Appendix F
Data Validation Report

LABORATORY DATA CONSULTANTS, INC.
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Anchor QEA, LLC
720 Olive Way Suite 1900
Seattle, WA 98101
ATTN: Ms. Lydia Greaves
lgreaves@anchorqea.com

July 25, 2023

SUBJECT: City of Seattle, Pier 63 - Data Validation

Dear Ms. Greaves,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on June 22 & July 6, 2023. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #56963:

SDG #	Fraction
2304-330	Semivolatiles, Chlorinated Pesticides, Polychlorinated Biphenyls,
2305023	Metals, Wet Chemistry, Polychlorinated Dioxins/Dibenzofurans

The data validation was performed under Stage 2B guidelines. The analysis was validated using the following documents, as applicable to each method:

- Sampling and Quality Assurance Project Plan (SQAPP), Pier 63 Removal Project, Seattle, Washington (April 2023)
- USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020)
- USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (November 2020)
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014; update VI, July 2018

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

Sincerely,

Stella Cuenco
scuenco@lab-data.com
Project Manager/Senior Chemist

67 pages-ADV Due 07/20/23 Attachment 1

Stage 2B EDD **LDC# 56963 (Anchor Environmental-Seattle WA / City of Seattle, Pier 63)** **Project# 220795-01.01**

LDC	SDG#	DATE REC'D	(3) DATE DUE	SVOA (8270E)		3-7 PAH (8270E -SIM)		Pest. (8081B)		PCBs (8082A)		Metals (6020D /7471B)		Dioxins (1613B)		NH_3 (4500-NH3-H)		Part. Size (D422)		S= (4500 -S2)		TOC (9060A)		Total Solids (2540G)													
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	2304-330	06/22/23	07/20/23	0	5	0	5	0	5	0	5	0	5	-	-	0	5	0	5	0	5	0	5	0	5												
B	2305023	07/06/23	07/20/23	-	-	-	-	-	-	-	-	-	-	0	5	-	-	-	-	-	-	-	-	-	-												
Total	TR/SC			0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	0	0	0	0	0	0	0	0	0	0	55

Shaded cells indicate Stage 4 validation (all other cells are Stage 2B validation). These sample counts do not include MS, MSD, or DUP's.

V:\LOGIN\Anchor\City of Seattle\Pier 63\56963ST.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: City of Seattle, Pier 63

LDC Report Date: July 25, 2023

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: OnSite Environmental, Inc., Redmond, WA

Sample Delivery Group (SDG): 2304-330

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
PS63-SS-01	04-330-01	Sediment	04/27/23
PS63-SS-02	04-330-02	Sediment	04/27/23
PS63-SS-03	04-330-03	Sediment	04/27/23
PS63-SS-04	04-330-04	Sediment	04/27/23
PS63-SS-05	04-330-05	Sediment	04/27/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Quality Assurance Project Plan (SQAPP), Pier 63 Removal Project, Seattle, Washington (April 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Semivolatile Organic Compounds (SVOCs) by Environmental Protection Agency (EPA) SW 846 Method 8270E and EPA SW 846 Method 8270E in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the methods.

For analytes where average relative response factors (RRFs) were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the analytes, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all analytes were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all analytes.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes with the following exceptions:

Date	Analyte	%D	Associated Samples	Flag	A or P
05/05/23	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol Pentachlorophenol	31.9 26.2 26.2	PS63-SS-01 PS63-SS-02 PS63-SS-04 PS63-SS-05	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A
05/08/23	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol Pentachlorophenol	45.1 34.2 50.0	PS63-SS-03	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the methods. All surrogate recoveries (%R) were within QC limits.

VIII. 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.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Analyte	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
SB050351LCS/LCSD (All samples in SDG 2304-330)	Pyridine	17 (20-120)	-	UJ (all non-detects)	A

Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to continuing calibration %D and LCS/LCSD %R, data were qualified as estimated in five samples.

City of Seattle, Pier 63
Semivolatiles - Data Qualification Summary - SDG 2304-330

Sample	Analyte	Flag	A or P	Reason
PS63-SS-01 PS63-SS-02 PS63-SS-03 PS63-SS-04 PS63-SS-05	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol Pentachlorophenol	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D)
PS63-SS-01 PS63-SS-02 PS63-SS-03 PS63-SS-04 PS63-SS-05	Pyridine	UJ (all non-detects)	A	Laboratory control samples (%R)

City of Seattle, Pier 63
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 2304-330

No Sample Data Qualified in this SDG

City of Seattle, Pier 63
Semivolatiles - Field Blank Data Qualification Summary - SDG 2304-330

