1435 Norjohn Court, Unit 1, Burlington, ON, Canada L7L 0E6

SVOC DATA PACKAGE

Client Project Information

Project ID: 1466-004 SEATTLE IRON & METALS
Project Description:
Contact: Amber Bailey

ALSE Project Information

Project ID: FAR100
Contact: Breanne Dusureault
Submission ID(s): L2569163

Final Package Review by: _____

Date Reviewed: 23-Apr-21

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SECTION 1: PROJECT NARRATIVE

ALSE Project Information

Project ID: FAR100
Contact: Breanne Dusureault
Submission ID(s): L2569163

Client Project Information

Project ID: 1466-004 SEATTLE IRON & METALS
Project Description:
Contact: Amber Bailey

Analytical Method: PCDD/F by TO9A via EPA M23/8290A

ALS Sample ID	Client Sample Descriptions	Matrix	Date Sampled	Date Received	Temp/degrees C. on receipt	Date Extracted	Date Analyzed
L2550675-1	L2527465-6	PUF	18-Jan-21	21-Jan-21	2.0	n/a	n/a
L2561344-1	L2548709-1-1	PUF	23-Feb-21	25-Feb-21	5.6	n/a	n/a
L2569160-1	L2542414-6	PUF	18-Mar-21	22-Mar-21	19.7	n/a	n/a
L2569163-1	**SITE 1 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)**	**PUF**	**n/a**	**n/a**	**n/a**	**29-Mar-21**	**21-Apr-21**
L2550675-2	L2516041-5	PUF	18-Jan-21	21-Jan-21	2.0	n/a	n/a
L2561344-2	L2548709-5-2	PUF	23-Feb-21	25-Feb-21	5.6	n/a	n/a
L2569160-2	L2542414-2	PUF	18-Mar-21	22-Mar-21	19.7	n/a	n/a
L2569163-2	**SITE 2 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)**	**PUF**	**n/a**	**n/a**	**n/a**	**29-Mar-21**	**21-Apr-21**
L2550675-3	L2516041-4	PUF	18-Jan-21	21-Jan-21	2.0	n/a	n/a
L2561344-3	L2548709-2-3	PUF	23-Feb-21	25-Feb-21	5.6	n/a	n/a
L2569160-3	L2542414-3	PUF	18-Mar-21	22-Mar-21	19.7	n/a	n/a
L2569163-3	**SITE 3 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)**	**PUF**	**n/a**	**n/a**	**n/a**	**29-Mar-21**	**21-Apr-21**
L2550675-4	L2516041-2	PUF	18-Jan-21	21-Jan-21	2.0	n/a	n/a
L2561344-4	L2548709-4-4	PUF	23-Feb-21	25-Feb-21	5.6	n/a	n/a
L2569160-4	L2542414-4	PUF	18-Mar-21	22-Mar-21	19.7	n/a	n/a
L2569163-4	**SITE 4 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)**	**PUF**	**n/a**	**n/a**	**n/a**	**29-Mar-21**	**21-Apr-21**
L2550675-5	L2516041-3	PUF	18-Jan-21	21-Jan-21	2.0	n/a	n/a
L2561344-5	L2548709-3-5	PUF	23-Feb-21	25-Feb-21	5.6	n/a	n/a
L2569160-5	L2542414-5	PUF	18-Mar-21	22-Mar-21	19.7	n/a	n/a
L2569163-5	**SITE 5 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)**	**PUF**	**n/a**	**n/a**	**n/a**	**29-Mar-21**	**21-Apr-21**
WG3507253-1	**Method Blank**	**MEDIA**	**n/a**	**n/a**	**n/a**	**29-Mar-21**	**21-Apr-21**
WG3507253-4	**Method Blank**	**REAGENT**	**n/a**	**n/a**	**n/a**	**29-Mar-21**	**21-Apr-21**
WG3507253-2	**Laboratory Control Sample**	**MEDIA**	**n/a**	**n/a**	**n/a**	**29-Mar-21**	**21-Apr-21**

Comments and Notes:
a) Sample Integrity:

The samples were received on 3 different dates as noted above. The three samples for each sites were extracted together for a total of 5 composites. Some of the samples were received at above the recommended transportation and storage temperature. However, the brief period at above the recommended temperature is not expected to have a negative impact on reported native target results.

b) Instrumental Analysis:

No criteria failures or exceedances.

I certify that this data package is in compliance with the terms and condition of the contract , both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this data package (hardcopy and/or electronic version) has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Steve Kennedy, Technical Supervisor

23-Apr-21
Date

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SECTION 2: DATA SUMMARY REPORT

1435 Norjohn Court, Unit 1, Burlington, ON, Canada L7L 0E6
Phone: 905-331-3111, FAX: 905-331-4567

Certificate of Analysis

ALS Project Contact:	Breanne Dusureault	**Client Name:**	Farallon Consulting, L.L.C.
ALS Project ID:	FAR100	**Client Address:**	975 5th Avenue Northwest
ALS WO#:	L2569163		Issaquah
Date of Report	26-Apr-21		WA 98027
Date of Sample Receipt	22-Mar-21	**Client Contact:**	Amber Bailey
		Client Project ID:	1466-004 SEATTLE IRON & METALS

COMMENTS: **PCDD/F by TO9A via EPA M23/8290A**

Certified by:

Steve Kennedy
Technical Supervisor

ALS Life Sciences

Sample Analysis summary Report

Sample Name	SITE 1 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)	SITE 2 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)	SITE 3 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)	SITE 4 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)	SITE 5 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)
ALS Sample ID	L2569163-1	L2569163-2	L2569163-3	L2569163-4	L2569163-5
Sample Size	1	1	1	1	1
Sample size units	Sample	Sample	Sample	Sample	Sample
Percent Moisture	n/a	n/a	n/a	n/a	n/a
Sample Matrix	PUF	PUF	PUF	PUF	PUF
Sampling Date	n/a	n/a	n/a	n/a	n/a
Extraction Date	29-Mar-21	29-Mar-21	29-Mar-21	29-Mar-21	29-Mar-21
Target Analytes	**pg**	**pg**	**pg**	**pg**	**pg**
2,3,7,8-TCDD	<2.6	<3.0	<4.4	<5.1	<1.9
1,2,3,7,8-PeCDD	<1.3	<1.9	<2.4	<3.7	1.42
1,2,3,4,7,8-HxCDD	<1.8	2.91	<2.7	<4.7	<2.5
1,2,3,6,7,8-HxCDD	<3.0	<4.3	<3.0	<3.6	4.54
1,2,3,7,8,9-HxCDD	<3.1	<3.4	<2.3	<4.0	<4.1
1,2,3,4,6,7,8-HpCDD	52.6	60.4	55.7	62.5	61.6
OCDD	267	282	309	370	298
2,3,7,8-TCDF	<2.7	<3.1	<3.9	<5.0	<3.0
1,2,3,7,8-PeCDF	3.20	<3.4	4.52	<3.5	<3.0
2,3,4,7,8-PeCDF	<4.1	7.01	<3.0	<2.9	3.54
1,2,3,4,7,8-HxCDF	4.48	7.35	<2.6	<4.0	<3.2
1,2,3,6,7,8-HxCDF	3.91	<4.5	3.73	<3.4	<1.9
2,3,4,6,7,8-HxCDF	<3.1	7.08	<3.6	<3.7	3.57
1,2,3,7,8,9-HxCDF	<1.9	<2.4	<2.3	<4.4	2.87
1,2,3,4,6,7,8-HpCDF	18.5	24.3	<10	<11	<9.9
1,2,3,4,7,8,9-HpCDF	2.60	<3.6	<5.2	<3.5	<1.8
OCDF	15.6	21.7	21.5	<25	12.8
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	98	95	96	97	95
13C12-1,2,3,4,7,8-HxCDD	97	129	111	99	117
13C12-2,3,4,7,8-PeCDF	109	109	101	109	106
13C12-1,2,3,4,7,8-HxCDF	109	104	95	102	99
13C12-1,2,3,4,7,8,9-HpCDF	96	95	91	90	96
Extraction Standards					
13C12-2,3,7,8-TCDD	75	54	75	67	71
13C12-1,2,3,7,8-PeCDD	78	58	79	65	73
13C12-1,2,3,6,7,8-HxCDD	93	54	83	84	72
13C12-1,2,3,4,6,7,8-HpCDD	68	50	75	60	65
13C12-OCDD	61	48	68	54	68
13C12-2,3,7,8-TCDF	78	56	76	71	72
13C12-1,2,3,7,8-PeCDF	73	54	74	62	69
13C12-1,2,3,6,7,8-HxCDF	87	62	96	85	84
13C12-1,2,3,4,6,7,8-HpCDF	73	55	81	68	71
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	69	51	72	61	64
Homologue Group Totals	**pg**	**pg**	**pg**	**pg**	**pg**
Total-TCDD	<2.6	13.1	<4.4	9.87	8.69
Total-PeCDD	14.0	10.2	<2.4	<3.7	9.78
Total-HxCDD	26.9	35.7	12.0	<4.7	17.0
Total-HpCDD	120	128	55.7	151	130
Total-TCDF	48.0	90.6	19.2	6.32	26.3
Total-PeCDF	14.9	36.7	4.52	<3.3	16.7
Total-HxCDF	8.39	31.2	3.73	<4.4	15.5
Total-HpCDF	21.1	38.6	<5.2	<3.5	<1.5
Toxic Equivalency - (WHO 2005)					
Lower Bound PCDD/F TEQ (WHO 2005)	1.76	4.78	1.16	0.736	4.29
Mid Point PCDD/F TEQ (WHO 2005)	6.27	10.1	7.07	7.45	6.77
Upper Bound PCDD/F TEQ (WHO 2005)	8.45	11.6	11.1	13.9	7.87

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Quality Control Summary Report

Sample Name	Method Blank	Method Blank	Laboratory Control Sample
ALS Sample ID	WG3507253-1	WG3507253-4	WG3507253-2
Sample Size	1	1	1
Sample size units	Sample	Sample	Sample
Percent Moisture	n/a	n/a	n/a
Sample Matrix	MEDIA	REAGENT	MEDIA
Sampling Date	n/a	n/a	n/a
Extraction Date	29-Mar-21	29-Mar-21	29-Mar-21
Target Analytes	**pg**	**pg**	**% Rec**
2,3,7,8-TCDD	<1.5	<1.9	86
1,2,3,7,8-PeCDD	<0.74	<1.3	93
1,2,3,4,7,8-HxCDD	<0.82	<0.81	105
1,2,3,6,7,8-HxCDD	<0.63	<0.62	105
1,2,3,7,8,9-HxCDD	<0.69	<0.68	126
1,2,3,4,6,7,8-HpCDD	3.44	3.23	97
OCDD	65.5	52.7	87
2,3,7,8-TCDF	<1.1	<1.2	89
1,2,3,7,8-PeCDF	<0.48	<0.71	99
2,3,4,7,8-PeCDF	<0.43	<0.63	96
1,2,3,4,7,8-HxCDF	<0.73	<0.62	106
1,2,3,6,7,8-HxCDF	<0.62	<0.53	102
2,3,4,6,7,8-HxCDF	<0.67	<0.57	109
1,2,3,7,8,9-HxCDF	<0.82	<0.97	113
1,2,3,4,6,7,8-HpCDF	<0.74	<0.75	97
1,2,3,4,7,8,9-HpCDF	<0.94	<0.96	89
OCDF	<4.0	<2.3	87
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	NS	NS	NS
13C12-1,2,3,4,7,8-HxCDD	NS	NS	NS
13C12-2,3,4,7,8-PeCDF	NS	NS	NS
13C12-1,2,3,4,7,8-HxCDF	NS	NS	NS
13C12-1,2,3,4,7,8,9-HpCDF	NS	NS	NS
Extraction Standards			
13C12-2,3,7,8-TCDD	85	64	58
13C12-1,2,3,7,8-PeCDD	93	73	68
13C12-1,2,3,6,7,8-HxCDD	78	64	65
13C12-1,2,3,4,6,7,8-HpCDD	81	76	67
13C12-OCDD	77	79	64
13C12-2,3,7,8-TCDF	86	64	60
13C12-1,2,3,7,8-PeCDF	87	67	62
13C12-1,2,3,6,7,8-HxCDF	85	69	69
13C12-1,2,3,4,6,7,8-HpCDF	87	77	75
Cleanup Standard			
13C12-1,2,3,7,8,9-HxCDF	76	67	69
Homologue Group Totals	**pg**	**pg**	
Total-TCDD	<1.5	<1.9	
Total-PeCDD	<0.74	<1.3	
Total-HxCDD	<0.82	<0.81	
Total-HpCDD	3.44	3.23	
Total-TCDF	<1.1	<1.2	
Total-PeCDF	<0.48	<0.71	
Total-HxCDF	<0.82	<0.70	
Total-HpCDF	<0.94	<0.96	
Toxic Equivalency - (WHO 2005)			
Lower Bound PCDD/F TEQ (WHO 2005)	0.0541	0.0481	
Mid Point PCDD/F TEQ (WHO 2005)	1.56	2.11	
Upper Bound PCDD/F TEQ (WHO 2005)	3.06	4.08	

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Continuing Calibration Summary Report

Sample Name	CVS	CCV	CCV
ALS Sample ID	H7-21-RS1-0199	H7-21-CCV-0203	H7-21-CCV-0204
Sample Size	1	1	1
Sample size units	n/a	n/a	n/a
Percent Moisture	n/a	n/a	n/a
Sample Matrix	QC	QC	QC
Sampling Date	n/a	n/a	n/a
Extraction Date	n/a	n/a	n/a
Target Analytes	**% Rec**	**% Rec**	**% Rec**
2,3,7,8-TCDD	102	93	97
1,2,3,7,8-PeCDD	109	94	97
1,2,3,4,7,8-HxCDD	104	108	115
1,2,3,6,7,8-HxCDD	97	97	98
1,2,3,7,8,9-HxCDD	102	98	104
1,2,3,4,6,7,8-HpCDD	101	105	104
OCDD	90	90	90
2,3,7,8-TCDF	101	95	108
1,2,3,7,8-PeCDF	108	99	101
2,3,4,7,8-PeCDF	99	96	97
1,2,3,4,7,8-HxCDF	106	101	121
1,2,3,6,7,8-HxCDF	102	99	104
2,3,4,6,7,8-HxCDF	101	93	107
1,2,3,7,8,9-HxCDF	108	94	113
1,2,3,4,6,7,8-HpCDF	100	101	101
1,2,3,4,7,8,9-HpCDF	106	100	105
OCDF	102	110	96
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	118	91	98
13C12-1,2,3,4,7,8-HxCDD	98	109	113
13C12-2,3,4,7,8-PeCDF	99	100	98
13C12-1,2,3,4,7,8-HxCDF	103	102	119
13C12-1,2,3,4,7,8,9-HpCDF	102	98	104
Extraction Standards			
13C12-2,3,7,8-TCDD	97	102	96
13C12-1,2,3,7,8-PeCDD	94	82	91
13C12-1,2,3,6,7,8-HxCDD	101	103	97
13C12-1,2,3,4,6,7,8-HpCDD	99	80	98
13C12-OCDD	97	70	108
13C12-2,3,7,8-TCDF	101	95	92
13C12-1,2,3,7,8-PeCDF	96	82	93
13C12-1,2,3,6,7,8-HxCDF	104	120	100
13C12-1,2,3,4,6,7,8-HpCDF	100	93	103
Cleanup Standard			
13C12-1,2,3,7,8,9-HxCDF	102	109	106

