC-S144-4TO6	SE	OCDD	7.4	0.017	ug/kg	J	q,d
PDI-SC-S144-6TO8	SE	2,3,7,8-TCDD	0.00048	0.00013	ug/kg	JN	k
PDI-SC-S144-8TO10	SE	1,2,3,4,7,8-HxCDD	0.00029	0.00019	ug/kg	J+	bl
PDI-SC-S144-8TO10	SE	1,2,3,7,8,9-HxCDD	0.00038	0.00017	ug/kg	JN	k
PDI-SC-S172-0TO2	SE	1,2,3,4,6,7,8-HpCDD	0.46	0.0072	ug/kg	J	d
PDI-SC-S172-0TO2	SE	1,2,3,7,8-PeCDF	0.0016	0.00050	ug/kg	JN	k
PDI-SC-S172-0TO2	SE	2,3,4,7,8-PeCDF	0.0013	0.00056	ug/kg	JN	k
PDI-SC-S172-0TO2	SE	2,3,7,8-TCDD	0.00046	0.00011	ug/kg	JN	k
PDI-SC-S172-0TO2	SE	2,3,7,8-TCDF	0.0046	0.0023	ug/kg	J	d
PDI-SC-S172-2TO4	SE	1,2,3,4,6,7,8-HpCDD	0.47	0.0062	ug/kg	J	d
PDI-SC-S172-2TO4	SE	1,2,3,4,7,8,9-HpCDF	0.0047	0.0028	ug/kg	JN	k
PDI-SC-S172-2TO4	SE	1,2,3,4,7,8-HxCDD	0.0031	0.00060	ug/kg	JN	k
PDI-SC-S172-2TO4	SE	1,2,3,7,8-PeCDD	0.0012	0.00055	ug/kg	JN	k
PDI-SC-S172-2TO4	SE	2,3,7,8-TCDD	0.0011	0.00015	ug/kg	JN	k
PDI-SC-S172-2TO4	SE	OCDD	4.2	0.021	ug/kg	J	q,d