No Sample Data Qualified in this SDG

LDC #: 56963A2bW

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/16/23

SDG #: 2304-330

Page: 1 of 1

Laboratory: OnSite Environmental, Inc., Redmond, WA

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Semivolatiles (EPA SW-846 Method 8270E-SIM) / 8270E

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.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	%RSD ≤20, r² ICV ≤30 CCV ≤20
IV.	Continuing calibration	SW	
V.	Laboratory Blanks	A	
VI.	Field blanks	A	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	SW	LCS 1D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Target analyte quantitation	N	
XIII.	Target analyte identification	N	
XIV.	Overall assessment of data	A	

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; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	PS63-SS-01	04-330-01	Sediment	04/27/23
2	PS63-SS-02	04-330-02	Sediment	04/27/23
3	PS63-SS-03	04-330-03	Sediment	04/27/23
4	PS63-SS-04	04-330-04	Sediment	04/27/23
5	PS63-SS-05	04-330-05	Sediment	04/27/23
6				
7				
8				
9				
10				

Notes:

	MB050353						

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS SVOA

A. Phenol	CC. Dimethylphthalate	EEE. Bis(2-ethylhexyl)phthalate	GGGG. C30-Hopane	I1. Methyl methanesulfonate
B. Bis (2-chloroethyl) ether	DD. Acenaphthylene	FFF. Di-n-octylphthalate	HHHH. 1-Methylphenanthrene	J1. Ethyl methanesulfonate
C. 2-Chlorophenol	EE. 2,6-Dinitrotoluene	GGG. Benzo(b)fluoranthene	IIII. 1,4-Dioxane	K1. o,o',o"-Triethylphosphorothioate
D. 1,3-Dichlorobenzene	FF. 3-Nitroaniline	HHH. Benzo(k)fluoranthene	JJJJ. Acetophenone	L1. n-Phenylene diamine
E. 1,4-Dichlorobenzene	GG. Acenaphthene	III. Benzo(a)pyrene	KKKK. Atrazine	M1. 1,4-Naphthoquinone
F. 1,2-Dichlorobenzene	HH. 2,4-Dinitrophenol	JJJ. Indeno(1,2,3-cd)pyrene	LLLL. Benzaldehyde	N1. N-Nitro-o-toluidine
G. 2-Methylphenol	II. 4-Nitrophenol	KKK. Dibenz(a,h)anthracene	MMMM. Caprolactam	O1. 1,3,5-Trinitrobenzene
H. 2,2'-Oxybis(1-chloropropane)	JJ. Dibenzofuran	LLL. Benzo(g,h,i)perylene	NNNN. 2,6-Dichlorophenol	P1. Pentachlorobenzene
I. 4-Methylphenol	KK. 2,4-Dinitrotoluene	MMM. Bis(2-Chloroisopropyl)ether	OOOO. 1,2-Diphenylhydrazine	Q1. 4-Aminobiphenyl
J. N-Nitroso-di-n-propylamine	LL. Diethylphthalate	NNN. Aniline	PPPP. 3-Methylphenol	R1. 2-Naphthylamine
K. Hexachloroethane	MM. 4-Chlorophenyl-phenyl ether	OOO. N-Nitrosodimethylamine	QQQQ. 3&4-Methylphenol	S1. Triphenylene
L. Nitrobenzene	NN. Fluorene	PPP. Benzoic Acid	RRRR. 4-Dimethyldibenzothiophene (4MDT)	T1. Octachlorostyrene
M. Isophorone	OO. 4-Nitroaniline	QQQ. Benzyl alcohol	SSSS. 2/3-Dimethyldibenzothiophene (4MDT)	U1. Famphur
N. 2-Nitrophenol	PP. 4,6-Dinitro-2-methylphenol	RRR. Pyridine	TTTT. 1-Methyldibenzothiophene (1MDT)	V1. 1,4-phenylenediamine
O. 2,4-Dimethylphenol	QQ. N-Nitrosodiphenylamine	SSS. Benzidine	UUUU.. 2,3,4,6-Tetrachlorophenol	W1. Methapyrilene
P. Bis(2-chloroethoxy)methane	RR. 4-Bromophenyl-phenylether	TTT. 1-Methylnaphthalene	VVVV. 1,2,4,5-Tetrachlorobenzene	X1. Pentachloroethane
Q. 2,4-Dichlorophenol	SS. Hexachlorobenzene	UUU.Benzo(b)thiophene	WWWW.. 2-Picoline	Y1. 3,3'-Dimethylbenzidine
R. 1,2,4-Trichlorobenzene	TT. Pentachlorophenol	VVV.Benzonaphthothiophene	XXXX. 3-Methylcholanthrene	Z1. o-Toluidine
S. Naphthalene	UU. Phenanthrene	WWW.Benzo(e)pyrene	YYYY. a,a-Dimethylphenethylamine	A2. 1-Naphthylamine
T. 4-Chloroaniline	VV. Anthracene	XXX. 2,6-Dimethylnaphthalene	ZZZZ. Hexachloropropene	B2. 4-Aminobiphenyl
U. Hexachlorobutadiene	WW. Carbazole	YYY. 2,3,5-Trimethylnaphthalene	A1. N-Nitrosodiethylamine	C2. 4-Nitroquinoline-1-oxide
V. 4-Chloro-3-methylphenol	XX. Di-n-butylphthalate	ZZZ. Perylene	B1. N-Nitrosodi-n-butylamine	D2. Hexachloropene
W. 2-Methylnaphthalene	YY. Fluoranthene	AAAA. Dibenzothiophene	C1. N-Nitrosomethylethylamine	E2. Bis (2-chloro-1-methylethyl) ether
X. Hexachlorocyclopentadiene	ZZ. Pyrene	BBBB. Benzo(a)fluoranthene	D1. N-Nitrosomorpholine	F2. Bifenthrin
Y. 2,4,6-Trichlorophenol	AAA. Butylbenzylphthalate	CCCC. Benzo(b)fluorene	E1. N-Nitrosopyrrolidine	G2. Cyfluthrin
Z. 2,4,5-Trichlorophenol	BBB. 3,3'-Dichlorobenzidine	DDDD. cis/trans-Decalin	F1. Phenacetin	H2. Cypermethrin
AA. 2-Chloronaphthalene	CCC. Benzo(a)anthracene	EEEE. 1,1'-Biphenyl	G1. 2-Acetylaminofluorene	I2. Permethrin (cis/trans)
BB. 2-Nitroaniline	DDD. Chrysene	FFFF. Retene	H1. Pronamide	J2. 5-Nitro-o-toluidine