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Sample Analysis Report

Sample Name	**SITE 1 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)**	Sampling Date	n/a		
ALS Sample ID	L2569163-1	Extraction Date	29-Mar-21		Approved:
Analysis Method	EPA TO9A	Sample Size	1	Sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	2		22-Apr-2021

Run Information	**Run 1**
Filename	7-210421A08
Run Date	21-Apr-21 17:37
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSO710442H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<2.6	2.6	U		10
1,2,3,7,8-PeCDD	1	32.20	<1.3	1.3	M,U	1.2	50
1,2,3,4,7,8-HxCDD	0.1	34.21	<1.8	1.2	M,J,R	1.8	50
1,2,3,6,7,8-HxCDD	0.1	34.26	<3.0	0.89	J,R	3.0	50
1,2,3,7,8,9-HxCDD	0.1	34.38	<3.1	0.98	M,J,R	3.1	50
1,2,3,4,6,7,8-HpCDD	0.01	35.86	52.6	1.9	M		50
OCDD	0.0003	37.35	267	2.8	B		100
2,3,7,8-TCDF	0.1	NotFnd	<2.7	2.7	U		10
1,2,3,7,8-PeCDF	0.03	31.29	3.20	1.5	M,J		50
2,3,4,7,8-PeCDF	0.3	31.99	<4.1	1.3	M,J,R	4.1	50
1,2,3,4,7,8-HxCDF	0.1	33.73	4.48	1.7	M,J		50
1,2,3,6,7,8-HxCDF	0.1	33.80	3.91	1.5	M,J		50
2,3,4,6,7,8-HxCDF	0.1	34.11	<3.1	1.6	M,J,R	3.1	50
1,2,3,7,8,9-HxCDF	0.1	34.54	<1.9	1.9	M,U	0.67	50
1,2,3,4,6,7,8-HpCDF	0.01	35.31	18.5	0.89	J		50
1,2,3,4,7,8,9-HpCDF	0.01	36.11	2.60	1.1	M,J		50
OCDF	0.0003	37.45	15.6	2.2	J		100
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	1800	28.25	98	70-130			
13C12-1,2,3,4,7,8-HxCDD	18000	34.20	97	70-130	M		
13C12-2,3,4,7,8-PeCDF	18000	31.98	109	70-130			
13C12-1,2,3,4,7,8-HxCDF	18000	33.72	109	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	18000	36.11	96	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	4000	28.22	75	40-130			
13C12-1,2,3,7,8-PeCDD	4000	32.19	78	40-130			
13C12-1,2,3,6,7,8-HxCDD	4000	34.23	93	40-130	M		
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.85	68	25-130			
13C12-OCDD	8000	37.34	61	25-130			
13C12-2,3,7,8-TCDF	4000	27.31	78	40-130			
13C12-1,2,3,7,8-PeCDF	4000	31.27	73	40-130			
13C12-1,2,3,6,7,8-HxCDF	4000	33.79	87	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.30	73	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	4000	34.53	69	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		**LQL**
Total-TCDD	0	<2.6	2.6	U	10
Total-PeCDD	3	14.0	1.3		50
Total-HxCDD	3	26.9	1.2		50
Total-HpCDD	2	120	1.9		50
Total-TCDF	6	48.0	2.7		10
Total-PeCDF	3	14.9	1.5		50
Total-HxCDF	2	8.39	1.9		50
Total-HpCDF	2	21.1	1.1		50

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	1.76
Mid Point PCDD/F TEQ (WHO 2005)	6.27
Upper Bound PCDD/F TEQ (WHO 2005)	8.45

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**SITE 2 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)**	Sampling Date	n/a		
ALS Sample ID	L2569163-2	Extraction Date	29-Mar-21		Approved:
Analysis Method	EPA TO9A	Sample Size	1	Sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	2		22-Apr-2021

Run Information	**Run 1**
Filename	7-210421A09
Run Date	21-Apr-21 18:19
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSO710442H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<3.0	3.0	U		10
1,2,3,7,8-PeCDD	1	32.19	<1.9	1.6	M,J,R	1.9	50
1,2,3,4,7,8-HxCDD	0.1	34.21	2.91	1.4	M,J		50
1,2,3,6,7,8-HxCDD	0.1	34.25	<4.3	1.1	M,J,R	4.3	50
1,2,3,7,8,9-HxCDD	0.1	34.38	<3.4	1.2	M,J,R	3.4	50
1,2,3,4,6,7,8-HpCDD	0.01	35.85	60.4	2.4			50
OCDD	0.0003	37.34	282	2.3	B		100
2,3,7,8-TCDF	0.1	27.35	<3.1	2.9	J,R	3.1	10
1,2,3,7,8-PeCDF	0.03	31.27	<3.4	1.9	M,J,R	3.4	50
2,3,4,7,8-PeCDF	0.3	31.99	7.01	1.7	M,J		50
1,2,3,4,7,8-HxCDF	0.1	33.72	7.35	1.9	M,J		50
1,2,3,6,7,8-HxCDF	0.1	33.80	<4.5	1.6	M,J,R	4.5	50
2,3,4,6,7,8-HxCDF	0.1	34.11	7.08	1.8	M,J		50
1,2,3,7,8,9-HxCDF	0.1	34.53	<2.4	2.2	M,J,R	2.4	50
1,2,3,4,6,7,8-HpCDF	0.01	35.30	24.3	2.8	M,J		50
1,2,3,4,7,8,9-HpCDF	0.01	36.12	<3.6	3.6	M,J,R	3.6	50
OCDF	0.0003	37.43	21.7	2.2	M,J		100

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	1800	28.24	95	70-130
13C12-1,2,3,4,7,8-HxCDD	18000	34.20	129	70-130
13C12-2,3,4,7,8-PeCDF	18000	31.97	109	70-130
13C12-1,2,3,4,7,8-HxCDF	18000	33.71	104	70-130
13C12-1,2,3,4,7,8,9-HpCDF	18000	36.11	95	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	4000	28.22	54	40-130
13C12-1,2,3,7,8-PeCDD	4000	32.18	58	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.24	54	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.85	50	25-130
13C12-OCDD	8000	37.34	48	25-130
13C12-2,3,7,8-TCDF	4000	27.29	56	40-130
13C12-1,2,3,7,8-PeCDF	4000	31.26	54	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.79	62	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.30	55	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.52	51	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**	**LQL**
Total-TCDD	1	13.1	3.0	10
Total-PeCDD	2	10.2	1.6	50
Total-HxCDD	3	35.7	1.4	50
Total-HpCDD	2	128	2.4	50
Total-TCDF	9	90.6	2.9	10
Total-PeCDF	4	36.7	1.9	50
Total-HxCDF	3	31.2	2.2	50
Total-HpCDF	3	38.6	3.6	50

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	4.78
Mid Point PCDD/F TEQ (WHO 2005)	10.1
Upper Bound PCDD/F TEQ (WHO 2005)	11.6

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**SITE 3 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)**	Sampling Date	n/a		
ALS Sample ID	L2569163-3	Extraction Date	29-Mar-21		Approved:
Analysis Method	EPA TO9A	Sample Size	1	Sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	2		22-Apr-2021

Run Information	**Run 1**
Filename	7-210421A10
Run Date	21-Apr-21 19:02
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSO710442H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<4.4	4.4	U		10
1,2,3,7,8-PeCDD	1	NotFnd	<2.4	2.4	U		50
1,2,3,4,7,8-HxCDD	0.1	34.22	<2.7	2.7	M,U	2.6	50
1,2,3,6,7,8-HxCDD	0.1	34.27	<3.0	2.1	M,J,R	3.0	50
1,2,3,7,8,9-HxCDD	0.1	34.39	<2.3	2.3	M,U	1.5	50
1,2,3,4,6,7,8-HpCDD	0.01	35.86	55.7	3.4	M		50
OCDD	0.0003	37.35	309	5.0	B		100
2,3,7,8-TCDF	0.1	NotFnd	<3.9	3.9	U		10
1,2,3,7,8-PeCDF	0.03	31.29	4.52	2.8	J		50
2,3,4,7,8-PeCDF	0.3	32.01	<3.0	2.5	M,J,R	3.0	50
1,2,3,4,7,8-HxCDF	0.1	33.74	<2.6	2.0	J,R	2.6	50
1,2,3,6,7,8-HxCDF	0.1	33.81	3.73	1.7	J		50
2,3,4,6,7,8-HxCDF	0.1	34.12	<3.6	1.9	J,R	3.6	50
1,2,3,7,8,9-HxCDF	0.1	34.55	<2.3	2.3	M,U	1.3	50
1,2,3,4,6,7,8-HpCDF	0.01	35.31	<10	4.1	M,J,R	10	50
1,2,3,4,7,8,9-HpCDF	0.01	36.13	<5.2	5.2	M,U	4.9	50
OCDF	0.0003	37.45	21.5	3.7	J		100
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	1800	28.30	96	70-130			
13C12-1,2,3,4,7,8-HxCDD	18000	34.21	111	70-130			
13C12-2,3,4,7,8-PeCDF	18000	31.99	101	70-130			
13C12-1,2,3,4,7,8-HxCDF	18000	33.73	95	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	18000	36.12	91	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	4000	28.27	75	40-130			
13C12-1,2,3,7,8-PeCDD	4000	32.20	79	40-130			
13C12-1,2,3,6,7,8-HxCDD	4000	34.26	83	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.86	75	25-130			
13C12-OCDD	8000	37.35	68	25-130			
13C12-2,3,7,8-TCDF	4000	27.35	76	40-130			
13C12-1,2,3,7,8-PeCDF	4000	31.29	74	40-130			
13C12-1,2,3,6,7,8-HxCDF	4000	33.80	96	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.31	81	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	4000	34.54	72	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		**LQL**
Total-TCDD	0	<4.4	4.4	U	10
Total-PeCDD	0	<2.4	2.4	U	50
Total-HxCDD	1	12.0	2.7		50
Total-HpCDD	1	55.7	3.4		50
Total-TCDF	4	19.2	3.9		10
Total-PeCDF	1	4.52	2.8		50
Total-HxCDF	1	3.73	2.3		50
Total-HpCDF	0	<5.2	5.2	U	50

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	1.16
Mid Point PCDD/F TEQ (WHO 2005)	7.07
Upper Bound PCDD/F TEQ (WHO 2005)	11.1

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**SITE 4 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)**	Sampling Date	n/a		
ALS Sample ID	L2569163-4	Extraction Date	29-Mar-21		Approved:
Analysis Method	EPA TO9A	Sample Size	1	Sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	2		22-Apr-2021

Run Information	**Run 1**
Filename	7-210421A11
Run Date	21-Apr-21 19:44
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSO710442H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<5.1	5.1	U		10
1,2,3,7,8-PeCDD	1	NotFnd	<3.7	3.7	U		50
1,2,3,4,7,8-HxCDD	0.1	34.22	<4.7	4.7	M,U	3.6	50
1,2,3,6,7,8-HxCDD	0.1	34.26	<3.6	3.6	M,U	1.3	50
1,2,3,7,8,9-HxCDD	0.1	34.38	<4.0	4.0	M,U	2.6	50
1,2,3,4,6,7,8-HpCDD	0.01	35.88	62.5	4.1	M		50
OCDD	0.0003	37.36	370	7.9	B		100
2,3,7,8-TCDF	0.1	NotFnd	<5.0	5.0	U		10
1,2,3,7,8-PeCDF	0.03	31.31	<3.5	3.3	J,R	3.5	50
2,3,4,7,8-PeCDF	0.3	NotFnd	<2.9	2.9	U		50
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<4.0	4.0	U		50
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<3.4	3.4	U		50
2,3,4,6,7,8-HxCDF	0.1	34.15	<3.7	3.7	U	3.2	50
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<4.4	4.4	U		50
1,2,3,4,6,7,8-HpCDF	0.01	35.32	<11	2.8	M,J,R	11	50
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<3.5	3.5	U		50
OCDF	0.0003	37.46	<25	7.9	M,J,R	25	100
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	1800	28.30	97	70-130			
13C12-1,2,3,4,7,8-HxCDD	18000	34.21	99	70-130	M		
13C12-2,3,4,7,8-PeCDF	18000	31.99	109	70-130			
13C12-1,2,3,4,7,8-HxCDF	18000	33.73	102	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	18000	36.12	90	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	4000	28.27	67	40-130			
13C12-1,2,3,7,8-PeCDD	4000	32.20	65	40-130			
13C12-1,2,3,6,7,8-HxCDD	4000	34.26	84	40-130	M		
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.86	60	25-130			
13C12-OCDD	8000	37.35	54	25-130			
13C12-2,3,7,8-TCDF	4000	27.35	71	40-130			
13C12-1,2,3,7,8-PeCDF	4000	31.29	62	40-130			
13C12-1,2,3,6,7,8-HxCDF	4000	33.80	85	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.31	68	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	4000	34.54	61	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		**LQL**
Total-TCDD	1	9.87	5.1		10
Total-PeCDD	0	<3.7	3.7	U	50
Total-HxCDD	0	<4.7	4.7	U	50
Total-HpCDD	2	151	4.1		50
Total-TCDF	2	6.32	5.0		10
Total-PeCDF	0	<3.3	3.3	U	50
Total-HxCDF	0	<4.4	4.4	U	50
Total-HpCDF	0	<3.5	3.5	U	50

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.736
Mid Point PCDD/F TEQ (WHO 2005)	7.45
Upper Bound PCDD/F TEQ (WHO 2005)	13.9

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**SITE 5 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)**	Sampling Date	n/a		
ALS Sample ID	L2569163-5	Extraction Date	29-Mar-21		Approved:
Analysis Method	EPA TO9A	Sample Size	1	Sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	2		22-Apr-2021