Sample ID	Matrix	Compound	Result	EDL	Units	Validation Qualifiers	Validation Reason
PDI-SC-S172-2TO4D	SE	2,3,7,8-TCDD	0.00052	0.000085	ug/kg	JN	k
PDI-SC-S172-4TO6	SE	1,2,3,4,7,8-HxCDD	0.00048	0.000072	ug/kg	J+	bl
PDI-SC-S172-6TO8.1	SE	1,2,3,4,7,8-HxCDD	0.00045	0.000071	ug/kg	J+	bl
PDI-SC-S172-6TO8.1	SE	1,2,3,7,8-PeCDF	0.00035	0.00013	ug/kg	JN	k
PDI-SC-S172-6TO8.1	SE	2,3,4,7,8-PeCDF	0.00028	0.00014	ug/kg	JN	k
PDI-SC-S172-6TO8.1	SE	2,3,7,8-TCDD	0.00014	0.000038	ug/kg	JN	k
PDI-SC-S178-0TO2	SE	1,2,3,7,8-PeCDD	0.0020	0.00062	ug/kg	JN	k
PDI-SC-S178-0TO2	SE	1,2,3,7,8-PeCDF	0.0025	0.00047	ug/kg	JN	k
PDI-SC-S178-0TO2	SE	OCDD	4.8	0.0012	ug/kg	J	q
PDI-SC-S178-12.7TO14	SE	1,2,3,4,7,8-HxCDD	0.00020	0.000053	ug/kg	J+	bl
PDI-SC-S178-2TO3.7	SE	1,2,3,4,7,8,9-HpCDF	0.0044	0.0014	ug/kg	J	lc
PDI-SC-S178-2TO3.7	SE	2,3,7,8-TCDD	0.00073	0.000054	ug/kg	JN	k
PDI-SC-S178-3.7TO4.7	SE	1,2,3,4,6,7,8-HpCDF	0.079	0.00066	ug/kg	J	lc
PDI-SC-S178-3.7TO4.7	SE	2,3,7,8-TCDD	0.00042	0.000036	ug/kg	JN	k
PDI-SC-S178-4.7TO6.7	SE	1,2,3,4,6,7,8-HpCDF	0.00070	0.00011	ug/kg	JN	k
PDI-SC-S178-4.7TO6.7	SE	1,2,3,6,7,8-HxCDD	0.00016	0.000064	ug/kg	JN	k
PDI-SC-S178-4.7TO6.7	SE	1,2,3,7,8,9-HxCDD	0.00016	0.000059	ug/kg	JN	k
PDI-SC-S178-6.7TO8.7	SE	1,2,3,4,7,8-HxCDD		0.00015	ug/kg	U	bl
PDI-SC-S178-6.7TO8.7	SE	1,2,3,6,7,8-HxCDD	0.00010	0.000047	ug/kg	JN	k
PDI-SC-S178-6.7TO8.7	SE	2,3,7,8-TCDD	0.00012	0.000015	ug/kg	JN	k
PDI-SC-S178-8.7TO10.7	SE	1,2,3,4,7,8-HxCDD		0.000076	ug/kg	U	bl
PDI-SC-S178-8.7TO10.7	SE	1,2,3,6,7,8-HxCDD	0.000048	0.000034	ug/kg	JN	k
PDI-SC-S178-8.7TO10.7	SE	1,2,3,7,8,9-HxCDD	0.00011	0.000032	ug/kg	JN	k
PDI-SC-S178-8.7TO10.7	SE	2,3,7,8-TCDD	0.00016	0.000016	ug/kg	JN	k
PDI-SC-S218-0TO2	SE	1,2,3,4,6,7,8-HpCDD	0.32	0.0047	ug/kg	J	d
PDI-SC-S218-0TO2	SE	1,2,3,4,6,7,8-HpCDF	0.045	0.0016	ug/kg	JN	k
PDI-SC-S218-0TO2	SE	1,2,3,4,7,8-HxCDD	0.00080	0.00026	ug/kg	J+	bl
PDI-SC-S218-0TO2	SE	1,2,3,6,7,8-HxCDD	0.0062	0.00024	ug/kg	JN	k
PDI-SC-S218-0TO2	SE	1,2,3,7,8-PeCDD	0.00078	0.00014	ug/kg	JN	k
PDI-SC-S218-0TO2	SE	OCDD	5.1	0.0035	ug/kg	J	q
PDI-SC-S218-2TO4.5	SE	1,2,3,7,8-PeCDD	0.00099	0.00034	ug/kg	JN	k
PDI-SC-S218-2TO4.5	SE	OCDD	3.2	0.011	ug/kg	J	q,d
PDI-SC-S218-4.5TO6	SE	1,2,3,4,7,8-HxCDD	0.00023	0.000044	ug/kg	JN	bl,k
PDI-SC-S218-4.5TO6	SE	2,3,4,6,7,8-HxCDF	0.00028	0.00012	ug/kg	JN	k
PDI-SC-S218-4.5TO6	SE	2,3,7,8-TCDD	0.000097	0.000025	ug/kg	JN	k
PDI-SC-S218-6TO8	SE	1,2,3,4,6,7,8-HpCDF	0.00078	0.00011	ug/kg	JN	k
PDI-SC-S218-8TO10	SE	1,2,3,4,7,8-HxCDD	0.00026	0.000069	ug/kg	J+	bl
PDI-SC-S228-0TO2.3	SE	1,2,3,4,7,8-HxCDD	0.00039	0.00014	ug/kg	J+	bl
PDI-SC-S228-0TO2.3	SE	2,3,7,8-TCDD	0.00014	0.000044	ug/kg	JN	k

Attachment A

Nonconformance Summary Tables

Table A-1 - Field Duplicates

Sample ID	Duplicate ID	Compound	Sample Result	Qual	QL	Duplicate Result	Qual	QL	Units	RPD
PDI-SC-S086-0TO2	PDI-SC-S086-0TO2D	1,2,3,4,6,7,8-HpCDD	0.11	J	0.063	0.019	J	0.0031	ug/Kg	141
		OCDD	0.89	J	0.13	0.17	J	0.0062	ug/Kg	136
		OCDF	0.038	J	0.13	0.007	J	0.0062	ug/Kg	138

Table A-2 - Labeled Compound Recoveries

Sample ID	Labeled Compound	% Recovery	Lower Limit	Upper Limit
PDI-SC-S083-5TO6.6	13C-OCDD	13	17	157
PDI-SC-S178-2TO3.7	13C-1,2,3,4,7,8,9-HpCDF	22	26	138
PDI-SC-S178-3.7TO4.7	13C-1,2,3,4,6,7,8-HpCDF	27	28	143

Attachment B

Qualifier Codes and Explanations

Qualifier	Explanation
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