



LABORATORY DATA CONSULTANTS, INC.

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King County Environmental Laboratory
322 W. Ewing Street
Seattle WA 98119
ATTN: Mr. Fritz Grothkopp

September 27, 2010

SUBJECT: Lower Duwamish Waterway, Data Validation

Dear Mr. Grothkopp,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on September 13, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 23964:

<u>SDG #</u>	<u>Fraction</u>
DPWG33209, DPWG33746	Dioxins/Dibenzofurans

The data validation was performed under EPA Level III guidelines. The analyses were validated using the following documents, as applicable to each method:

- Lower Duwamish Waterway Source Tracking in King County Combined Sewer System Sampling and Analysis Plan, June 2010
- EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin(PCDD) and Polychlorinated Dibenzofuran(PCDF) Data, Revision 2.0, January 1996

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

**Lower Duwamish Waterway
Data Validation Reports
LDC #23964**

Dioxins/Dibenzofurans

LDC

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: Lower Duwamish Waterway
Collection Date: May 2 through May 5, 2009
LDC Report Date: September 27, 2010
Matrix: Water
Parameters: Dioxins/Dibenzofurans
Validation Level: EPA Level III
Laboratory: Analytical Perspectives

Sample Delivery Group (SDG): DPWG33209

Sample Identification

L47992-2
L48009-2

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Lower Duwamish Waterway Source Tracking in King County Combined Sewer System Sampling and Analysis Plan (June 2010) and EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data (Revision 2.0, January 31, 1996).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
 - J1 Blank Contamination: Indicates possible high bias and/or false positives.
 - J2 Calibration Range exceeded: Indicates possible low bias.
 - J3 Holding times not met: Indicates low bias for most analytes.
 - J4 Other QC parameters outside control limits: bias not readily determined.
 - J5 Other QC parameters outside control limits. The reported results appear to be biased high. The actual value of target compound in the sample may be lower than the value reported by the laboratory.
 - J6 Other QC parameters outside control limits. The reported results appear to be biased low. The actual value of target compound in the sample may be higher than the value reported by the laboratory.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
 - J1 Blank Contamination: Indicates possible high bias and/or false positives.
 - J2 Calibration Range exceeded: Indicates possible low bias.
 - J3 Holding times not met: Indicates low bias for most analytes.
 - J4 Other QC parameters outside control limits: bias not readily determined.
 - J5 Other QC parameters outside control limits. The reported results appear to be biased high. The actual value of target compound in the sample may be lower than the value reported by the laboratory.
 - J6 Other QC parameters outside control limits. The reported results appear to be biased low. The actual value of target compound in the sample may be higher than the value reported by the laboratory.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
L47992-2	All TCL compounds	1 year 24 days	1 year	J (all detects) UJ (all non-detects)	P
L48009-2	All TCL compounds	1 year 21 days	1 year	J (all detects) UJ (all non-detects)	P

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues. The chromatographic resolution between ^{13}C -2,3,7,8-TCDD and ^{13}C -1,2,3,4-TCDD was less than or equal to 25%.

III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

IV. Routine Calibration (Continuing)

Routine calibration was performed at the required frequencies.

All of the routine calibration concentrations were within the QC limits.

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated dioxin/dibenzofuran contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
WG32830-101	5/26/10	1,2,3,4,6,7,8-HpCDD OCDD OCDF Total HpCDD	0.551 pg/L 2.19 pg/L 0.735 pg/L 0.551 pg/L	All samples in SDG DPWG33209

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks.

Method blank results flagged "K" by the laboratory as estimated maximum possible concentration (EMPC) were considered not detected.

VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Ongoing Precision & Recovery (OPR) and Standard Reference Material (SRM) Samples

Percent recoveries (%R) of the ongoing precision and recovery samples were within QC limits.

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries were within QC limits.

X. Target Compound Identifications

Raw data were not reviewed for this SDG.

XI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG DPWG33209	All TCL compounds flagged "K" by the laboratory as estimated maximum possible concentration.	U	A

Raw data were not reviewed for this SDG.