Run Information	**Run 1**
Filename	7-210421A12
Run Date	21-Apr-21 20:27
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSO710442H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.9	1.9	U		10
1,2,3,7,8-PeCDD	1	32.20	1.42	1.3	M,J		50
1,2,3,4,7,8-HxCDD	0.1	34.21	<2.5	0.95	M,J,R	2.5	50
1,2,3,6,7,8-HxCDD	0.1	34.26	4.54	0.72	M,J		50
1,2,3,7,8,9-HxCDD	0.1	34.38	<4.1	0.80	M,J,R	4.1	50
1,2,3,4,6,7,8-HpCDD	0.01	35.86	61.6	2.3	M		50
OCDD	0.0003	37.35	298	1.9	B		100
2,3,7,8-TCDF	0.1	27.32	<3.0	3.0	U	2.2	10
1,2,3,7,8-PeCDF	0.03	31.26	<3.0	1.7	M,J,R	3.0	50
2,3,4,7,8-PeCDF	0.3	31.98	3.54	1.5	J		50
1,2,3,4,7,8-HxCDF	0.1	33.72	<3.2	1.1	M,J,R	3.2	50
1,2,3,6,7,8-HxCDF	0.1	33.79	<1.9	0.97	J,R	1.9	50
2,3,4,6,7,8-HxCDF	0.1	34.11	3.57	1.1	J		50
1,2,3,7,8,9-HxCDF	0.1	34.55	2.87	1.3	M,J		50
1,2,3,4,6,7,8-HpCDF	0.01	35.30	<9.9	1.2	J,R	9.9	50
1,2,3,4,7,8,9-HpCDF	0.01	36.12	<1.8	1.5	J,R	1.8	50
OCDF	0.0003	37.44	12.8	1.2	M,J		100
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	1800	28.24	95	70-130			
13C12-1,2,3,4,7,8-HxCDD	18000	34.20	117	70-130			
13C12-2,3,4,7,8-PeCDF	18000	31.97	106	70-130			
13C12-1,2,3,4,7,8-HxCDF	18000	33.72	99	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	18000	36.11	96	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	4000	28.22	71	40-130			
13C12-1,2,3,7,8-PeCDD	4000	32.18	73	40-130			
13C12-1,2,3,6,7,8-HxCDD	4000	34.25	72	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.85	65	25-130			
13C12-OCDD	8000	37.34	68	25-130			
13C12-2,3,7,8-TCDF	4000	27.29	72	40-130			
13C12-1,2,3,7,8-PeCDF	4000	31.26	69	40-130			
13C12-1,2,3,6,7,8-HxCDF	4000	33.79	84	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.30	71	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	4000	34.53	64	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		**LQL**
Total-TCDD	2	8.69	1.9		10
Total-PeCDD	2	9.78	1.3		50
Total-HxCDD	2	17.0	0.95		50
Total-HpCDD	2	130	2.3		50
Total-TCDF	5	26.3	3.0		10
Total-PeCDF	3	16.7	1.7		50
Total-HxCDF	3	15.5	1.3		50
Total-HpCDF	0	<1.5	1.5	U	50

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	4.29
Mid Point PCDD/F TEQ (WHO 2005)	6.77
Upper Bound PCDD/F TEQ (WHO 2005)	7.87

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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SVOC DATA PACKAGE

SECTION 3: METHOD SUMMARY

PCDD/F METHOD SUMMARY
Methods 23/0023A/1613B/8290/TO-9A

Introduction:

This summary is to provide ALSE Burlington PCDD/F method details in order to provide persons reviewing or validating this data package sufficient information to re-construct the sample calculation, data verification and review. It incorporates the analysis of PCDD/F via the following reference methods:

US EPA Office of Water, Method 1613B
US EPA Office of Solid Waste, SW846 Methods 8290A and 0023/8290A
US EPA Office of Research & Development Method TO-9A.
US EPA Office of Air Quality Planning & Standards Method 23.

Any deviations to what is listed herein would be listed in the project narrative.

To avoid the confusion and conflicting nomenclature within the methods, we have defined the labeled standards in terms relating to the time of addition to the sample or extract. Therefore;

The Field or Sampling Standards are added prior to field sampling
The Extraction Standards are added prior to extraction
The Clean-up Standards are added prior to extract clean-up
The Injection Standards are added prior to extract injection.

Calibration Standard Levels:

Six levels of standard are available for calibration as listed in Table 1. The low point (the CS0) is below method requirements and therefore is optional.

Table 1: Calibration Standards

		CS0	CS1	CS2	CS3	CS4	CS5
Natives	2,3,7,8-TCDD	0.1	0.5	2	10	40	200
	2,3,7,8-TCDF	0.1	0.5	2	10	40	200
	1,2,3,7,8-PeCDD	0.5	2.5	10	50	200	1000
	1,2,3,7,8-PeCDF	0.5	2.5	10	50	200	1000
	2,3,4,7,8-PeCDF	0.5	2.5	10	50	200	1000
	1,2,3,4,7,8-HxCDD	0.5	2.5	10	50	200	1000
	1,2,3,6,7,8-HxCDD	0.5	2.5	10	50	200	1000
	1,2,3,7,8,9-HxCDD	0.5	2.5	10	50	200	1000
	1,2,3,4,7,8-HxCDF	0.5	2.5	10	50	200	1000
	1,2,3,6,7,8-HxCDF	0.5	2.5	10	50	200	1000
	1,2,3,7,8,9-HxCDF	0.5	2.5	10	50	200	1000
	2,3,4,6,7,8-HxCDF	0.5	2.5	10	50	200	1000
	1,2,3,4,6,7,8-HpCDD	0.5	2.5	10	50	200	1000
	1,2,3,4,6,7,8-HpCDF	0.5	2.5	10	50	200	1000
	1,2,3,4,7,8,9-HpCDF	0.5	2.5	10	50	200	1000
	OCDD	1	5	20	100	400	2000
	OCDF	1	5	20	100	400	2000
Labeled	2,3,7,8-TCDD-$^{13}C_{12}$	100	100	100	100	100	100
	2,3,7,8-TCDF-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,7,8-PeCDD-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,7,8-PeCDF-$^{13}C_{12}$	100	100	100	100	100	100
	2,3,4,7,8-PeCDF-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	100	100	100	100	100	100
	2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	100	100	100	100	100	100
	OCDD-$^{13}C_{12}$	200	200	200	200	200	200
	2,3,7,8-TCDD-$^{37}Cl_4$	0.1	0.5	2	10	40	200
Injection	1,2,3,4-TCDD-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	100	100	100	100	100	100

Calibration Control Limits

The initial and continuing calibration control limits for all methods are presented in Table 2 below. For the initial calibration CS1 and for each calibration verification CS3, the signal to noise ratio for each quantification ion for labelled and non-labelled analytes must be greater than or equal to 10:1

Table 2: Calibration Control Limits

	1613B		M23 & TO-9A		8290A	
	Initial Cal.	Cal. Ver.	Initial Cal.	Cal. Ver.	Initial Cal.	Cal. Ver.
	%RSD	ng/mL	%RSD	% Diff	%RSD	% Diff
Natives						
2,3,7,8-TCDD	20	7.8-12.9	25	25	20	20*
2,3,7,8-TCDF	20	8.4-12.0	25	25	20	20*
1,2,3,7,8-PeCDD	20	39-65	25	25	20	20*
1,2,3,7,8-PeCDF	20	41-60	25	25	20	20*
2,3,4,7,8-PeCDF	20	41-61	25	25	20	20*
1,2,3,4,7,8-HxCDD	20	39-64	25	25	20	20*
1,2,3,6,7,8-HxCDD	20	39-64	25	25	20	20*
1,2,3,7,8,9-HxCDD	35	41-61	25	25	20	20*
1,2,3,4,7,8-HxCDF	20	45-56	25	25	20	20*
1,2,3,6,7,8-HxCDF	20	44-57	25	25	20	20*
1,2,3,7,8,9-HxCDF	20	45-56	25	25	20	20*
2,3,4,6,7,8-HxCDF	20	44-57	25	25	20	20*
1,2,3,4,6,7,8-HpCDD	20	43-58	25	25	20	20*
1,2,3,4,6,7,8-HpCDF	20	45-55	25	25	20	20*
1,2,3,4,7,8,9-HpCDF	20	43-58	25	25	20	20*
OCDD	20	79-126	25	25	20	20*
OCDF	35	63-159	30	30	20	20*
Labels						
2,3,7,8-TCDD-$^{13}C_{12}$	35	82-121	25	25	30	30**
2,3,7,8-TCDF-$^{13}C_{12}$	35	71-140	30	30	30	30**
1,2,3,7,8-PeCDD-$^{13}C_{12}$	35	62-160	30	30	30	30**
1,2,3,7,8-PeCDF-$^{13}C_{12}$	35	76-130	30	30	30	30**
2,3,4,7,8-PeCDF-$^{13}C_{12}$	35	77-130	25	25	30	30**
1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	35	85-117	25	25	30	30**
1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	35	85-118	25	25	30	30**
1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	35	76-131	25	25	30	30**
1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	35	70-143	30	30	30	30**
1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	35	74-135	-	-	-	-
2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	35	73-137	30	30	30	30**
1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	35	72-138	30	30	30	30**
1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	35	78-129	30	30	30	30**
1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	35	77-129	25	25	30	30**
OCDD-$^{13}C_{12}$	35	96-415	30	30	30	30**
2,3,7,8-TCDD-$^{37}Cl_4$	35	7.9-12.7	25	25	30	30**

* 25% is allowed for a post-run verification but when the value is above 20%, then the analyte quantification must be as per 8290A Section 8.3.2.4 and corrective action is required before more samples can be analyzed.
**35% is allowed for a post-run verification but when the value is above 30%, then the analyte quantification must be as per 8290A Section 8.3.2.4 and corrective action is required before more samples can be analyzed.

LCS Criteria:

The laboratory control sample (LCS) or the On-Going Precision and Accuracy (OPR) recovery criteria are listed in Table 3

Table 3: Acceptance Criteria for IPR and OPR[a]

	Test Conc.	IPR		OPR
		s[b]	X[c]	
	ng/L	ng/L	ng/L	ng/L
Natives				
2,3,7,8-TCDD	10	2.8	8.3-12.9	6.7-15.8
2,3,7,8-TCDF	10	2	8.7-13.7	7.5-15.8
1,2,3,7,8-PeCDD	50	7.5	38-66	35-71
1,2,3,7,8-PeCDF	50	7.5	43-62	40-67
2,3,4,7,8-PeCDF	50	8.6	36-75	34-80
1,2,3,4,7,8-HxCDD	50	9.4	39-76	35-82
1,2,3,6,7,8-HxCDD	50	7.7	42-62	38-67
1,2,3,7,8,9-HxCDD	50	11.1	37-71	32-81
1,2,3,4,7,8-HxCDF	50	8.7	41-59	36-67
1,2,3,6,7,8-HxCDF	50	6.7	46-60	42-65
1,2,3,7,8,9-HxCDF	50	6.4	42-61	39-65
2,3,4,6,7,8-HxCDF	50	7.4	37-74	35-78
1,2,3,4,6,7,8-HpCDD	50	7.7	38-65	35-70
1,2,3,4,6,7,8-HpCDF	50	6.3	45-56	41-61
1,2,3,4,7,8,9-HpCDF	50	8.1	43-63	39-69
OCDD	100	19	89-127	78-144
OCDF	100	27	74-146	63-170
Labels				
2,3,7,8-TCDD-$^{13}C_{12}$	100	37	28-134	20-175
2,3,7,8-TCDF-$^{13}C_{12}$	100	35	31-113	22-152
1,2,3,7,8-PeCDD-$^{13}C_{12}$	100	39	27-184	21-227
1,2,3,7,8-PeCDF-$^{13}C_{12}$	100	34	27-156	21-192
2,3,4,7,8-PeCDF-$^{13}C_{12}$	100	38	16-297	13-328
1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	100	41	29-147	21-193
1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	100	38	34-122	25-163
1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	100	43	27-152	19-202
1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	100	35	30-122	21-159
1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	100	40	24-157	17-205
2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	100	37	29-136	22-176
1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	100	35	34-129	26-166
1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	100	41	32-110	21-158
1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	100	40	28-141	20-186
OCDD-$^{13}C_{12}$	200	95	41-276	26-397
2,3,7,8-TCDD-$^{37}Cl_4$	10	3.6	3.9-15.4	3.1-19.1

[a] Assuming a final volume of 20uL
[b] s = standard deviation
[c] X = Average Concentration

Extraction/Clean-up & Sampling Standard Recovery Limts:

Table 4: Extraction, Clean-up, Injection & Sampling Standard Recovery Limits

	1613B or 8290A (non Stack)		M23 or 0023A/8290A or TO-9A	
	(% Rec.)	Ref.	(% Rec.)	Ref.
Extraction Standard				
2,3,7,8-TCDD-$^{13}C_{12}$	25-164	a	40-130	b
2,3,7,8-TCDF-$^{13}C_{12}$	24-169	a	40-130	b
1,2,3,7,8-PeCDD-$^{13}C_{12}$	25-181	a	40-130	b
1,2,3,7,8-PeCDF-$^{13}C_{12}$	24-185	a	40-130	b
2,3,4,7,8-PeCDF-$^{13}C_{12}$	21-178	a	-	
1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	32-141	a	-	
1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	28-130	a	40-130	b
1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	26-152	a	-	
1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	26-123	a	40-130	b
1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	29-147	a	-	
2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	28-136	a	40-130	c,d
1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	23-140	a	25-130	b
1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	28-143	a	25-130	b
1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	26-138	a	-	
OCDD-$^{13}C_{12}$	17-157	a	25-130	b
Clean-up Standard				
2,3,7,8-TCDD-$^{37}Cl_4$	35-197	a	-	
1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	-		40-130	b
Injection Standard				
1,2,3,4-TCDD-$^{13}C_{12}$	30-300	d	30-300	d
1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	30-300	d	30-300	d
Sampling Standard				
2,3,7,8-TCDD-$^{37}Cl_4$	-		70-130	b
2,3,4,7,8-PeCDF-$^{13}C_{12}$	-		70-130	b
1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	-		70-130	b
1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	-		70-130	b
1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	-		70-130	b

References & Notes

[a] from OW method 1613B

[b] from OAQPS method 23

[c] this extraction standard is not required in methods 23 and 0023A/8290A

[d] ALS In-house criteria

Reporting Limits:

Unless indicated in the otherwise, the PCDD/F data is reported down to 2.5:1 signal to noise for each isomer grouping for each extract injection. This is consistent to SW846 8290 defined protocols (i.e. EDL or Estimated Detection Limit) and is commonly applied throughout the industry to all the HRMS PCDD/F methods applicable to this method summary.

Method Blank:

The method blank levels must be below the response to the low calibration standard, CS0 or CS1, whichever low calibration point is being applied to the project.

MS/MSD:

The % relative difference between the MS and MSD spike recoveries should be less than or equal to 20%.

Instrument/Run Performance Criteria:

1. Elution windows must be defined by a 'Window Performance Mix' at the beginning of each 12-hour run sequence
2. GC performance criteria of 25% maximum valley between 2,3,7,8-TCDD and it's neared eluting isomers (DB5) or 2,3,7,8-TCDF and it's nearest eluting isomers (DB225).
3. At the beginning of and just following the end of each 12 hour run sequence, the instrument must be checked to demonstrate a resolution of 10,000 for each quantification window.
4. For method 1613B, the relative retention times (RRT) of the compounds in the daily CS3 calibration verification must fall into the ranges presented in Table 4.
5. For all calibrations, QC samples and field samples, the absolute retention time (RT) for 1,2,3,4-TCDD-13C12 must be >25.0 min on a DB5 column and >15.0 min on a DB225 column.
6. The RT in the daily CS3 verification standards must be within 15 seconds of the CS3 in the initial calibration run.
7. The maximum time between scans within a descriptor is 1 second.
8. Lock mass deviations to the average response must be less than or equal 20%.

Laboratory Duplicates:

The % relative difference between duplicates should be less than or equal to 25% but only where the response is greater than the low calibration standard.

Analyte Identification Criteria:

1. Ion ratio must be within 15% of theoretical or within 10% of the most recent CS3.
2. The retention time (RT) of the peak maxima for each pair of quantification ions must be no more than 2 seconds (i.e. 2 scans) difference.
3. The retention time (RT) of the peak maxima of all 2,3,7,8- substituted native analytes must be within -1 to +3 seconds of the RT of corresponding $^{13}C_{12}$-labelled isomer of that injection run.
4. For those native analytes without a corresponding labelled isomer, the relative retention time (RRT) must be within 0.005 of the relative retention time observed in the daily CS3 run.
5. When there is a significant PCDPE interference observed, then a peak in the PCDF channel is not confirmed to be PCDF. [Significant PCDPE interference is identified when there is a PCDPE parent ion peak 10% or more of the response of a peak at the same RT (i.e. within 2 seconds) in the corresponding PCDF channel.]
6. For any peak to be identified as a positive PCDD/F response, that peak must be within the retention time windows defined by the daily analysis of Window Performance Mixture.