LDC #: 56963A24a

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: FT

METHOD: GC/MS BNA (EPA SW 846 Method 8270 E)

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

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?

Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Y N N/A Were all %D and RRFs within the validation criteria of ≤20%D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	5/5/23 1032	CCV0505-1	HH	31.9		1, 2, 4, 5, MB 050552	J/UJ/A NP
			PP	26.2		↓	↓
			TT	26.2			
	5/8/23 1117	CCV0508-2	HH	45.1		3	J/UJ/A NP
			PP	34.2		↓	↓
			TT	50.0			

LDC #: 56963A2b/a

VALIDATION FINDINGS WORKSHEET

Laboratory Control Samples (LCS)

Reviewer: FT

METHOD: GC/MS SVOA (EPA SW 846 Method 8270 E)

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

(Y) N N/A Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG?

Y (N) N/A Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

Level IV/D Only

Y N (N/A) Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

LCS/LCSD ID	Compound	LCS % Recovery	LCSD % Recovery	LCS/LCSD %Recovery limits	RPD (Limits)	Associated Samples	Qualifications
SBO50351	RRR	17	~~22~~	20 - 120	( )	All	J/UJ/A ND
LCS/D					( )		
					( )		
					( )		
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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: City of Seattle, Pier 63

LDC Report Date: July 20, 2023

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: OnSite Environmental, Inc., Redmond, WA

Sample Delivery Group (SDG): 2304-330

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
PS63-SS-01	04-330-01	Sediment	04/27/23
PS63-SS-02	04-330-02	Sediment	04/27/23
PS63-SS-03	04-330-03	Sediment	04/27/23
PS63-SS-04	04-330-04	Sediment	04/27/23
PS63-SS-05	04-330-05	Sediment	04/27/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Quality Assurance Project Plan (SQAPP), Pier 63 Removal Project, Seattle, Washington (April 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Chlorinated Pesticides by Environmental Protection Agency (EPA) SW 846 Method 8081B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For analytes where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the analytes, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all analytes with the following exceptions:

Date	Standard	Column	Analyte	%D	Associated Samples	Flag	A or P
05/05/23	ICV	Col 2	Endrin ketone	20.1	All samples in SDG 2304-330	UJ (all non-detects)	A

Sample	Analyte	Finding	Flag	A or P
All samples in SDG 2304-330	HCBD Hexachlorobenzene	These analytes were inadvertently not included in the ICV (second source) standard.	UJ (all non-detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes with the following exceptions:

Date	Standard	Column	Analyte	%D	Associated Samples	Flag	A or P
05/09/23	F0509016-CCV	Col 2	4,4'-DDT Methoxychlor HCBD	22 30 24	All samples in SDG 2304-330	NA	-
05/09/23	F0509016-CCV	Col 1	HCBD	36	All samples in SDG 2304-330	NA	-