XII. System Performance

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
All samples in SDG DPWG33209	2,3,7,8-TCDF (from DB-5)	R	A

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

**Lower Duwamish Waterway
Dioxins/Dibenzofurans - Data Qualification Summary - SDG DPWG33209**

SDG	Sample	Compound	Flag	A or P	Reason
DPWG33209	L47992-2 L48009-2	All TCL compounds	J (all detects) UJ (all non-detects)	P	Technical holding times
DPWG33209	L47992-2 L48009-2	All TCL compounds flagged "K" by the laboratory as estimated maximum possible concentration.	U	A	Compound quantitation and CRQLs (EMPC)
DPWG33209	L47992-2 L48009-2	2,3,7,8-TCDF (from DB-5)	R	A	Overall assessment of data

**Lower Duwamish Waterway
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG
DPWG33209**

No Sample Data Qualified in this SDG

LDC #: 23964A321

VALIDATION COMPLETENESS WORKSHEET

Date: 9/23/10

SDG #: DPWG33209

Level III

Page: 1 of 1

Laboratory: Analytical Perspectives

Reviewer: [Signature]

2nd Reviewer: [Signature]

METHOD: HRGC/HRMS ^{Dioxins} Polychlorinated Biphenyl Congeners (EPA Method 1668B) 1613B

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: <u>9/3-10/26/09 5/2-5/09</u>
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	<u>20% for labeled standards</u>
IV.	Routine calibration/ICV	A	
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	N	<u>diand spiked</u>
VII.	Laboratory control samples	D	<u>OPR</u>
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	N	
XI.	Compound quantitation and CRQLs	SW	
XII.	System performance	N	
XIII.	Overall assessment of data	SW	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet

ND = No compounds detected
 R = Rinsate
 FB = Field blank

D = Duplicate
 TB = Trip blank
 EB = Equipment blank

Validated Samples:

1	L47992-2	W	11	<u>WF32830-101</u>	21		31	
2	L48009-2	V	12		22		32	
3			13		23		33	
4			14		24		34	
5			15		25		35	
6			16		26		36	
7			17		27		37	
8			18		28		38	
9			19		29		39	
10			20		30		40	

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:

LDC #: 2394 A1
 SDG #: SEL CONY

VALIDATION FINDINGS WORKSHEET

Blanks

Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

Dioxins

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668-1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- Y N N/A Were all samples associated with a method blank?
- Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
- Y N N/A Was the method blank contaminated? If yes, please see qualification below.

Blank extraction date: 5/26/10 Blank analysis date: 6/4/10

Conc. units: pg/L Associated samples: all (>5x)

Compound	Blank ID	Sample Identification							
	<u>2830-10/1</u>								
<u>F</u>	<u>0.551</u>								
<u>F</u>	<u>2.19</u>								
<u>Q</u>	<u>0.735</u>								
<u>U</u>	<u>0.551</u>								

Blank extraction date: _____ Blank analysis date: _____
 Conc. units: _____ Associated samples: _____

Compound	Blank ID	Sample Identification							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
 All contaminants within five times the method blank concentration were qualified as not detected, "U".

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: Lower Duwamish Waterway
Collection Date: September 3 through October 26, 2009
LDC Report Date: September 27, 2010
Matrix: Water
Parameters: Dioxins/Dibenzofurans
Validation Level: EPA Level III
Laboratory: Analytical Perspectives
Sample Delivery Group (SDG): DPWG33746

Sample Identification

L49003-1
L49199-5
L49487-1

Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Lower Duwamish Waterway Source Tracking in King County Combined Sewer System Sampling and Analysis Plan (June 2010) and EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data (Revision 2.0, January 31, 1996).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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 - J3 Holding times not met: Indicates low bias for most analytes.
 - J4 Other QC parameters outside control limits: bias not readily determined.
 - J5 Other QC parameters outside control limits. The reported results appear to be biased high. The actual value of target compound in the sample may be lower than the value reported by the laboratory.
 - J6 Other QC parameters outside control limits. The reported results appear to be biased low. The actual value of target compound in the sample may be higher than the value reported by the laboratory.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues. The chromatographic resolution between ^{13}C -2,3,7,8-TCDD and ^{13}C -1,2,3,4-TCDD was less than or equal to 25%.

III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

IV. Routine Calibration (Continuing)

Routine calibration was performed at the required frequencies.

All of the routine calibration concentrations were within the QC limits.

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated dioxin/dibenzofuran contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
WG33371-101	7/19/10	2,3,7,8-TCDD 1,2,3,7,8-PeCDD 1,2,3,4,6,7,8-HpCDD OCDD 2,3,7,8-TCDF 2,3,4,7,8-PeCDF 1,2,3,7,8,9-HxCDF 2,3,4,6,7,8-HxCDF OCDF Total PeCDD	1.14 pg/L 1.18 pg/L 0.856 pg/L 3.38 pg/L 0.678 pg/L 0.787 pg/L 0.928 pg/L 1.02 pg/L 1.22 pg/L 1.18 pg/L	All samples in SDG DPWG33746