Table 4: Quantitation References and Method 1613B RT References and RRT

Analyte	Stack/Ambient Quantitation Reference	Method 1613B RT Reference Solids/ Waters Quantitation Reference	Method 1613B RRT
Compounds using 1,2,3,4-TCDD-$^{13}C_{12}$ as injection standard			
2,3,7,8-TCDF	2,3,7,8-TCDF-$^{13}C_{12}$	2,3,7,8-TCDF-$^{13}C_{12}$	0.999-1.003
2,3,7,8-TCDD	2,3,7,8-TCDD-$^{13}C_{12}$	2,3,7,8-TCDD-$^{13}C_{12}$	0.999-1.002
1,2,3,7,8-PeCDF	1,2,3,7,8-PeCDF-$^{13}C_{12}$	1,2,3,7,8-PeCDF-$^{13}C_{12}$	0.999-1.002
2,3,4,7,8-PeCDF	1,2,3,7,8-PeCDF-$^{13}C_{12}$	2,3,4,7,8-PeCDF-$^{13}C_{12}$	0.999-1.002
1,2,3,7,8-PeCDD	1,2,3,7,8-PeCDD-$^{13}C_{12}$	1,2,3,7,8-PeCDD-$^{13}C_{12}$	0.999-1.002
2,3,7,8-TCDF-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	0.923-1.103
2,3,7,8-TCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	0.976-1.043
2,3,7,8-TCDD-$^{37}Cl_4$	2,3,7,8-TCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	0.989-1.052
1,2,3,7,8-PeCDF-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1.000-1.425
2,3,4,7,8-PeCDF-$^{13}C_{12}$	1,2,3,7,8-PeCDF-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1.011-1.526
1,2,3,7,8-PeCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1.000-1.567
Compounds using 1,2,3,7,8,9-HxCDD-$^{13}C_{12}$ as injection standard			
1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	0.999-1.001
1,2,3,6,7,8-HxCDF	1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	0.997-1.005
1,2,3,7,8,9-HxCDF	1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	0.999-1.001
2,3,4,6,7,8-HxCDF	2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	0.999-1.001
1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	0.999-1.001
1,2,3,6,7,8-HxCDD	1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	0.998-1.004
1,2,3,7,8,9-HxCDD[a]	1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	[a]	1.000-1.019
1,2,3,4,6,7,8-HpCDF	1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	0.999-1.001
1,2,3,4,7,8,9-HpCDF	1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	0.999-1.001
1,2,3,4,6,7,8-HpCDD	1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	0.999-1.001
OCDF	OCDD-$^{13}C_{12}$	OCDD-$^{13}C_{12}$	0.999-1.008
OCDD	OCDD-$^{13}C_{12}$	OCDD-$^{13}C_{12}$	0.999-1.001
1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	0.944-0.970
1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	0.949-0.975
1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	0.977-1.047
2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	0.959-1.021
1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	0.977-1.000
1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	0.981-1.003
1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1.043-1.085
1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1.057-1.151
1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1.086-1.110
OCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1.032-1.311

[a] For solids/waters via 1612B, 1,2,3,7,8,9-HXCDD is quantified against the average responses of 1,2,3,4,7,8-HxCDD-$^{13}C_{12}$ and 1,2,3,6,7,8-HxCDD-$^{13}C_{12}$ while 1,2,3,6,7,8-HxCDD-$^{13}C_{12}$ is the RT reference.

Table 5: HRMS Instrumental Descriptor Parameters

Descriptor	Exact M/Z	M/Z Type	Elemental Composition	Substance	Type	Theoretical Ion Ratio	Ion Ratio QC Limits Upper	Lower
1	303.9016	M	$^{12}C_{12}\ ^{1}H_4\ ^{35}Cl_4\ ^{16}O$	TCDF	Native	0.77	0.65	0.89
	305.8987	M+2	$^{12}C_{12}\ ^{1}H_4\ ^{35}Cl_3\ ^{37}Cl\ ^{16}O$	TCDF	Native			
	315.9419	M	$^{13}C_{12}\ ^{1}H_4\ ^{35}Cl_4\ ^{16}O$	TCDF	^{13}C	0.77	0.65	0.89
	317.9389	M+2	$^{13}C_{12}\ ^{1}H_4\ ^{35}Cl_3\ ^{37}Cl\ ^{16}O$	TCDF	^{13}C			
	316.9824	Lock	$^{12}C_9\ ^{19}F_{11}$	PFK	Lock			
	319.8965	M	$^{12}C_{12}\ ^{1}H_4\ ^{35}Cl_4\ ^{16}O_2$	TCDD	Native	0.77	0.65	0.89
	321.8936	M+2	$^{12}C_{12}\ ^{1}H_4\ ^{35}Cl_3\ ^{37}Cl\ ^{16}O_2$	TCDD	Native			
	327.8847	M+8	$^{12}C_{12}\ ^{1}H_4\ ^{37}Cl_4\ ^{16}O_2$	TCDD	^{37}Cl			
	331.9368	M	$^{13}C_{12}\ ^{1}H_4\ ^{35}Cl_4\ ^{16}O_2$	TCDD	^{13}C	0.77	0.65	0.89
	333.9339	M+2	$^{13}C_{12}\ ^{1}H_4\ ^{35}Cl_3\ ^{37}Cl\ ^{16}O_2$	TCDD	^{13}C			
	339.8597	M+2	$^{12}C_{12}\ ^{1}H_3\ ^{35}Cl_4\ ^{37}Cl\ ^{16}O$	PeCDF	Native	1.55	1.32	1.78
	341.8568	M+4	$^{12}C_{12}\ ^{1}H_3\ ^{35}Cl_3\ ^{37}Cl_2\ ^{16}O$	PeCDF	Native			
	351.9	M+2	$^{13}C_{12}\ ^{1}H_3\ ^{35}Cl_4\ ^{37}Cl\ ^{16}O$	PeCDF	^{13}C	1.55	1.32	1.78
	353.897	M+4	$^{13}C_{12}\ ^{1}H_3\ ^{35}Cl_3\ ^{37}Cl_2\ ^{16}O$	PeCDF	^{13}C			
	375.8364	M+2	$^{12}C_{12}\ ^{1}H_4\ ^{35}Cl_5\ ^{37}Cl\ ^{16}O$	HxCDPE	Cl-DPE			
	409.7974	M+2	$^{12}C_{12}\ ^{1}H_3\ ^{35}Cl_6\ ^{37}Cl\ ^{16}O$	HpCDPE	Cl-DPE			
2	339.8597	M+2	$^{12}C_{12}\ ^{1}H_3\ ^{35}Cl_4\ ^{37}Cl\ ^{16}O$	PeCDF	Native	1.55	1.32	1.78
	341.8568	M+4	$^{12}C_{12}\ ^{1}H_3\ ^{35}Cl_3\ ^{37}Cl_2\ ^{16}O$	PeCDF	Native			
	351.9	M+2	$^{13}C_{12}\ ^{1}H_3\ ^{35}Cl_4\ ^{37}Cl\ ^{16}O$	PeCDF	^{13}C	1.55	1.32	1.78
	353.897	M+4	$^{13}C_{12}\ ^{1}H_3\ ^{35}Cl_3\ ^{37}Cl_2\ ^{16}O$	PeCDF	^{13}C			
	353.8576	M	$^{12}C_{12}\ ^{1}H_3\ ^{35}Cl_5\ ^{16}O_2$	PeCDD	Native	0.63	0.54	0.72
	355.8546	M+2	$^{12}C_{12}\ ^{1}H_3\ ^{35}Cl_4\ ^{37}Cl\ ^{16}O_2$	PeCDD	Native			
	366.9792	Lock	$^{12}C_{10}\ ^{19}F_{13}$	PFK	Lock			
	365.8978	M	$^{13}C_{12}\ ^{1}H_3\ ^{35}Cl_5\ ^{16}O_2$	PeCDD	^{13}C	0.63	0.54	0.72
	367.8949	M+2	$^{13}C_{12}\ ^{1}H_3\ ^{35}Cl_4\ ^{37}\ Cl\ ^{16}O_2$	PeCDD	^{13}C			
	409.7974	M+2	$^{12}C_{12}\ ^{1}H_3\ ^{35}Cl_6\ ^{37}Cl\ ^{16}O$	HpCDPE	Cl-DPE			
3	373.8207	M+2	$^{12}C_{12}\ ^{1}H_2\ ^{35}Cl_5\ ^{37}Cl\ ^{16}O$	HxCDF	Native	1.24	1.05	1.43
	375.8178	M+4	$^{12}C_{12}\ ^{1}H_2\ ^{35}Cl_4\ ^{37}Cl_2\ ^{16}O$	HxCDF	Native			
	380.976	Lock	$^{12}C_8\ ^{19}F_5$	PFK	Lock			
	383.8639	M	$^{13}C_{12}\ ^{1}H_2\ ^{35}Cl_6\ ^{16}O$	HxCDF	^{13}C	0.51	0.43	0.59
	385.861	M+2	$^{13}C_{12}\ ^{1}H_2\ ^{35}Cl_5\ ^{37}Cl\ ^{16}O$	HxCDF	^{13}C			
	389.8156	M+2	$^{12}C_{12}\ ^{1}H_2\ ^{35}Cl_5\ ^{37}Cl\ ^{16}O_2$	HxCDD	Native	1.24	1.05	1.43
	391.8127	M+4	$^{12}C_{12}\ ^{1}H_2\ ^{35}Cl_4\ ^{37}Cl_2\ ^{16}O_2$	HxCDD	Native			
	401.8559	M+2	$^{13}C_{12}\ ^{1}H_2\ ^{35}Cl_5\ ^{37}Cl\ ^{16}O_2$	HxCDD	^{13}C	1.24	1.05	1.43
	403.853	M+4	$^{13}C_{12}\ ^{1}H_2\ ^{35}Cl_4\ ^{37}Cl_2\ ^{16}O_2$	HxCDD	^{13}C			
	445.7555	M+4	$^{12}C_{12}\ ^{1}H_2\ ^{35}Cl_6\ ^{37}Cl_2\ ^{16}O$	OCDPE	Cl-DPE			
4	409.7789	M+4	$^{12}C_{12}\ ^{1}H\ ^{35}Cl_5\ ^{37}Cl_2\ ^{16}O$	HpCDF	Native	1.88	1.60	2.16
	411.7759	M+6	$^{12}C_{12}\ ^{1}H\ ^{35}Cl_4\ ^{37}Cl_3\ ^{16}O$	HpCDF	Native			
	417.8253	M	$^{13}C_{12}\ ^{1}H\ ^{35}Cl_7\ ^{16}O$	HpCDF	^{13}C	0.44	0.37	0.51
	419.822	M+2	$^{13}C_{12}\ ^{1}H\ ^{35}Cl_6\ ^{37}Cl\ ^{16}O$	HpCDF	^{13}C			
	423.7767	M+2	$^{12}C_{12}\ ^{1}H\ ^{35}Cl_6\ ^{37}Cl\ ^{16}O_2$	HpCDD	Native	1.04	0.88	1.20
	425.7737	M+4	$^{12}C_{12}\ ^{1}H\ ^{35}Cl_5\ ^{37}Cl_2\ ^{16}O_2$	HpCDD	Native			
	430.9728	Lock	$^{12}C_9\ ^{19}F_{17}$	PFK	Lock			
	435.8169	M+2	$^{13}C_{12}\ ^{1}H\ ^{35}Cl_6\ ^{37}Cl\ ^{16}O_2$	HpCDD	^{13}C	1.04	0.88	1.20
	437.814	M+4	$^{13}C_{12}\ ^{1}H\ ^{35}Cl_5\ ^{37}Cl_2\ ^{16}O_2$	HpCDD	^{13}C			
	479.7165	M+4	$^{12}C_{12}\ ^{1}H\ ^{35}Cl_7\ ^{37}Cl_2\ ^{16}O$	NCDPE	Cl-DPE			
5	441.7428	M+2	$^{12}C_{12}\ ^{35}Cl_7\ ^{37}Cl\ ^{16}O$	OCDF	Native	0.89	0.76	1.02
	443.7399	M+4	$^{12}C_{12}\ ^{35}Cl_6\ ^{37}Cl2\ ^{16}O$	OCDF	Native			
	454.9728	Lock	$^{12}C_{11}\ ^{19}F_{17}$	PFK	Lock			
	457.7377	M+2	$^{12}C_{12}\ ^{35}Cl_7\ ^{37}Cl\ ^{16}O_2$	OCDD	Native	0.89	0.76	1.02
	459.7348	M+4	$^{12}C_{12}\ ^{35}Cl_6\ ^{37}Cl_2\ ^{16}O_2$	OCDD	Native			
	469.778	M+2	$^{13}C_{12}\ ^{35}Cl_7\ ^{37}Cl\ ^{16}O_2$	OCDD	^{13}C	0.89	0.76	1.02
	471.775	M+4	$^{13}C_{12}\ ^{35}Cl_6\ ^{37}Cl_2\ ^{16}O_2$	OCDD	^{13}C			
	513.6775	M+4	$^{12}C_{12}\ ^{35}Cl_8\ ^{37}Cl_2\ ^{16}O$	DCDPE	Cl-DPE			

Data Calculations:

a) Analyte Concentrations:

The relative response factor of each target relative to the standard against which it is to be calculated is determined using the area responses of both quantification ions via equation 9.1.
In cases where a native target is calculated against an exact labelled analogue, the quantification will be considered to be by isotope dilution. In other cases, the quantification will be considered to be by internal standard.

$$RRF = \frac{(A1_t + A2_t)\ C_s}{(A1_s + A2_s)\ C_t} \qquad \text{Equ. 9.1}$$

Where,
$A1_t + A2_t$ = The areas of the two quantification ions for the target analyte
$A1_s + A2_s$ = The areas of the two quantification ions for the labelled compound against which the target analyte will be calculated.
C_t = The concentration in the calibration standard of the target analyte.
C_s = The concentration in the calibration standard of the labelled compound against which the target will be calculated.

For all analytes to be quantified and from the initial calibration series of standard injections, a table of RRFs is prepared. The relative standard deviation (%RSD, or the coefficient of variance) is checked to confirm that the appropriate method criteria has been met as listed in Table 3. The average of the five or six levels of standard for each analyte, RRF_{av} is applied for quantification of samples according to Equations 9.2 and 9.3 below.

$$\text{Amount in sample (pg)} = \frac{(A1_n + A2_n)\ Q_l}{(A1_l + A2_l)\ (RRF_{av})} \qquad \text{Equ. 9.2}$$

$$\text{Concentration in sample (pg/g or pg/l)} = \frac{(A1_n + A2_n)\ Q_l}{(A1_l + A2_l)\ (RRF_{av})\ (W_s)} \qquad \text{Equ. 9.3}$$

Where,
Q_l = The amount (pg) of labelled compound added to the sample
W_s = The weight (g) or volume (l) of sample

b) Extraction, Clean-up, and Sampling Standard Recovery Calculation:

The extraction, clean-up, and sampling standard recoveries are determined by Equation 9.4 below.