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. 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.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Analyte	LCS %R (Limits)	LCSD %R (Limits)	Flag	A or P
SB0505S2 (All samples in SDG 2304-330)	alpha-BHC gamma-BHC beta-BHC Heptachlor epoxide gamma-Chlordane alpha-Chlordane 4,4'-DDE Endosulfan I Dieldrin	- - - - - - - - -	114 (59-113) 114 (58-112) 113 (50-108) 119 (56-116) 113 (55-110) 119 (55-110) 126 (56-125) 121 (56-111) 127 (60-118)	NA	-

Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XII. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV %D and analytes not included in the ICV standard, data were qualified as estimated in five samples.

City of Seattle, Pier 63
Chlorinated Pesticides - Data Qualification Summary - SDG 2304-330

Sample	Analyte	Flag	A or P	Reason
PS63-SS-01 PS63-SS-02 PS63-SS-03 PS63-SS-04 PS63-SS-05	Endrin ketone	UJ (all non-detects)	A	Initial calibration verification (%D)
PS63-SS-01 PS63-SS-02 PS63-SS-03 PS63-SS-04 PS63-SS-05	HCBD Hexachlorobenzene	UJ (all non-detects) UJ (all non-detects)	A	Initial calibration verification (not included in standard)

City of Seattle, Pier 63
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 2304-330

No Sample Data Qualified in this SDG

LDC #: 56963A3a
SDG #: 2304-330
Laboratory: OnSite Environmental, Inc., Redmond, WA

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 7/16/23
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: GC Chlorinated Pesticides (EPA SW-846 Method 8081B)

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.	Sample receipt/Technical holding times	A,D	
II.	GC Instrument Performance Check	A	
III.	Initial calibration/ICV	A~~SW~~	% RSD ≤ 20, r² ICV ≤ 20
IV.	Continuing calibration	SW	CCV ≤ 20
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	SW	LCS ID
X.	Field duplicates	N	
XI.	Target analyte quantitation	N	
XII.	Target analyte identification	N	
XIII.	Overall assessment of data	A	

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; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	PS63-SS-01	04-330-01	Sediment	04/27/23
2	PS63-SS-02	04-330-02	Sediment	04/27/23
3	PS63-SS-03	04-330-03	Sediment	04/27/23
4	PS63-SS-04	04-330-04	Sediment	04/27/23
5	PS63-SS-05	04-330-05	Sediment	04/27/23
6				
7				
8				
9				
10				
11				
12				

Notes:

	MB050552						

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG. Chlordane
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH. Chlordane (Technical)
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	II. Aroclor 1262
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ. Aroclor 1268
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. 2,4'-DDD	KK. Oxychlordane
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. 2,4'-DDE	LL. trans-Nonachlor
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM. cis-Nonachlor
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF. Hexachlorobenzene	NN.

Notes:_____

LDC #: 26963A3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Verification

Reviewer: FT

METHOD: ✓ GC __ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of initial calibration verification calculation was performed? __%D or __%R
Y N N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?
Y N N/A Did the initial calibration verification standards meet the %D / %R validation criteria of ≤20.0% / 80-120%?

#	Date	Standard ID	Detector/ Column	Compound	%D (Limit ≤ 20.0)	Associated Samples	Qualifications
	5/5/23	ICV	col 2	Q	20.1	All	J/UJ/A ND
	↓	↓	HCBD and Hexachlorobenzene were inadvertently not included in the ICV (second source) standard			All	FT ~~Ft~~ J/UJ/A ND

LDC #: 56963A23/9a

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: ___ of ___
Reviewer: FT

METHOD: ✓ GC ___ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of continuing calibration calculation was performed? ___%D or ___%R

Y N N/A Were continuing calibration standards analyzed at the required frequencies?
Y N N/A Did the continuing calibration standards meet the %D / %R validation criteria of ≤20.0% / 80-120%?