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
L49003-1	2,3,7,8-TCDD 2,3,4,6,7,8-HxCDF Total PeCDD (5X)	1.64 pg/L 2.84 pg/L 7.79 pg/L	1.64U pg/L 2.84U pg/L 7.79U pg/L
L49199-5 (5X)	2,3,7,8-TCDF	2.02 pg/L	2.02U pg/L
L49487-1	1,2,3,7,8-PeCDD 2,3,7,8-TCDF 2,3,4,7,8-PeCDF 2,3,4,6,7,8-HxCDF	3.24 pg/L 2.11 pg/L 2.21 pg/L 3.69 pg/L	3.24U pg/L 2.11U pg/L 2.21U pg/L 3.69U pg/L

Method blank results flagged "K" by the laboratory as estimated maximum possible concentration (EMPC) were considered not detected.

VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Ongoing Precision & Recovery (OPR) and Standard Reference Material (SRM) Samples

Percent recoveries (%R) of the ongoing precision and recovery samples were within QC limits.

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries were within QC limits with the following exceptions:

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
L49003-1	¹³ C-2,3,7,8-TCDD ¹³ C-1,2,3,4,7,8-HxCDD ¹³ C-1,2,3,6,7,8-HxCDD ¹³ C-1,2,3,4,6,7,8-HpCDD ¹³ C-2,3,7,8-TCDF ¹³ C-1,2,3,4,7,8-HxCDF ¹³ C-1,2,3,6,7,8-HxCDF ¹³ C-1,2,3,7,8,9-HxCDF ¹³ C-2,3,4,6,7,8-HxCDF ¹³ C-1,2,3,4,6,7,8-HpCDF ¹³ C-1,2,3,4,7,8,9-HpCDF	17.5 (25-164) 20.2 (32-141) 20.4 (28-130) 22.1 (23-140) 17.4 (24-169) 21.2 (26-152) 21.8 (26-123) 20.9 (29-147) 17.8 (28-136) 23.7 (28-143) 23.3 (26-138)	2,3,7,8-TCDD 1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 2,3,7,8-TCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF Total TCDD Total HxCDD Total HpCDD Total TCDF Total HxCDF Total HpCDF	J (all detects) UJ (all non-detects)	P
L49003-1 (5X)	¹³ C-1,2,3,7,8-PeCDF ¹³ C-2,3,4,7,8-PeCDF	23.9 (24-185) 20.4 (21-141)	1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF Total PeCDF	J (all detects) UJ (all non-detects)	P
L49199-5	¹³ C-2,3,7,8-TCDD ¹³ C-1,2,3,4,7,8-HxCDD ¹³ C-1,2,3,6,7,8-HxCDD ¹³ C-2,3,7,8-TCDF ¹³ C-1,2,3,4,7,8-HxCDF ¹³ C-1,2,3,6,7,8-HxCDF ¹³ C-1,2,3,7,8,9-HxCDF ¹³ C-2,3,4,6,7,8-HxCDF ¹³ C-1,2,3,4,6,7,8-HpCDF ¹³ C-1,2,3,4,7,8,9-HpCDF	22.2 (25-164) 23.1 (32-141) 23.3 (28-130) 21.1 (24-169) 22.0 (26-152) 22.8 (26-123) 19.4 (29-147) 22.4 (28-136) 23.9 (28-143) 23.9 (26-138)	2,3,7,8-TCDD 1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 2,3,7,8-TCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF Total TCDD Total HxCDD Total TCDF Total HxCDF Total HpCDF	J (all detects) UJ (all non-detects)	P

X. Target Compound Identifications

Raw data were not reviewed for this SDG.

XI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG DPWG33746	All TCL compounds flagged "K" by the laboratory as estimated maximum possible concentration.	U	A

Raw data were not reviewed for this SDG.

XII. System Performance

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
All samples in SDG DPWG33746	2,3,7,8-TCDF (from DB-5)	R	A

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

**Lower Duwamish Waterway
Dioxins/Dibenzofurans - Data Qualification Summary - SDG DPWG33746**

SDG	Sample	Compound	Flag	A or P	Reason
DPWG33746	L49003-1	2,3,7,8-TCDD 1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 2,3,7,8-TCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF Total TCDD Total HxCDD Total HpCDD Total TCDF Total HxCDF Total HpCDF 1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF Total PeCDF	J (all detects) UJ (all non-detects)	P	Internal standards (%R)
DPWG33746	L49199-5	2,3,7,8-TCDD 1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 2,3,7,8-TCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF Total TCDD Total HxCDD Total TCDF Total HxCDF Total HpCDF	J (all detects) UJ (all non-detects)	P	Internal standards (%R)
DPWG33746	L49003-1 L49199-5 L49487-1	All TCL compounds flagged "K" by the laboratory as estimated maximum possible concentration.	U	A	Compound quantitation and CRQLs (EMPC)
DPWG33746	L49003-1 L49199-5 L49487-1	2,3,7,8-TCDF (from DB-5)	R	A	Overall assessment of data