% Recovery = (Amount in sample)/(Amount added to sample) X 100 Equ. 9.4

c) Estimated Detection Limit

$$EDL = \frac{2.5 \times H_x \times Q_{es}}{H_{es} \times W \times RFF_{av}} \qquad \text{Equ. 9.5}$$

Where,

EDL = estimated detection limit for homologous 2,3,7,8-Substituted PCDD/Fs

H_x = sum of the height of the noise level for each quantification ions for the unlabelled PCDD/Fs.

H_{es} = Sum of the heights of responses of both quantification ions for the labelled extraction standard.

W = weight of volume of sample

RRF_{av} = average relative response factor

Q_{es} = Amount of extraction standard added

Chromatogram Annotation Codes

All manually integrated peaks are expanded and reprinted with the following annotations:

* Analyst Initials	AA
* Date	YYMMDD
* integration code	CC

The Syntax is:	Example:
AAYYMMDDCC	SK111220MB

Code	Mnemonic	Description
MB	Manual Baseline	The peak was manually integrated because the initial baseline was determined incorrectly by the software
MS	Manual Split	The peak was manually integrated because the peak was incorrectly or not split by the software
MJ/MC	Manual Join/Manual Combine	The peak was manually integrated because the peak was split by the software and the peak should be integrated as a single peak
MA	Manual Add	The peak was manually integrated because the signal:noise ratio was judged to be >2.5
MD	Manual Delete	The peak was excluded because the signal:noise ratio was judged to be <2.5
MX	Manual Exclude	The peak was excluded due to an interference
NH	Noise Height	The noise height for detection limit calculation was manually defined, over-riding the software chosen value
MT	Manual Time	The peak retention time was manually chosen

The following explanatory annotation codes may appear on the chromatograms of peaks that have been reviewed:

Code	Mnemonic	Description
+	Detected Peak	A peak was detected at this mass and retention time that was above 2.5:1 signal to noise
<	Below Detection Limit	The signal at this mass and retention time was below 2.5:1 signal to noise
EMPC	Estimated Maximum Possible Concentration	The signal at this mass and retention time is an interference such that the target compound could not be confirmed
X-RT	Not Detected due to Retention Time non-conformance	The signal at this retention time could not be used to positively identify the target compound because of retention time non-conformance (apex of quantification and confirmation ions do not maximize within the same two seconds, or the retention time of the peak does not fall within the expected range with respect to its labeled analogue)
X-LOC	Not Detected due to interference from a higher level of chlorination	The signal at this retention time is attributable to a fragment from a co-eluting compound at a higher level of chlorination, and cannot be used to positively identify the target. The result is expressed as an Estimated Maximum Possible Concentration (EMPC)
X-DPE	Not Detected due to diphenyl ether interference	The signal at this retention time is attributable to interference from a chlorinated diphenyl ether, and cannot be used to positively identify the target. The result is expressed as an Estimated Maximum Possible Concentration (EMPC)
X-IF	Not Detected due to interference	The signal at this retention time is attributable to a co-eluting interference, and cannot be used to positively identify the target. The result is expressed as an Estimated Maximum Possible Concentration (EMPC)

Deviations from the Primary Reference Methods:

The following changes and clarifications apply:

1) The calibration standards as listed in Table 2 are applied appropriately to all of the reference methods listed above. Such an application of one standard calibration series to all of these methods is within the scope of each and every one of the methods. The calibration standard set CS1 through CS5 is consistent with the standards concentration listing in method 1613B Table 4. The CS0 extends the calibration range below what is required by all of the methods. Table 4 defines the use of each of the labelled standards relative to each of the methods.

a. Method 1613B lists a larger suite of labelled extraction standards than does method 8290A. Additional labelled extraction standards have been added into the 8290A analysis to enhance the method and the data quality. These additions to the method constitute performance based enhancements and are within the scope of SW846 Method 8290A.

b. The levels presented in the calibration table of method 8290A are recommended values only. Changes to these concentrations, especially to expand the range, are within the scope of the method. Therefore application of the 1613B calibration standards to method 8290A is compliant with the scope of the method.

c. TO-9A is also a performance based method. It specifically states that different extraction standards and different concentrations of standards from those listed in TO-9A Table 3 is acceptable (see Section 6.8 of reference method).

d. Although OAQPS reference method 23 is not a performance based method, application of the 1613B standards has been defined as within the scope of the method. (see Appendix B)

2) Chlorinated Diphenyl Ether interferences: Both methods 1613B and 8290A indicate that any instrumental response showing the presence of a chlorinated diphenyl ether response and that coelutes with a PCDF represents an interference on that analyte (see Sections 18.3 and 7.8.4.4 respectively). This apparent zero tolerance does not take into account that the response in the diphenyl ether channel may be trivial relative to the corresponding PCDF. For this 'Standard Method', we have defined a chlorinated diphenyl ether interference as the presence of a **significant** response within the chlorinated diphenyl ether channel (rather than zero response) and defined significant as a response equal to or greater than 10% of the peak response in the PCDF channel.

3) When the primary analysis is performed using a DB5MS GC column, 2,3,7,8-TCDF can be resolved to a valley height of 60% from the closest-eluting isomers for this column, providing good quantification of this target without further confirmation. Confirmation of 2,3,7,8-TCDF concentrations above the level of the lowest calibration standard are performed on a second column on a contract basis when requested. Confirmation of additional 2,3,7,8-subtituted PCDD/F isomers is also available when requested.

4) Although not categorically stated in all associated PCDD/F methods, we maintain that each and every individual clean-up procedure is, by definition, performance-based and optional. There is not an expectation within the industry to follow exactly the descriptions of clean-ups in reference methods. Adaptations which meet or exceed the required performance criteria are therefore acceptable within the scope of each reference method. The reference method descriptions are intended as guidelines or templates available to help the laboratory to define effective in-house clean-up methods. The objective within the laboratory is to provide quality clean extracts to the instrument for analysis. Each individual clean-up is part of the laboratory's 'arsenal' in order to achieve this objective.

5) There are differences within the individual reference methods as to the precise spiking protocols for adding extraction standards and native spikes (for LCS, MS and MSD). To ensure consistency within the laboratory between PCDD/F and related methods, the PCDD/F preparative 'Specific Method' requires solids (including stack and ambient sorbants/filters) to be spiked in the soxhlet thimble from a nonane solution and waters are spiked before filtering from an acetone solution. This is consistent with the 8290A approach.

6) Sub-sampling of solids and pre-extraction processing is done in a manner that minimizes potential for cross-contamination. These processes are designed around SW846 protocols rather than 1613B protocols. Solids are sub-sampled directly from the bottle as submitted to the laboratory wherever practical. If the sample is submitted such that homogenization in the bottle is impractical (eg. the bottle is too full or lumps cannot be broken down), then transferring the sample to a tray or another bottle maybe in order.

7) The concentrations of labelled and native spiking solutions are not consistent with those listed in all of the reference methods. These concentrations are prepared at levels convenient and expedient for accurate laboratory processing.

8) With respect to extraction standard recovery limits on non-stack samples analyzed via method 8290A, the limits are based upon the inter-laboratory performance limits defined in method 1613B rather than the relatively arbitrary limits of 35-140% suggested in Section 8.4 of method 8290A.

9) With respect to ions monitored for P5CDD and H7CDF:

a. The 358 ion has a potential for interference from PCB (hexachlorobiphenyls) dependent upon levels of PCBs in the sample and the instrument tuning. Of particular concern is PCB-169 which on a DB5MS column elutes very close to 1,2,3,7,8-P5CDD and which is not removed for the PCDD/F extracts even by carbon clean-up. To eliminate the potential of such interferences from PCB on the 358 mass, we choose to monitor the alternate ion pair of 354 and 356.

b. Similarly, the 408 ion of native H7CDF is prone to problematic interferences arising from 13C12-labeled heptachlorinated biphenyls. To eliminate the potential of such interferences from PCB on the 358 mass, we choose to monitor the alternate ion pair of 410 and 412.

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SVOC DATA PACKAGE

SECTION 4: CALIBRATION DATA

Including:

for Multi-Point Calibration(s)

- Multi-Point Calibration Tables
- Individual Quantitation Reports

for Continuing Calibration(s)

- Individual Quantitation Reports

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Calibration Summary Report

Calibration Level	Filename	Run Date
CS-1	7-210419A01	19-Apr-2021 10:54
CS-2	7-210419A03	19-Apr-2021 12:19
CS-3	7-210419A02	19-Apr-2021 11:39
CS-4	7-210419A07	19-Apr-2021 15:08
CS-5	7-210419A06	19-Apr-2021 14:26

Approved: *N Ashtari*
--e-signature--
22-Apr-2021

Relative Response Factors

Target Analytes	CS-1	CS-2	CS-3	CS-4	CS-5	Mean	% RSD
2,3,7,8-TCDD	0.742	0.931	0.961	0.975	1.023	0.926	12%
1,2,3,7,8-PeCDD	0.838	0.981	0.966	0.999	0.985	0.954	7%
1,2,3,4,7,8-HxCDD	0.753	0.759	0.688	0.734	0.753	0.737	4%
1,2,3,6,7,8-HxCDD	0.952	0.954	0.953	0.987	0.975	0.964	2%
1,2,3,7,8,9-HxCDD	0.873	0.907	0.836	0.877	0.881	0.875	3%
1,2,3,4,6,7,8-HpCDD	0.897	0.927	0.986	0.949	0.912	0.934	4%
OCDD	1.321	1.147	1.032	1.109	1.021	1.126	11%
2,3,7,8-TCDF	0.825	0.931	0.957	0.970	0.964	0.929	6%
1,2,3,7,8-PeCDF	0.788	0.965	0.937	0.999	0.978	0.933	9%
2,3,4,7,8-PeCDF	0.866	1.080	1.069	1.141	1.101	1.051	10%
1,2,3,4,7,8-HxCDF	0.879	0.991	0.974	0.984	0.972	0.960	5%
1,2,3,6,7,8-HxCDF	0.991	1.156	1.170	1.192	1.172	1.136	7%
2,3,4,6,7,8-HxCDF	0.905	1.017	1.068	1.111	1.117	1.044	8%
1,2,3,7,8,9-HxCDF	0.786	0.826	0.853	0.912	0.918	0.859	7%
1,2,3,4,6,7,8-HpCDF	0.841	1.010	1.007	1.038	1.044	0.988	8%
1,2,3,4,7,8,9-HpCDF	0.685	0.775	0.783	0.830	0.808	0.776	7%
OCDF	1.056	1.275	1.269	1.502	1.553	1.331	15%
Field Spike Standards							
37Cl4-2,3,7,8-TCDD	0.918	0.973	0.929	0.951	1.017	0.958	4%
13C12-1,2,3,4,7,8-HxCDD	0.895	0.722	0.663	0.678	0.711	0.734	13%
13C12-2,3,4,7,8-PeCDF	1.018	1.015	1.019	1.056	1.026	1.027	2%
13C12-1,2,3,4,7,8-HxCDF	0.860	0.819	0.816	0.784	0.770	0.810	4%
13C12-1,2,3,4,7,8,9-HpCDF	0.754	0.751	0.763	0.770	0.781	0.764	2%
Extraction Standards							
13C12-2,3,7,8-TCDD	1.163	1.151	1.220	1.197	1.247	1.196	3%
13C12-1,2,3,7,8-PeCDD	0.735	0.787	0.861	0.911	1.038	0.866	14%
13C12-1,2,3,6,7,8-HxCDD	0.951	0.998	1.119	1.073	1.085	1.045	7%
13C12-1,2,3,4,6,7,8-HpCDD	0.647	0.762	0.719	0.741	0.751	0.724	6%
13C12-OCDD	0.456	0.452	0.513	0.498	0.508	0.485	6%
13C12-2,3,7,8-TCDF	1.284	1.465	1.503	1.438	1.537	1.445	7%
13C12-1,2,3,7,8-PeCDF	0.964	1.173	1.258	1.260	1.466	1.224	15%
13C12-1,2,3,6,7,8-HxCDF	1.071	1.185	1.190	1.145	1.178	1.154	4%
13C12-1,2,3,4,6,7,8-HpCDF	0.745	0.904	0.857	0.853	0.860	0.844	7%
Cleanup Standard							
13C12-1,2,3,7,8,9-HxCDF	0.823	0.860	0.905	0.885	0.918	0.878	4%

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Calibration Report

ALS Sample ID **H7-21-CS1-0199**
Analysis Method EPA M23
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-210419A01	HRMS-7	DB5MSUSO710442H	19-Apr-2021 10:54		--e-signature-- 22-Apr-2021

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	28.43	0.87	0.50	6.33E+03	0.742
1,2,3,7,8-PeCDD	32.27	1.60	2.50	2.26E+04	0.838
1,2,3,4,7,8-HxCDD	34.26	1.30	2.50	2.30E+04	0.753
1,2,3,6,7,8-HxCDD	34.32	1.25	2.50	2.90E+04	0.952
1,2,3,7,8,9-HxCDD	34.44	1.29	2.50	2.66E+04	0.873
1,2,3,4,6,7,8-HpCDD	35.91	1.04	2.50	1.86E+04	0.897
OCDD	37.4	0.84	5.00	3.87E+04	1.321
2,3,7,8-TCDF	27.52	0.68	0.50	7.77E+03	0.825
1,2,3,7,8-PeCDF	31.37	1.43	2.50	2.79E+04	0.788
2,3,4,7,8-PeCDF	32.07	1.41	2.50	3.06E+04	0.866
1,2,3,4,7,8-HxCDF	33.79	1.16	2.50	3.02E+04	0.879
1,2,3,6,7,8-HxCDF	33.85	1.24	2.50	3.41E+04	0.991
2,3,4,6,7,8-HxCDF	34.18	1.18	2.50	3.11E+04	0.905
1,2,3,7,8,9-HxCDF	34.59	1.20	2.50	2.70E+04	0.786
1,2,3,4,6,7,8-HpCDF	35.35	1.85	2.50	2.01E+04	0.841
1,2,3,4,7,8,9-HpCDF	36.16	1.93	2.50	1.64E+04	0.685
OCDF	37.5	0.96	5.00	3.09E+04	1.056
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	28.43	0.00	0.50	7.84E+03	0.918
13C12-1,2,3,4,7,8-HxCDD	34.25	1.23	100.00	1.09E+06	0.895
13C12-2,3,4,7,8-PeCDF	32.06	1.57	100.00	1.44E+06	1.018
13C12-1,2,3,4,7,8-HxCDF	33.77	0.51	100.00	1.18E+06	0.860
13C12-1,2,3,4,7,8,9-HpCDF	36.16	0.45	100.00	7.21E+05	0.754
Extraction Standards					
13C12-2,3,7,8-TCDD	28.41	0.778	100	1.71E+06	1.163
13C12-1,2,3,7,8-PeCDD	32.26	1.65	100	1.08E+06	0.735
13C12-1,2,3,6,7,8-HxCDD	34.31	1.224	100	1.22E+06	0.951
13C12-1,2,3,4,6,7,8-HpCDD	35.9	1.057	100	8.31E+05	0.647
13C12-OCDD	37.4	0.888	200	1.17E+06	0.456
13C12-2,3,7,8-TCDF	27.5	0.772	100	1.88E+06	1.284
13C12-1,2,3,7,8-PeCDF	31.35	1.524	100	1.42E+06	0.964
13C12-1,2,3,6,7,8-HxCDF	33.85	0.519	100	1.38E+06	1.071
13C12-1,2,3,4,6,7,8-HpCDF	35.35	0.445	100	9.57E+05	0.745
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.58	0.504	100	1.06E+06	0.823
Injection Standards					
13C12-1234-TCDD IS	27.73	0.766	100	1467921.5	-
13C12-123789-HxCDD IS	34.43	1.21	100.00	1.28E+06	-