Level IV Only

Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Detector/ Column	Compound	%D (Limit ≤ 20.0)	RT (limit)	Associated Samples	Qualifications
	5/9/23	F0509016-CCV	Col 2	Ø	F1 ~~55~~ 22		All - MB	Jdet/A ND
				P	30		↓	↓
				~~HB~~ HCBD	24			
			Col 1	HCBD	36		↓	↓
		Note 4,4'-DDT raw data page 827 =				122.447	ppb = 22.%	difference
		CCV p 819	raw	page 827				
		note next	CCV =	F0509024	samples are		- 9017, - 9018,	- 9019, - 9020, - 9021

LDC #: 56963 A2b

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: ___ of ___
Reviewer: FT

METHOD: ✓ GC ___ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of continuing calibration calculation was performed? ___%D or ___%R
Y N N/A Were continuing calibration standards analyzed at the required frequencies?
Y N N/A Did the continuing calibration standards meet the %D / %R validation criteria of ≤20.0% / 80-120%?
Level IV Only
Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Detector/ Column	Compound	%D (Limit ≤ 20.0)	RT (limit)	Associated Samples	Qualifications
	5/8/23	F050800 4-CCV	col 1	A	41		MB050552	J det/A
				D	39			
				B	33			
				C	42			
				E	28			
				F	23			
				I	23			
				N	23			
				Q	21			
			col 2	C	24			
				T	27			
				S	28			
				J	28			
				H	21			
				M	24			
				R	26			
			col 1	HCBD	34			
				Hexachlorobenzene	30			
		page	8 21					

LDC #: 56963A3a

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

METHOD: ✓ GC ___ HPLC

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

Y N N/A Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG?

Y N N/A Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

Level IV/D Only

Y N N/A Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

LCS/LCSD ID	Compound	LCS % Recovery	LCSD % Recovery	LCS/LCSD %Recovery limits	RPD (Limits)	Associated Samples	Qualifications
SB050552	A		114	59-113	( )	All	J (all ND)
	D		114	58-112	( )		
	B		113	50-108	( )		
	G		119	56-116	( )		
	T		113	55-110	( )		
	S		119	55-110	( )		
	J		126	56-125	( )		
	H		121	56-111	( )		
	I		127	60-118	( )		
					( )		
					( )		
					( )		
					( )		
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					( )		
					( )		
					( )		
					( )		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: City of Seattle, Pier 63

LDC Report Date: July 20, 2023

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: OnSite Environmental, Inc., Redmond, WA

Sample Delivery Group (SDG): 2304-330

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
PS63-SS-01	04-330-01	Sediment	04/27/23
PS63-SS-02	04-330-02	Sediment	04/27/23
PS63-SS-03	04-330-03	Sediment	04/27/23
PS63-SS-04	04-330-04	Sediment	04/27/23
PS63-SS-05	04-330-05	Sediment	04/27/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Quality Assurance Project Plan (SQAPP), Pier 63 Removal Project, Seattle, Washington (April 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Biphenyls (PCBs) by Environmental Protection Agency (EPA) SW 846 Method 8082A

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all analytes.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. 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.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

City of Seattle, Pier 63
Polychlorinated Biphenyls - Data Qualification Summary - SDG 2304-330

No Sample Data Qualified in this SDG

City of Seattle, Pier 63
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 2304-330

No Sample Data Qualified in this SDG

City of Seattle, Pier 63
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 2304-330

No Sample Data Qualified in this SDG

LDC #: 56963A3b

SDG #: 2304-330

Laboratory: OnSite Environmental, Inc., Redmond, WA

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/16/23

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW-846 Method 8082A)

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.	Sample receipt/Technical holding times	A/A	
II.	Initial calibration/ICV	A/A	%D RSD ≤ 20 ICV ≤ 20
III.	Continuing calibration	A	CCV ≤ 20
IV.	Laboratory Blanks	A	
V.	Field blanks	N	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	MS
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Target analyte quantitation	N	
XI.	Target analyte identification	N	
XII.	Overall assessment of data	A	

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; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	PS63-SS-01	04-330-01	Sediment	04/27/23
2	PS63-SS-02	04-330-02	Sediment	04/27/23
3	PS63-SS-03	04-330-03	Sediment	04/27/23
4	PS63-SS-04	04-330-04	Sediment	04/27/23
5	PS63-SS-05	04-330-05	Sediment	04/27/23
6				
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13				

Notes:

	MB050551						

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: City of Seattle, Pier 63

LDC Report Date: July 24, 2023

Parameters: Metals

Validation Level: Stage 2B

Laboratory: OnSite Environmental, Inc., Redmond, WA

Sample Delivery Group (SDG): 2304-330

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
PS63-SS-01	04-330-01	Sediment	04/27/23
PS63-SS-02	04-330-02	Sediment	04/27/23
PS63-SS-03	04-330-03	Sediment	04/27/23
PS63-SS-04	04-330-04	Sediment	04/27/23
PS63-SS-05	04-330-05	Sediment	04/27/23
PS63-SS-02MS	04-330-02MS	Sediment	04/27/23
PS63-SS-02MSD	04-330-02MSD	Sediment	04/27/23
PS63-SS-02DUP	04-330-02DUP	Sediment	04/27/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Quality Assurance Project Plan (SQAPP), Pier 63 Removal Project, Seattle, Washington (April 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Metals by Environmental Protection Agency (EPA) SW 846 Methods 6020D/7471B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
PS63-SS-02MS/MSD (All samples in SDG 2304-330)	Copper	-	142 (75-125)	J (all detects)	A
PS63-SS-02MS/MSD (All samples in SDG 2304-330)	Zinc	74 (75-125)	-	J (all detects)	A

Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Flag	A or P
PS63-SS-02DUP (All samples in SDG 2304-330)	Barium	73 (≤20)	J (all detects)	A

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. Percent differences (%D) were within QC limits.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to MS/MSD %R and DUP RPD, data were qualified as estimated in five samples.

City of Seattle, Pier 63
Metals - Data Qualification Summary - SDG 2304-330

Sample	Analyte	Flag	A or P	Reason
PS63-SS-01 PS63-SS-02 PS63-SS-03 PS63-SS-04 PS63-SS-05	Copper	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)
PS63-SS-01 PS63-SS-02 PS63-SS-03 PS63-SS-04 PS63-SS-05	Zinc	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)
PS63-SS-01 PS63-SS-02 PS63-SS-03 PS63-SS-04 PS63-SS-05	Barium	J (all detects)	A	Duplicate sample analysis (RPD)

City of Seattle, Pier 63
Metals - Laboratory Blank Data Qualification Summary - SDG 2304-330

No Sample Data Qualified in this SDG

City of Seattle, Pier 63
Metals - Field Blank Data Qualification Summary - SDG 2304-330

No Sample Data Qualified in this SDG

LDC #: 56963A4a

SDG #: 2304-330

Laboratory: OnSite Environmental, Inc., Redmond, WA

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/21/23

Page: 1 of 1

Reviewer: NC

2nd Reviewer: M

METHOD: Metals (EPA SW-846 Method 6020D/7471B)

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.	Sample receipt/Technical holding times	A/A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	SW	MS/MSD
VIII.	Duplicate sample analysis	SW	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Target Analyte Quantitation	N	
XIV.	Overall Assessment of Data	A	

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; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	PS63-SS-01	04-330-01	Sediment	04/27/23
2	PS63-SS-02	04-330-02	Sediment	04/27/23
3	PS63-SS-03	04-330-03	Sediment	04/27/23
4	PS63-SS-04	04-330-04	Sediment	04/27/23
5	PS63-SS-05	04-330-05	Sediment	04/27/23
6	PS63-SS-02MS	04-330-02MS	Sediment	04/27/23
7	PS63-SS-02MSD	04-330-02MSD	Sediment	04/27/23
8	PS63-SS-02DUP	04-330-02DUP	Sediment	04/27/23
9				
10				

Notes:

All elements are applicable to each sample as noted below.

Sample ID	Target Analyte List
1 to 5	Metals by EPA SW-846 Method 6020D, Mercury by EPA SW-846 Method7471B
QC	
6, 7, 8	Metals by EPA SW-846 Method 6020D

Analysis Method

ICP-MS	Metals by EPA SW-846 Method 6020D
CVAA	Mercury by EPA SW-846 Method7471B

METHOD: Trace Metals (EPA SW 846 Methods 6010/6020/7000)

MS/MSD analysis was performed by the laboratory. All MS/MSD percent recoveries (%R) and relative percent differences (RPDs) were within the acceptable limits with the following exceptions:

MS/MSD ID	Matrix	Analyte	MS %R	MSD %R	%R Limit	RPD	RPD Limit	Associated Samples	Qualification	Det/ND
6, 7	S	Cu		142	75-125			1 2	J/det/A	Det
		Zn	74						J/UJ/A	Det

Comments:

VALIDATION FINDINGS WORKSHEETS
Laboratory Duplicates

METHOD: Trace Metals (EPA SW 846 Methods 6010/6020/7000)

Laboratory duplicate analysis was performed by the laboratory. All laboratory duplicates were with the relative percent difference (RPD) for samples >5X the reporting limits with the exceptions listed below. If samples were <5X the reporting limits, the difference was within 1X the reporting limit for water samples and within 2X the reporting limit for soil samples for all samples with the exceptions listed below.