**Lower Duwamish Waterway
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG
DPWG33746**

SDG	Sample	Compound	Modified Final Concentration	A or P
DPWG33746	L49003-1	2,3,7,8-TCDD 2,3,4,6,7,8-HxCDF Total PeCDD (5X)	1.64U pg/L 2.84U pg/L 7.79U pg/L	A
DPWG33746	L49199-5 (5X)	2,3,7,8-TCDF	2.02U pg/L	A
DPWG33746	L49487-1	1,2,3,7,8-PeCDD 2,3,7,8-TCDF 2,3,4,7,8-PeCDF 2,3,4,6,7,8-HxCDF	3.24U pg/L 2.11U pg/L 2.21U pg/L 3.69U pg/L	A

LDC #: 23964B3

VALIDATION COMPLETENESS WORKSHEET

Date: 9/23/10

SDG #: DPWG33746

Level III

Page: 1 of 1

Laboratory: Analytical Perspectives

Reviewer: [Signature]

2nd Reviewer: [Signature]

METHOD: HRGC/HRMS Polychlorinated Biphenyl Congeners (EPA Method 1668B) ^{Dioxins} 7613B

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/3-10/26/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	
IV.	Routine calibration/ICV	A	
V.	Blanks	W	
VI.	Matrix spike/Matrix spike duplicates	N	
VII.	Laboratory control samples	A	OPR
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	W	
X.	Target compound identifications	N	
XI.	Compound quantitation and CRQLs	SW	
XII.	System performance	N	
XIII.	Overall assessment of data	W	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

Note: A = Acceptable ND = No compounds detected D = Duplicate
 N = Not provided/applicable R = Rinsate TB = Trip blank
 SW = See worksheet FB = Field blank EB = Equipment blank

Validated Samples:

1	L49003-1	W	11	W 3337101	21		31	
2	L49199-5	I	12		22		32	
3	L49487-1	V	13		23		33	
4			14		24		34	
5			15		25		35	
6			16		26		36	
7			17		27		37	
8			18		28		38	
9			19		29		39	
10			20		30		40	

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:

LDC # 23964B21
SDG # See count

VALIDATION FINDINGS WORKSHEET
Internal Standards

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METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

N/A Are all internal standard recoveries were within the 40-135% criteria?

N/A Was the S/N ratio all internal standard peaks ≥ 10 ?

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit: 40-135%)	Qualifications
		1	13C-A	17.5 (25-164)	✓/N/A (A, C-H K-P,R T-V,X,Y)
			13C-C	20.2 (32-141)	
			13C-D	20.4 (28-130)	
			13C-F	22.1 (23-140)	
			13C-H	17.4 (24-169)	
			13C-K	21.2 (26-152)	
			13C-L	21.8 (26-123)	
			13C-N	20.9 (29-147)	
			13C-M	17.8 (28-136)	
			13C-O	23.7 (28-143)	
			13C-P	23.3 (26-138)	✓
		1 (5x)	13C-I	23.9 (24-185)	✓/N/A (I, J, W)
			13C-J	20.4 (21-141)	
		2	13C-A	22.2 (25-164)	✓/N/A (A, C-Z, H, K-P, R, T V, X, Y)
			13C-C	23.1 (32-141)	
			13C-D	23.3 (28-130)	
			13C-H	21.1 (24-169)	
			13C-K	22.0 (26-152)	

	Internal Standards	Check Standard Used		Internal Standards	Check Standard Used
A.	¹³C-2,3,7,8-TCDF		I.	¹³C-OCDD	
B.	¹³C-2,3,7,8-TCDD		K.	¹³C-1,2,3,4-TCDD	
C.	¹³C-1,2,3,7,8-PeCDF		L.	¹³C-1,2,3,7,8,9-HxCDD	
D.	¹³C-1,2,3,7,8-PeCDD		M.		
E.	¹³C-1,2,3,4,7,8-HxCDF		N.		
F.	¹³C-1,2,3,6,7,8-HxCDD		O.		
G.	¹³C-1,2,3,4,6,7,8-HpCDF		P.		
F.	¹³C-1,2,3,4,6,7,8-HpSDD				