ALS Life Sciences

Calibration Report

ALS Sample ID **H7-21-CS2-0199**
Analysis Method EPA M23
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-210419A03	HRMS-7	DB5MSUSO710442H	19-Apr-2021 12:19		--e-signature--
					22-Apr-2021

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	28.4	0.74	2.00	3.72E+04	0.931
1,2,3,7,8-PeCDD	32.25	1.69	10.00	1.34E+05	0.981
1,2,3,4,7,8-HxCDD	34.24	1.29	10.00	1.28E+05	0.759
1,2,3,6,7,8-HxCDD	34.29	1.27	10.00	1.61E+05	0.954
1,2,3,7,8,9-HxCDD	34.42	1.19	10.00	1.53E+05	0.907
1,2,3,4,6,7,8-HpCDD	35.9	1.07	10.00	1.19E+05	0.927
OCDD	37.39	0.87	20.00	1.75E+05	1.147
2,3,7,8-TCDF	27.48	0.84	2.00	4.73E+04	0.931
1,2,3,7,8-PeCDF	31.34	1.59	10.00	1.96E+05	0.965
2,3,4,7,8-PeCDF	32.04	1.53	10.00	2.20E+05	1.080
1,2,3,4,7,8-HxCDF	33.77	1.23	10.00	1.99E+05	0.991
1,2,3,6,7,8-HxCDF	33.84	1.28	10.00	2.32E+05	1.156
2,3,4,6,7,8-HxCDF	34.16	1.23	10.00	2.04E+05	1.017
1,2,3,7,8,9-HxCDF	34.57	1.30	10.00	1.66E+05	0.826
1,2,3,4,6,7,8-HpCDF	35.34	1.93	10.00	1.54E+05	1.010
1,2,3,4,7,8,9-HpCDF	36.15	1.87	10.00	1.19E+05	0.775
OCDF	37.48	0.91	20.00	1.95E+05	1.275
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	28.4	0.00	2.00	3.88E+04	0.973
13C12-1,2,3,4,7,8-HxCDD	34.24	1.23	100.00	1.22E+06	0.722
13C12-2,3,4,7,8-PeCDF	32.03	1.53	100.00	2.06E+06	1.015
13C12-1,2,3,4,7,8-HxCDF	33.76	0.52	100.00	1.64E+06	0.819
13C12-1,2,3,4,7,8,9-HpCDF	36.14	0.45	100.00	1.15E+06	0.751
Extraction Standards					
13C12-2,3,7,8-TCDD	28.37	0.761	100	2.00E+06	1.151
13C12-1,2,3,7,8-PeCDD	32.24	1.59	100	1.36E+06	0.787
13C12-1,2,3,6,7,8-HxCDD	34.29	1.268	100	1.69E+06	0.998
13C12-1,2,3,4,6,7,8-HpCDD	35.89	1.092	100	1.29E+06	0.762
13C12-OCDD	37.38	0.851	200	1.53E+06	0.452
13C12-2,3,7,8-TCDF	27.45	0.783	100	2.54E+06	1.465
13C12-1,2,3,7,8-PeCDF	31.33	1.568	100	2.03E+06	1.173
13C12-1,2,3,6,7,8-HxCDF	33.83	0.516	100	2.00E+06	1.185
13C12-1,2,3,4,6,7,8-HpCDF	35.33	0.452	100	1.53E+06	0.904
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.56	0.536	100	1.45E+06	0.86
Injection Standards					
13C12-1234-TCDD IS	27.68	0.774	100	1734422	-
13C12-123789-HxCDD IS	34.41	1.26	100.00	1.69E+06	-

ALS Life Sciences

Calibration Report

ALS Sample ID **H7-21-CCV-0199**
Analysis Method EPA M23
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-210419A02	HRMS-7	DB5MSUSO710442H	19-Apr-2021 11:39		--e-signature-- 22-Apr-2021

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	28.41	0.80	10.00	1.84E+05	0.961
1,2,3,7,8-PeCDD	32.26	1.62	50.00	6.52E+05	0.966
1,2,3,4,7,8-HxCDD	34.26	1.21	50.00	6.66E+05	0.688
1,2,3,6,7,8-HxCDD	34.32	1.27	50.00	9.23E+05	0.953
1,2,3,7,8,9-HxCDD	34.43	1.25	50.00	8.09E+05	0.836
1,2,3,4,6,7,8-HpCDD	35.91	1.10	50.00	6.13E+05	0.986
OCDD	37.4	0.92	100.00	9.16E+05	1.032
2,3,7,8-TCDF	27.5	0.84	10.00	2.26E+05	0.957
1,2,3,7,8-PeCDF	31.37	1.58	50.00	9.26E+05	0.937
2,3,4,7,8-PeCDF	32.07	1.60	50.00	1.06E+06	1.069
1,2,3,4,7,8-HxCDF	33.79	1.25	50.00	1.00E+06	0.974
1,2,3,6,7,8-HxCDF	33.85	1.30	50.00	1.21E+06	1.170
2,3,4,6,7,8-HxCDF	34.17	1.25	50.00	1.10E+06	1.068
1,2,3,7,8,9-HxCDF	34.59	1.20	50.00	8.79E+05	0.853
1,2,3,4,6,7,8-HpCDF	35.35	1.93	50.00	7.47E+05	1.007
1,2,3,4,7,8,9-HpCDF	36.16	1.83	50.00	5.81E+05	0.783
OCDF	37.5	0.95	100.00	1.13E+06	1.269
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	28.41	0.00	10.00	1.78E+05	0.929
13C12-1,2,3,4,7,8-HxCDD	34.25	1.25	100.00	1.28E+06	0.663
13C12-2,3,4,7,8-PeCDF	32.06	1.56	100.00	2.01E+06	1.019
13C12-1,2,3,4,7,8-HxCDF	33.77	0.52	100.00	1.68E+06	0.816
13C12-1,2,3,4,7,8,9-HpCDF	36.15	0.47	100.00	1.13E+06	0.763
Extraction Standards					
13C12-2,3,7,8-TCDD	28.4	0.767	100	1.91E+06	1.22
13C12-1,2,3,7,8-PeCDD	32.25	1.591	100	1.35E+06	0.861
13C12-1,2,3,6,7,8-HxCDD	34.31	1.263	100	1.94E+06	1.119
13C12-1,2,3,4,6,7,8-HpCDD	35.9	1.056	100	1.24E+06	0.719
13C12-OCDD	37.4	0.904	200	1.78E+06	0.513
13C12-2,3,7,8-TCDF	27.48	0.777	100	2.36E+06	1.503
13C12-1,2,3,7,8-PeCDF	31.35	1.554	100	1.98E+06	1.258
13C12-1,2,3,6,7,8-HxCDF	33.84	0.525	100	2.06E+06	1.19
13C12-1,2,3,4,6,7,8-HpCDF	35.34	0.448	100	1.48E+06	0.857
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.58	0.524	100	1.57E+06	0.905
Injection Standards					
13C12-1234-TCDD IS	27.71	0.768	100	1569674.6	-
13C12-123789-HxCDD IS	34.43	1.24	100.00	1.73E+06	-

ALS Life Sciences

Calibration Report

ALS Sample ID **H7-21-CS4-0199**
Analysis Method EPA M23
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-210419A07	HRMS-7	DB5MSUSO710442H	19-Apr-2021 15:08		--e-signature-- 22-Apr-2021

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	28.4	0.78	40.00	6.39E+05	0.975
1,2,3,7,8-PeCDD	32.25	1.63	200.00	2.49E+06	0.999
1,2,3,4,7,8-HxCDD	34.25	1.23	200.00	2.62E+06	0.734
1,2,3,6,7,8-HxCDD	34.29	1.24	200.00	3.53E+06	0.987
1,2,3,7,8,9-HxCDD	34.42	1.23	200.00	3.13E+06	0.877
1,2,3,4,6,7,8-HpCDD	35.9	1.03	200.00	2.35E+06	0.949
OCDD	37.39	0.89	400.00	3.69E+06	1.109
2,3,7,8-TCDF	27.48	0.76	40.00	7.64E+05	0.970
1,2,3,7,8-PeCDF	31.35	1.59	200.00	3.45E+06	0.999
2,3,4,7,8-PeCDF	32.04	1.57	200.00	3.94E+06	1.141
1,2,3,4,7,8-HxCDF	33.77	1.26	200.00	3.75E+06	0.984
1,2,3,6,7,8-HxCDF	33.84	1.26	200.00	4.55E+06	1.192
2,3,4,6,7,8-HxCDF	34.16	1.24	200.00	4.24E+06	1.111
1,2,3,7,8,9-HxCDF	34.57	1.27	200.00	3.48E+06	0.912
1,2,3,4,6,7,8-HpCDF	35.34	1.91	200.00	2.95E+06	1.038
1,2,3,4,7,8,9-HpCDF	36.15	1.86	200.00	2.36E+06	0.830
OCDF	37.49	0.92	400.00	4.99E+06	1.502
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	28.4	0.00	40.00	6.24E+05	0.951
13C12-1,2,3,4,7,8-HxCDD	34.24	1.24	100.00	1.21E+06	0.678
13C12-2,3,4,7,8-PeCDF	32.03	1.58	100.00	1.82E+06	1.056
13C12-1,2,3,4,7,8-HxCDF	33.76	0.52	100.00	1.50E+06	0.784
13C12-1,2,3,4,7,8,9-HpCDF	36.14	0.48	100.00	1.10E+06	0.770
Extraction Standards					
13C12-2,3,7,8-TCDD	28.37	0.77	100	1.64E+06	1.197
13C12-1,2,3,7,8-PeCDD	32.24	1.588	100	1.25E+06	0.911
13C12-1,2,3,6,7,8-HxCDD	34.29	1.259	100	1.79E+06	1.073
13C12-1,2,3,4,6,7,8-HpCDD	35.89	1.119	100	1.24E+06	0.741
13C12-OCDD	37.39	0.814	200	1.66E+06	0.498
13C12-2,3,7,8-TCDF	27.45	0.795	100	1.97E+06	1.438
13C12-1,2,3,7,8-PeCDF	31.34	1.548	100	1.73E+06	1.26
13C12-1,2,3,6,7,8-HxCDF	33.83	0.525	100	1.91E+06	1.145
13C12-1,2,3,4,6,7,8-HpCDF	35.33	0.461	100	1.42E+06	0.853
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.57	0.528	100	1.47E+06	0.885
Injection Standards					
13C12-1234-TCDD IS	27.68	0.773	100	1369208.5	-
13C12-123789-HxCDD IS	34.42	1.26	100.00	1.67E+06	-

ALS Life Sciences

Calibration Report

ALS Sample ID **H7-21-CS5-0199**
Analysis Method EPA M23
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-210419A06	HRMS-7	DB5MSUSO710442H	19-Apr-2021 14:26		--e-signature--
					22-Apr-2021

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	28.41	0.80	200.00	1.55E+06	1.023
1,2,3,7,8-PeCDD	32.26	1.62	1000.00	6.21E+06	0.985
1,2,3,4,7,8-HxCDD	34.26	1.22	1000.00	6.87E+06	0.753
1,2,3,6,7,8-HxCDD	34.31	1.24	1000.00	8.91E+06	0.975
1,2,3,7,8,9-HxCDD	34.43	1.24	1000.00	8.04E+06	0.881
1,2,3,4,6,7,8-HpCDD	35.91	1.06	1000.00	5.77E+06	0.912
OCDD	37.41	0.89	2000.00	8.72E+06	1.021
2,3,7,8-TCDF	27.5	0.79	200.00	1.80E+06	0.964
1,2,3,7,8-PeCDF	31.35	1.57	1000.00	8.71E+06	0.978
2,3,4,7,8-PeCDF	32.06	1.56	1000.00	9.81E+06	1.101
1,2,3,4,7,8-HxCDF	33.79	1.26	1000.00	9.64E+06	0.972
1,2,3,6,7,8-HxCDF	33.85	1.27	1000.00	1.16E+07	1.172
2,3,4,6,7,8-HxCDF	34.17	1.25	1000.00	1.11E+07	1.117
1,2,3,7,8,9-HxCDF	34.58	1.27	1000.00	9.10E+06	0.918
1,2,3,4,6,7,8-HpCDF	35.35	1.87	1000.00	7.55E+06	1.044
1,2,3,4,7,8,9-HpCDF	36.16	1.92	1000.00	5.85E+06	0.808
OCDF	37.51	0.91	2000.00	1.33E+07	1.553
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	28.4	0.00	200.00	1.54E+06	1.017
13C12-1,2,3,4,7,8-HxCDD	34.25	1.26	100.00	6.49E+05	0.711
13C12-2,3,4,7,8-PeCDF	32.06	1.57	100.00	9.14E+05	1.026
13C12-1,2,3,4,7,8-HxCDF	33.77	0.52	100.00	7.64E+05	0.770
13C12-1,2,3,4,7,8,9-HpCDF	36.16	0.45	100.00	5.65E+05	0.781
Extraction Standards					
13C12-2,3,7,8-TCDD	28.38	0.775	100	7.58E+05	1.247
13C12-1,2,3,7,8-PeCDD	32.25	1.587	100	6.31E+05	1.038
13C12-1,2,3,6,7,8-HxCDD	34.31	1.259	100	9.13E+05	1.085
13C12-1,2,3,4,6,7,8-HpCDD	35.9	1.126	100	6.33E+05	0.751
13C12-OCDD	37.4	0.896	200	8.54E+05	0.508
13C12-2,3,7,8-TCDF	27.47	0.803	100	9.34E+05	1.537
13C12-1,2,3,7,8-PeCDF	31.35	1.554	100	8.91E+05	1.466
13C12-1,2,3,6,7,8-HxCDF	33.84	0.528	100	9.91E+05	1.178
13C12-1,2,3,4,6,7,8-HpCDF	35.34	0.428	100	7.24E+05	0.86
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.58	0.526	100	7.73E+05	0.918
Injection Standards					
13C12-1234-TCDD IS	27.68	0.775	100	607559.6	-
13C12-123789-HxCDD IS	34.43	1.25	100.00	8.42E+05	-

ALS Life Sciences

Second Source Calibration Verification Report

Sample Name	**CVS**	Sampling Date	n/a		
ALS Sample ID	H7-21-RS1-0199	Extraction Date	n/a		Approved:
Analysis Method	EPA M23	Sample Size	1	n/a	*N Ashtari*
Analysis Type	CCV	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		22-Apr-2021

Run Information	**Run 1**
Filename	7-210419A08
Run Date	19-Apr-21 15:50
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-7 DB5MSUSO710442H