Duplicate ID	Matrix	Analyte	RPD	RPD Limit	Difference (units)	Difference Limit	Associated Samples	Qualification	Det/ND
8	S	Ba	73	20			1 2	J/UJ/A	Det

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: City of Seattle, Pier 63

LDC Report Date: July 24, 2023

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: OnSite Environmental, Inc., Redmond, WA

Sample Delivery Group (SDG): 2304-330

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
PS63-SS-01	04-330-01	Sediment	04/27/23
PS63-SS-02	04-330-02	Sediment	04/27/23
PS63-SS-03	04-330-03	Sediment	04/27/23
PS63-SS-04	04-330-04	Sediment	04/27/23
PS63-SS-05	04-330-05	Sediment	04/27/23
PS63-SS-01DUP	04-330-01DUP	Sediment	04/27/23
PS63-SS-02DUP	04-330-02DUP	Sediment	04/27/23
PS63-SS-03DUP	04-330-03DUP	Sediment	04/27/23
PS63-SS-05DUP	04-330-05DUP	Sediment	04/27/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Quality Assurance Project Plan (SQAPP), Pier 63 Removal Project, Seattle, Washington (April 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Ammonia by Standard Method 4500-NH3 H
Particle Size by American Society for Testing and Material (ASTM) D-422
Sulfide by Standard Method 4500-S2 D
Total Organic Carbon by Environmental Protection Agency (EPA) SW 846 Method 9060A
Total Solids by Standard Method 2540G

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

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. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

City of Seattle, Pier 63
Wet Chemistry - Data Qualification Summary - SDG 2304-330

No Sample Data Qualified in this SDG

City of Seattle, Pier 63
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 2304-330

No Sample Data Qualified in this SDG

City of Seattle, Pier 63
Wet Chemistry - Field Blank Data Qualification Summary - SDG 2304-330

No Sample Data Qualified in this SDG

LDC #: 56963A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/21/23

SDG #: 2304-330 Stage 2B Page: 1 of 1

Laboratory: OnSite Environmental, Inc., Redmond, WA Reviewer: NC

2nd Reviewer: A

METHOD: (Analyte) Ammonia (SM4500-NH3-H), Particle Size (ASTM D-422), Sulfide (SM4500-S2-D), TOC (EPA SW-846 Method 9060A), Total Solids (SM2540G)

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.	Sample receipt/Technical holding times	A/A	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	N	
VII.	Duplicate sample analysis	A	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Target Analyte Quantitation	N	
XI.	Overall assessment of data	A	

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; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	PS63-SS-01	04-330-01	Sediment	04/27/23
2	PS63-SS-02	04-330-02	Sediment	04/27/23
3	PS63-SS-03	04-330-03	Sediment	04/27/23
4	PS63-SS-04	04-330-04	Sediment	04/27/23
5	PS63-SS-05	04-330-05	Sediment	04/27/23
6	PS63-SS-01DUP	04-330-01DUP	Sediment	04/27/23
7	PS63-SS-02DUP	04-330-02DUP	Sediment	04/27/23
8	PS63-SS-03DUP	04-330-03DUP	Sediment	04/27/23
9	PS63-SS-05DUP	04-330-05DUP	Sediment	04/27/23
10				

Notes:

Sample Specific Element Reference Reviewer:NC

All elements are applicable to each sample as noted below.

Sample ID	Target Analyte List
1 to 5	Ammonia, Particle Size, S2, TOC, TS
QC	
6	TS
7	TOC
8	TOC
9	Ammonia, S2

LDC Report# 56963B21

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: City of Seattle, Pier 63

LDC Report Date: July 20, 2023

Parameters: Polychlorinated Dioxins/Dibenzofurans

Validation Level: Stage 2B

Laboratory: Enthalpy Analytical, El Dorado Hills, CA

Sample Delivery Group (SDG): 2305023

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
PS63-SS-01	2305023-01	Sediment	04/27/23
PS63-SS-02	2305023-02	Sediment	04/27/23
PS63-SS-03	2305023-03	Sediment	04/27/23
PS63-SS-04	2305023-04	Sediment	04/27/23
PS63-SS-05	2305023-05	Sediment	04/27/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Quality Assurance Project Plan (SQAPP), Pier 63 Removal Project, Seattle, Washington (April 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for High Resolution Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Dioxins/Dibenzofurans by Environmental Protection Agency (EPA) Method 1613B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

The static resolving power was at least 10,000 (10% valley definition).

III. Initial Calibration and Initial Calibration Verification

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

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes and less than or equal to 35.0% for labeled compounds.

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

The concentrations of the initial calibration verification (ICV) standard were within the QC limits for all analytes and labeled compounds with the following exceptions:

Date	Analyte	Concentration (Limits)	Associated Samples	Affected Analyte	Flag	A or P
06/02/23	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	59.296 ng/mL (44-57) 59.831 ng/mL (44-47) 56.663 ng/mL (45-56) 59.285 ng/mL (45-55)	All samples in SDG 2305023	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 Total HxCDF Total HpCDF	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for all analytes and labeled compounds.