Target Analytes	**pg/uL**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	10	28.41	102	75-125	
1,2,3,7,8-PeCDD	50	32.26	109	75-125	
1,2,3,4,7,8-HxCDD	50	34.25	104	75-125	
1,2,3,6,7,8-HxCDD	50	34.31	97	75-125	
1,2,3,7,8,9-HxCDD	50	34.43	102	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.91	101	75-125	
OCDD	100	37.40	90	75-125	
2,3,7,8-TCDF	10	27.50	101	75-125	
1,2,3,7,8-PeCDF	50	31.35	108	75-125	
2,3,4,7,8-PeCDF	50	32.06	99	75-125	
1,2,3,4,7,8-HxCDF	50	33.77	106	75-125	
1,2,3,6,7,8-HxCDF	50	33.85	102	75-125	
2,3,4,6,7,8-HxCDF	50	34.17	101	75-125	
1,2,3,7,8,9-HxCDF	50	34.58	108	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.35	100	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.16	106	75-125	
OCDF	100	37.50	102	70-130	
Field Spike Standards	**pg/uL**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	10	28.41	118	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.25	98	75-125	
13C12-2,3,4,7,8-PeCDF	100	32.04	99	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.76	103	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.15	102	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	28.38	97	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.25	94	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.31	101	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.90	99	70-130	
13C12-OCDD	200	37.39	97	70-130	
13C12-2,3,7,8-TCDF	100	27.47	101	70-130	
13C12-1,2,3,7,8-PeCDF	100	31.34	96	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.84	104	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.34	100	70-130	
Cleanup Standard	**pg/uL**				
13C12-1,2,3,7,8,9-HxCDF	100	34.57	102	40-130	

ALS Life Sciences

Continuing Calibration Report

Sample Name	**CCV**	Sampling Date	n/a		
ALS Sample ID	H7-21-CCV-0203	Extraction Date	n/a		Approved:
Analysis Method	EPA M23	Sample Size	1	n/a	*N Ashtari*
Analysis Type	CCV	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		22-Apr-2021

Run Information	**Run 1**
Filename	7-210421A01
Run Date	21-Apr-21 12:36
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-7 DB5MSUSO710442H

Target Analytes	**pg/uL**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	10	28.30	93	75-125	
1,2,3,7,8-PeCDD	50	32.22	94	75-125	
1,2,3,4,7,8-HxCDD	50	34.22	108	75-125	
1,2,3,6,7,8-HxCDD	50	34.27	97	75-125	
1,2,3,7,8,9-HxCDD	50	34.40	98	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.88	105	75-125	
OCDD	100	37.36	90	75-125	
2,3,7,8-TCDF	10	27.38	95	75-125	
1,2,3,7,8-PeCDF	50	31.30	99	75-125	
2,3,4,7,8-PeCDF	50	32.01	96	75-125	
1,2,3,4,7,8-HxCDF	50	33.74	101	75-125	
1,2,3,6,7,8-HxCDF	50	33.82	99	75-125	
2,3,4,6,7,8-HxCDF	50	34.14	93	75-125	
1,2,3,7,8,9-HxCDF	50	34.55	94	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.32	101	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.13	100	75-125	
OCDF	100	37.46	110	70-130	
Field Spike Standards	**pg/uL**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	10	28.30	91	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.22	109	75-125	
13C12-2,3,4,7,8-PeCDF	100	32.00	100	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.73	102	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.12	98	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	28.28	102	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.21	82	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.27	103	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.86	80	70-130	
13C12-OCDD	200	37.35	70	70-130	
13C12-2,3,7,8-TCDF	100	27.36	95	70-130	
13C12-1,2,3,7,8-PeCDF	100	31.29	82	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.81	120	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.31	93	70-130	
Cleanup Standard	**pg/uL**				
13C12-1,2,3,7,8,9-HxCDF	100	34.54	109	40-130	

ALS Life Sciences

Continuing Calibration Report

Sample Name	**CCV**	Sampling Date	n/a		
ALS Sample ID	H7-21-CCV-0204	Extraction Date	n/a		Approved:
Analysis Method	EPA M23	Sample Size	1	n/a	*N Ashtari*
Analysis Type	CCV	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		22-Apr-2021

Run Information	**Run 1**
Filename	7-210421A13
Run Date	21-Apr-21 21:09
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-7 DB5MSUSO710442H

Target Analytes	**pg/uL**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	10	28.28	97	75-125	
1,2,3,7,8-PeCDD	50	32.21	97	75-125	
1,2,3,4,7,8-HxCDD	50	34.22	115	75-125	
1,2,3,6,7,8-HxCDD	50	34.26	98	75-125	
1,2,3,7,8,9-HxCDD	50	34.39	104	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.86	104	75-125	
OCDD	100	37.35	90	75-125	
2,3,7,8-TCDF	10	27.36	108	75-125	
1,2,3,7,8-PeCDF	50	31.29	101	75-125	
2,3,4,7,8-PeCDF	50	32.00	97	75-125	
1,2,3,4,7,8-HxCDF	50	33.73	121	75-125	
1,2,3,6,7,8-HxCDF	50	33.81	104	75-125	
2,3,4,6,7,8-HxCDF	50	34.12	107	75-125	
1,2,3,7,8,9-HxCDF	50	34.54	113	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.31	101	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.12	105	75-125	
OCDF	100	37.45	96	70-130	
Field Spike Standards	**pg/uL**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	10	28.28	98	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.21	113	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.99	98	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.72	119	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.12	104	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	28.25	96	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.20	91	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.26	97	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.86	98	70-130	
13C12-OCDD	200	37.35	108	70-130	
13C12-2,3,7,8-TCDF	100	27.33	92	70-130	
13C12-1,2,3,7,8-PeCDF	100	31.28	93	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.80	100	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.31	103	70-130	
Cleanup Standard	**pg/uL**				
13C12-1,2,3,7,8,9-HxCDF	100	34.54	106	40-130	

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SVOC DATA PACKAGE

SECTION 5: QC SAMPLE DATA

Including:

- Laboratory Method Blank Analysis Reports
- Laboratory Control Sample Analysis Reports
- Matrix Spike Analysis Reports
- Other QC Sample Analysis Reports (where applicable)

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a		
ALS Sample ID	WG3507253-1	Extraction Date	29-Mar-21		Approved:
Analysis Method	EPA M23	Sample Size	1	Sample	*N Ashtari*
Analysis Type	Blank	Percent Moisture	n/a		--e-signature--
Sample Matrix	MEDIA	Split Ratio	2		22-Apr-2021

Run Information	**Run 1**
Filename	7-210421A06
Run Date	21-Apr-21 16:12
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSO710442H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.5	1.5	U		10
1,2,3,7,8-PeCDD	1	NotFnd	<0.74	0.74	U		50
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.82	0.82	U		50
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.63	0.63	U		50
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.69	0.69	U		50
1,2,3,4,6,7,8-HpCDD	0.01	35.86	3.44	1.1	M,J		50
OCDD	0.0003	37.36	65.5	1.4	J		100
2,3,7,8-TCDF	0.1	NotFnd	<1.1	1.1	U		10
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.48	0.48	U		50
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.43	0.43	U		50
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.73	0.73	U		50
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.62	0.62	U		50
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.67	0.67	U		50
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.82	0.82	U		50
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<0.74	0.74	U		50
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.94	0.94	U		50
OCDF	0.0003	37.46	<4.0	1.0	J,R	4.0	100
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	0		NS				
13C12-1,2,3,4,7,8-HxCDD	0		NS				
13C12-2,3,4,7,8-PeCDF	0		NS				
13C12-1,2,3,4,7,8-HxCDF	0		NS				
13C12-1,2,3,4,7,8,9-HpCDF	0		NS				
Extraction Standards							
13C12-2,3,7,8-TCDD	4000	28.24	85	40-130			
13C12-1,2,3,7,8-PeCDD	4000	32.19	93	40-130			
13C12-1,2,3,6,7,8-HxCDD	4000	34.26	78	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.86	81	25-130			
13C12-OCDD	8000	37.35	77	25-130			
13C12-2,3,7,8-TCDF	4000	27.31	86	40-130			
13C12-1,2,3,7,8-PeCDF	4000	31.27	87	40-130			
13C12-1,2,3,6,7,8-HxCDF	4000	33.80	85	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.31	87	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	4000	34.53	76	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		**LQL**
Total-TCDD	0	<1.5	1.5	U	10
Total-PeCDD	0	<0.74	0.74	U	50
Total-HxCDD	0	<0.82	0.82	U	50
Total-HpCDD	1	3.44	1.1		50
Total-TCDF	0	<1.1	1.1	U	10
Total-PeCDF	0	<0.48	0.48	U	50
Total-HxCDF	0	<0.82	0.82	U	50
Total-HpCDF	0	<0.94	0.94	U	50

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.0541
Mid Point PCDD/F TEQ (WHO 2005)	1.56
Upper Bound PCDD/F TEQ (WHO 2005)	3.06

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure
NS	Indicates that this standard has not been added.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a		
ALS Sample ID	WG3507253-4	Extraction Date	29-Mar-21		Approved:
Analysis Method	EPA M23	Sample Size	1	Sample	*N Ashtari*
Analysis Type	Blank	Percent Moisture	n/a		--e-signature--
Sample Matrix	REAGENT	Split Ratio	2		22-Apr-2021

Run Information	**Run 1**
Filename	7-210421A07
Run Date	21-Apr-21 16:55
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSO710442H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.9	1.9	U		10
1,2,3,7,8-PeCDD	1	NotFnd	<1.3	1.3	U		50
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.81	0.81	U		50
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.62	0.62	U		50
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.68	0.68	U		50
1,2,3,4,6,7,8-HpCDD	0.01	35.88	3.23	0.96	M,J,B		50
OCDD	0.0003	37.35	52.7	1.6	J,B		100
2,3,7,8-TCDF	0.1	NotFnd	<1.2	1.2	U		10
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.71	0.71	U		50
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.63	0.63	U		50
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.62	0.62	U		50
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.53	0.53	U		50
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.57	0.57	U		50
1,2,3,7,8,9-HxCDF	0.1	34.54	<0.97	0.70	M,J,R	0.97	50
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<0.75	0.75	U		50
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.96	0.96	U		50
OCDF	0.0003	37.45	<2.3	1.2	M,J,R	2.3	100
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	0		NS				
13C12-1,2,3,4,7,8-HxCDD	0		NS				
13C12-2,3,4,7,8-PeCDF	0		NS				
13C12-1,2,3,4,7,8-HxCDF	0		NS				
13C12-1,2,3,4,7,8,9-HpCDF	0		NS				
Extraction Standards							
13C12-2,3,7,8-TCDD	4000	28.22	64	40-130			
13C12-1,2,3,7,8-PeCDD	4000	32.19	73	40-130			
13C12-1,2,3,6,7,8-HxCDD	4000	34.26	64	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.86	76	25-130			
13C12-OCDD	8000	37.35	79	25-130			
13C12-2,3,7,8-TCDF	4000	27.31	64	40-130			
13C12-1,2,3,7,8-PeCDF	4000	31.27	67	40-130			
13C12-1,2,3,6,7,8-HxCDF	4000	33.80	69	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.31	77	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	4000	34.53	67	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<1.9	1.9	U	10
Total-PeCDD	0	<1.3	1.3	U	50
Total-HxCDD	0	<0.81	0.81	U	50
Total-HpCDD	1	3.23	0.96		50
Total-TCDF	0	<1.2	1.2	U	10
Total-PeCDF	0	<0.71	0.71	U	50
Total-HxCDF	0	<0.70	0.70	U	50
Total-HpCDF	0	<0.96	0.96	U	50

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.0481
Mid Point PCDD/F TEQ (WHO 2005)	2.11
Upper Bound PCDD/F TEQ (WHO 2005)	4.08

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure
NS	Indicates that this standard has not been added.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a		
ALS Sample ID	WG3507253-2	Extraction Date	29-Mar-21		Approved:
Analysis Method	EPA M23	Sample Size	1	Sample	*N Ashtari*
Analysis Type	LCS	Percent Moisture	n/a		--e-signature--
Sample Matrix	MEDIA	Split Ratio	2		22-Apr-2021

Run Information	**Run 1**
Filename	7-210421A02
Run Date	21-Apr-21 13:24
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-7 DB5MSUSO710442H

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	400	28.28	86	70-130	
1,2,3,7,8-PeCDD	2000	32.20	93	70-130	
1,2,3,4,7,8-HxCDD	2000	34.21	105	70-130	
1,2,3,6,7,8-HxCDD	2000	34.26	105	70-130	
1,2,3,7,8,9-HxCDD	2000	34.39	126	70-130	
1,2,3,4,6,7,8-HpCDD	2000	35.85	97	70-130	
OCDD	4000	37.34	87	70-130	
2,3,7,8-TCDF	400	27.36	89	70-130	
1,2,3,7,8-PeCDF	2000	31.29	99	70-130	
2,3,4,7,8-PeCDF	2000	31.99	96	70-130	
1,2,3,4,7,8-HxCDF	2000	33.73	106	70-130	
1,2,3,6,7,8-HxCDF	2000	33.80	102	70-130	
2,3,4,6,7,8-HxCDF	2000	34.12	109	70-130	
1,2,3,7,8,9-HxCDF	2000	34.54	113	70-130	
1,2,3,4,6,7,8-HpCDF	2000	35.30	97	70-130	
1,2,3,4,7,8,9-HpCDF	2000	36.11	89	70-130	
OCDF	4000	37.44	87	70-130	
Field Spike Standards	**pg**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	0		NS		
13C12-1,2,3,4,7,8-HxCDD	0		NS		
13C12-2,3,4,7,8-PeCDF	0		NS		
13C12-1,2,3,4,7,8-HxCDF	0		NS		
13C12-1,2,3,4,7,8,9-HpCDF	0		NS		
Extraction Standards					
13C12-2,3,7,8-TCDD	4000	28.27	58	40-130	
13C12-1,2,3,7,8-PeCDD	4000	32.19	68	40-130	
13C12-1,2,3,6,7,8-HxCDD	4000	34.25	65	40-130	
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.85	67	25-130	
13C12-OCDD	8000	37.34	64	25-130	
13C12-2,3,7,8-TCDF	4000	27.35	60	40-130	
13C12-1,2,3,7,8-PeCDF	4000	31.28	62	40-130	
13C12-1,2,3,6,7,8-HxCDF	4000	33.79	69	40-130	
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.30	75	25-130	
Cleanup Standard	**pg**				
13C12-1,2,3,7,8,9-HxCDF	4000	34.53	69	40-130	

NS Indicates that this standard has not been added.