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

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Analyte	Concentration	Associated Samples
B23F146-BLK1	06/16/23	OCDD	0.192 pg/g	PS63-SS-03 PS63-SS-04

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

VI. Field Blanks

No field blanks were identified in this SDG.

VII. 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.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target analytes were within QC limits.

XI. Target Analyte Quantitation

All target analyte quantitations were within validation criteria with the following exceptions:

Sample	Analyte	Flag	A or P
All samples in SDG 2305023	All analytes reported by the laboratory as estimated maximum possible concentration (EMPC).	J (all detects)	A

Sample	Analyte	Finding	Criteria	Flag	A or P
PS63-SS-04	OCDD	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not reviewed for Stage 2B validation.

XII. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV concenration, results reported as EMPC, and results exceeding calibration range, data
were qualified as estimated in five samples.

City of Seattle, Pier 63
Polychlorinated Dioxins/Dibenzofurans - Data Qualification Summary - SDG 2305023

Sample	Analyte	Flag	A or P	Reason
PS63-SS-01 PS63-SS-02 PS63-SS-03 PS63-SS-04 PS63-SS-05	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 Total HxCDF Total HpCDF	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Initial calibration verification (Concentration)
PS63-SS-01 PS63-SS-02 PS63-SS-03 PS63-SS-04 PS63-SS-05	All analytes reported by the laboratory as estimated maximum possible concentration (EMPC).	J (all detects)	A	Target analyte quantitation (EMPC)
PS63-SS-04	OCDD	J (all detects)	A	Target analyte quantitation (exceeded range)

City of Seattle, Pier 63
Polychlorinated Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG 2305023

No Sample Data Qualified in this SDG

LDC #: 56963B21 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/16/23
SDG #: 2305023 Stage 2B Page: 1 of 1
Laboratory: Enthalpy Analytical, El Dororado Hills, CA Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Polychlorinated Dioxins/Dibenzofurans (EPA Method 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.	Sample receipt/Technical holding times	A / A	
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration/ICV	A / SW	%D RSD ≤ 20/35 ICV = QC limit
IV.	Continuing calibration	A	CCV = QC limit
V.	Laboratory Blanks	SW	
VI.	Field blanks	N	
VII.	Matrix spike/Matrix spike duplicates	N	LCS
VIII.	Laboratory control samples	A	~~LCS/LCSD~~ LCS
IX.	Field duplicates	N	
X.	Labeled Compounds	A	
XI.	Target analyte quantitation	SW	
XII.	Target analyte identification	N	
XIII.	Overall assessment of data	A	

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; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1 1	PS63-SS-01	2305023-01	Sediment	04/27/23
2 2	PS63-SS-02	2305023-02	Sediment	04/27/23
3 1	PS63-SS-03 3	2305023-03	Sediment	04/27/23
4 1	PS63-SS-04 3	2305023-04	Sediment	04/27/23
5 1	PS63-SS-05	2305023-05	Sediment	04/27/23
6				
7				
8				
9				
10				
11				

Notes:

1	B23E130-BLK1						
2	B23E152-BLK						
3	B23F146-BLK1						

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 #: 56963B21

VALIDATION FINDINGS WORKSHEET
Initial Calibration verification

Page: 1 of 1
Reviewer: FD

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

N Were all analyte's amount within QC limits for unlabeled and labeled compounds?
Y Did all continuing calibration standards meet the Ion Abundance Ratio criteria?

Date	Standard ID	Compound	Amount (QC Limits) in ng/ml	Finding Ion Abundance Ratio	Associated Samples	Qualifications
6/2/23	ICV	L	59.296 (44-57)		All, B23152-MB,	det/p qual L, X all Det
S22		M	59.831 (44-47)		B23E130-MB	M, X
		N	56.663 (45-56)			N, X
		O	59.285 (45-55)		↓	↓ O, Y

LDC #: 56963 B21

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: FT

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

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?

Blank extraction date: 6/16/23 **Blank analysis date:** 6/22/23 **Associated samples:** 3, 4 7 5X

Conc. units: pg/g

Compound	Blank ID	Sample Identification								
	B23F1	46-BLK	1							
9	0.192									

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".

LDC #: 59963B21

VALIDATION FINDINGS WORKSHEET
Target Analyte Quantitation

Reviewer: FT

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

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

Y N (N/A) Were the correct internal standard (IS), quantitation ions and relative response factors (RRF) used to quantitate the compound?
Y N (N/A) Compound quantitation and CRQLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		All	all analytes qualified as EMPC		J dw / A
		4	G - exceed cal Range		J dw / A

Comments: See sample calculation verification worksheet for recalculations