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SVOC DATA PACKAGE

SECTION 6: INTERNAL RECORDS

Including:

- Prep Logs
- Independent calculation checks
- Others as listed below:

8

Extraction Workup Sheet

Batch ID:	WG3507253
WG3507253	

Analysis:	PUF - M23/1668A (HR)

Prep Procedure: BU-TM-1110 Overall HR Prep, BU-TP-1101 8270D Prep, BU-TP-2100 PAH Prep Method

Analyst:	Andreea Rembarek

Date:	29-Mar-21

SUBSAMPLING

Sample I.D.	Client I.D.	Media Prep L#
WG3507253-1	Method Blank	L2542414
WG3507253-2	Laboratory Control Sample	L2542414
WG3507253-3	Extraction and Injection STD.	—
WG3507253-4	Method Blank (Reagent Blank)	empty thimble
L2569163-1	SITE 1 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)	see notes
L2569163-2	SITE 2 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)	see notes
L2569163-3	SITE 3 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)	see notes
L2569163-4	SITE 4 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)	see notes
L2569163-5	SITE 5 - COMPOSITE 5 (WET SEASON - JAN, FEB, MAR)	see notes
	Composite of 3 PUFs per sample	

BATCH TRACKING

	Date/Time/Initials
Client Labels Checked:	29-Mar-21 AR
Media transfer to soxhlet:	AR
Soxhlet Start Time:	29-Mar-21 3:15 PM AR
Soxhlets Reflux Properly:	AR
Soxhlet End Time:	30-Mar-21 7:30 AM AR
Rotovap Reduction + verify temp:	16-Apr-21 MCB
Extract split:	16-Apr-21 MCB
Archive portion:	16-Apr-21 MCB
Acid Silica Column:	16-Apr-21 MCB
Solvent exchange:	19-Apr-21 AP
Alumina Column:	19-Apr-21 AP
Split:	19-Apr-21 AP
Carbon Column:	20-Apr-21 NB
Micro/Robo Vial:	PCB: 19-Apr-21 AP 20-Apr-21 NB
Update to LIMS:	PCB: 19-Apr-21 AP 20-Apr-21 NB

Batch ID:	WG3507253

DX Extraction Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3507253-1	40	✓
WG3507253-2	40	✓
WG3507253-3	40	✓
WG3507253-4	40	✓
L2569163-1	40	✓
L2569163-2	40	✓
L2569163-3	40	✓
L2569163-4	40	✓
L2569163-5	40	✓
	40	
	40	
	40	

Syringe ID: 402

Standard: M23-ES#2- 043C

Spike Date: 29-Mar-2021

Spike Witnessing

Chemist's Initials

Chemist: AR

Witness's Initials

Witness: mc

Witness's Initials

Correct Syringe Obtained: mc

Witness's Initials

Correct Standard Obtained: mc

Witness's Initials

Correct Technique Followed: mc

PCB Extraction Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3507253-1	40	✓
WG3507253-2	40	✓
WG3507253-3	40	✓
WG3507253-4	40	✓
L2569163-1	40	✓
L2569163-2	40	✓
L2569163-3	40	✓
L2569163-4	40	✓
L2569163-5	40	✓
	40	
	40	

Syringe ID: 382

Standard: 1668A-ES#2- 071I

Spike Date: 29-Mar-2021

Spike Witnessing

Chemist's Initials

Chemist: AR.

Witness's Initials

Witness: mc

Witness's Initials

Correct Syringe Obtained: mc

Witness's Initials

Correct Standard Obtained: mc

Witness's Initials

Correct Technique Followed: mc

Batch ID:	WG3507253

Batch ID:	WG3507253

DX Native Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3507253-2	40	✓
WG3507253-3	40	✓

Syringe ID: 322
Standard: 1613B-NS#3- 031B
Date & Initials: 29-Mar-21 AR

PCB Native Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3507253-2	40	✓
WG3507253-3	40	✓

Syringe ID: 394
Standard: 1668A-NS#1- 041E
Date & Initials: 29-Mar-21 AR

DX Cleanup Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3507253-1	20	✓
WG3507253-2	20	✓
WG3507253-3	N/A	N/A
WG3507253-4	20	✓
L2569163-1	20	✓
L2569163-2	20	✓
L2569163-3	20	✓
L2569163-4	20	✓
L2569163-5	20	✓
	20	
	20	

Syringe ID: 357
Standard: M23-CL#1- 038D
Date & Initials: 16-Apr-21 ACB

Chemist's Initials
Correct Syringe Obtained: ACB
Chemist's Initials
Correct Standard Obtained: ACB
Chemist's Initials
Correct Technique Followed: ACB

PCB Cleanup Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3507253-1	20	✓
WG3507253-2	20	✓
WG3507253-3	N/A	N/A
WG3507253-4	20	✓
L2569163-1	20	✓
L2569163-2	20	✓
L2569163-3	20	✓
L2569163-4	20	✓
L2569163-5	20	✓
	20	
	20	

Syringe ID: 378
Standard: 1668A-CL#2- 039G
Date & Initials: 16-Apr-21 ACB

Chemist's Initials
Correct Syringe Obtained: ACB
Chemist's Initials
Correct Standard Obtained: ACB
Chemist's Initials
Correct Technique Followed: ACB

Batch ID:	WG3507253

DX Injection Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3507253-1	10	✓
WG3507253-2	10	✓
WG3507253-3	10	✓
WG3507253-4	10	✓
L2569163-1	10	✓
L2569163-2	10	✓
L2569163-3	10	✓
L2569163-4	10	✓
L2569163-5	10	✓
	10	
	10	
	10	
	10	
	10	
	10	
	10	

Syringe ID: 392

Standard: 1613B-IS#1-088B

Date & Initials: 20-Apr-2021 NB

	Chemist's Initials
Correct Syringe Obtained:	NB
Correct Standard Obtained:	NB
Correct Technique Followed:	NB

PCB Injection Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3507253-1	5	✓
WG3507253-2	5	✓
WG3507253-3	5	✓
WG3507253-4	5	✓
L2569163-1	5	✓
L2569163-2	5	✓
L2569163-3	5	✓
L2569163-4	5	✓
L2569163-5	5	✓
	5	
	5	
	5	
	5	
	5	
	5	
	5	

Syringe ID: 365

Standard: 1668A-IS#2-015E

Date & Initials: 19-Apr-2021 AP

	Chemist's Initials
Correct Syringe Obtained:	AP
Correct Standard Obtained:	AP
Correct Technique Followed:	AP.

Batch ID:	WG3507253

Reagent Lot Numbers:

Reagent	Lot#	Manufacturer
Acetone	105971	
Hexane	105963	
DCM	106037	
Toluene	106110	
Nonane	ORG-WAKONON- 058	
1:1 DCM:HEX	ORG-DH2- 684	
Sodium Sulphate	ORG-SSU- 2573, 2568	
Acid Silica	ORG-ASI- 9838, 9840,	9839, 9841
Neutral Silica	ORG-NSI- 2541, 2546,	2540
Alumina	ORG-ALU- 503	
1% Deactivated Silica	ORG-2%DAS-	
Chromacarb	ORG-CC- 244	
Batch ID:	WG3507253	

corn oil ORG-CO-077

Procedure:

This batchsheet is a guideline only. Please see test procedure for complete set of instructions.
Extraction:
- For MB and LCS you **must** use blank media - if not available see your Team Lead
- Place a layer of pre-cleaned glasswool in to the bottom of the soxhlet body.
- Add ~1cm Sodium Sulphate.
- Place PUF in soxhlet
- Spike with Extraction Standard (plus Native for LCS and ENI).
- Soxhlet extract in DCM for 16 hours (check with team lead or supervisor) approved by Brad Reimer

Rotovap:
- Rotovap down to approx 2mL
- Transfer to a calibrated c-tube (marked at 1ml and 2ml) with 3x2ml hexane
- Mix well then quantitatively spilt the extract **1/2 DX/PCB** **1/2 Archive**

Batch ID: WG3507253

DX/PCB:
- Perform Acid Silica column
`- Solvent Exchange (reduce to **~50ul**, bulk back up to 1ml Hexane, vortex well.
`- Perform Alumina Column:
  - Pre-elute the Alumina Column with 7ml Hexane
  - Place F1 c-tube under the column, then load the sample with 3x1ml Hexane rinses
  - F1 (Archive) 1mL Hexane
  - F2 (DX/PCB) 14mL 1:1 DCM:Hexane

-Split Alumina F2 1/2 PCB 1/2 DX

Micro-Vial:

PCB:
- Blow down to ~1/2ml
- Vortex **very** well.
- Transfer every last drop to a micro-vial (Marked at 20uL with nonane).
- Blow down to the line
- Spike PCB Injection Standard, cap and vortex. **FV=25ul**

DX:
- Solvent Exchange to Hexane (Reduce to Just Dry then bulk back up to 1ml Hexane)
- ChromaCarb: - 4cm of well-packed chroma-carb.
  - Pre-elute Carbon with 5ml Hexane
  - Transfer with 3x1ml Hexane
  - F1 = **10ml** 1:1 DCM:Hexane (Archive)
  - After dripping has stopped Invert Column.
  - F2 = 14ml Toluene (DX and PCB)

- After the column has stopped dripping reduce the **F2** portion down to ~1/2ml.
- Vortex well, then transfer to a micro-vial without rinses.
- Blow the micro-vial down to just-dry.
- Spike with Injection Standard, Cap the micro-vial, and Vortex. **FV=10ul**

Batch ID:	WG3507253

Comments:

NOTE: Label and Save All Columns including Acid Silica Columns

Approval of Deviation from Standard Method

(Batch Writer): _____

☐ Procedure does deviate from Standard Method. **Approved (Supervisor/Manager):** _____

WG3507253			Prep Analyst:		
PUF - M23/1668A (HR)			Date:		
	Very Good	Meets Method Req	Some Outliers	Very Poor	Comments? Was spl/batch sent for rework? Why?
MB					
LCS					
DUP					
ES rec					

L2569163-1 → (L2569160-1 → L2542414-6
L2550675-1 → L2527465-6
L2561344-1 → L2548709-1)

L2569163-2 → (L2569160-2 → L2542414-2
L2561344-2 → L2548709-5
L2550675-2 → L2516041-5)

L2569163-3 (L2569160-3 → L2542414-3
L2561344-3 → L2548709-2
L2550675-3 → L2516041-4)

L2569163-4 (L2561344-4 → L2548709-4
L2569160-4 → L2542414-4
L2550675-4 → L2516041-2)

L2569163-5 (L2569160-5 → L2542414-5
L2561344-5 → L2548709-3
L2550675-5 → L2516041-3)

ALS Life Sciences

Sample Calculation Report

CS3 RRF Check

Approved: *N Ashtari* --e-signature-- 22-Apr-2021

$$RRF = \frac{\text{Response of 2,3,7,8-TCDD}}{\text{Response of 13C12-2,3,7,8-TCDD}} \times \frac{\text{Concentration of 13C12-2,3,7,8-TCDD}}{\text{Concentration of TCDD}}$$

						Calculated Value	Value from TargetLynx	
RRF	**=**	**184055.90** / **1914332.40**	**x**	**100** / **10**	**=**	**0.961**	**0.961**	

Calculation of OCDD amount in L2569163-1

$$pg = \frac{\text{Response of OCDD}}{\text{Response of 13C12-OCDD}} \times \frac{\text{pg of 13C12-OCDD spiked}}{\text{Mean RRF} * \text{Sample Size}}$$

pg	**=**	**26011.4** / **691630.5**	**x**	**8000** / **1.126**	*****	**1.00**	**=**	**267**	**267**	

Calculation of 13C12-2,3,7,8-TCDD Recovery in L2569163-1

$$\%\ Recovery = \frac{\text{Response of 13C12-2,3,7,8-TCDD}}{\text{Response of 13C12-1,2,3,4-TCDD}} \times \frac{\text{pg of 13C12-1,2,3,4-TCDD spiked} * 100}{\text{Mean RRF} * \text{Amount Spiked}}$$

% Recovery	**=**	**1348751.4** / **1513746.5**	**x**	**4000** / **1.196**	*****	**100** / **4000**	**=**	**75**	**75**	**%**

1435 Norjohn Court, Unit 1, Burlington, ON, Canada L7L 0E6

SVOC DATA PACKAGE

SECTION 7: SHIPPING/RECEIVING DOCUMENTS

Including:

- Airbills
- Chain-of-Custody Records
- Sample Log-in Sheet(s) - where applicable
- Others as listed below:

☆ REVISED ☆

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2550675-COFC

Number: 17 - 792311

Page | of |

Report To	Contact and company name below will appear on the final report
Company:	Forallen Consulting
Contact:	Amber Bailey
Phone:	250-735-6178
	Company address below will appear on the final report
Street:	97 5th Ave. NW
City/Province:	Issaquah, WA
Postal Code:	98027
Invoice To	Same as Report To [X] YES [ ] NO
	Copy of Invoice with Report [X] YES [ ] NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: [X] PDF [X] EXCEL [ ] EDD (DIGITAL)
Quality Control (QC) Report with Report [ ] YES [ ] NO
[ ] Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: [X] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax abailey@forallenconsulting.com
Email 2 sparkhouse@forallenconsulting.com
Email 3

Invoice Distribution

Select Invoice Distribution: [X] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax AP@forallenconsulting.com
Email 2

Project Information

ALS Account # / Quote #:
Job #:
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#
Major/Minor Code: | Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only):
ALS Contact: | Sampler:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] [X] Standard TAT if received by 3 pm - business days - no surcharges apply

Priority (Business Days): 4 day [P4-20%] [ ] | 3 day [P3-25%] [ ] | 2 day [P2-50%] [ ]
Emergency: 1 Business day [E - 100%] [ ] | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	EPA Method 1668 PCBs	EPA Method 8290A Dioxins	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	L2527465 - 10	18-Jan-21	1330	Air	1	X	X		
2	L2516041 - 5		--		1	X	X		
3	L2516041 - 4		1128		1	X	X		
4	L2516041 - 2		1437		1	X	X		
5	L2516041 - 3		1447		1	X	X		
	1/25/21								

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
[ ] YES [ ] NO
Are samples for human consumption/ use?
[ ] YES [ ] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Hold samples for composite.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] | SIF Observations Yes [ ] No [X]
Ice Packs [X] Ice Cubes [ ] | Custody seal intact Yes [X] No [ ]
Cooling Initiated [X]

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
2.0°C							

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
	1/20/21	1200

INITIAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:
ANDREW BURTON	21-JAN-2021	17:05

FINAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FINAL

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

Composite WO: L2569163

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2561344-COFC

COC Number: 17 - 792312

Page of

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Faralion Consulting	Select Report Format: ☑ PDF ☒ EXCEL ☒ EDD (DIGITAL)	Regular [R] ☒ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Amber Bailey	Quality Control (QC) Report with Report ☐ YES ☐ NO	PRIORITY (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐
Phone:	206 735 6478	☐ Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E - 100%] ☐ / Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐
	Company address below will appear on the final report	Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	975 5th AVE NW	Email 1 or Fax abailey@faralionconsulting.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Issaquah, WA	Email 2 Sgatherson@faralionconsulting.com	
Postal Code:	98027	Email 3	
Invoice To	Same as Report To ☒ YES ☐ NO	**Invoice Distribution**	**Analysis Request**
	Copy of Invoice with Report ☒ YES ☐ NO	Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax APC faralionconsulting.com	
Contact:	APC faralionconsulting.com	Email 2	

Project Information	Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	AFE/Cost Center:	PO#
Job #:	Major/Minor Code:	Routing Code:
PO / AFE:	Requisitioner:	
LSD:	Location:	
ALS Lab Work Order # (lab use only):	**ALS Contact:**	**Sampler:**

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	PCBs method 1668	Dioxins method 8290A	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	L2548709-1-1	2/23/21	1137	Air	1	X	X		
2	L2548709-5-2		1408		1	X	X		
3	L2548709-2-3		1350		1	X	X		
4	L2548709-4-4		1337		1	X	X		
5	L2548709-3-5		1324		1	X	X		

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	Hold samples for composite
Are samples for human consumption/ use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No	☒
Ice Packs	☒ Ice Cubes ☐	Custody seal intact	Yes ☒	No	☐
Cooling Initiated	☒				

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
5.6°C	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Amber Bailey	2/23/21	1640	AARON BURTON	25-FEB-2021	15:15			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Composite WO: L2569163

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2569160-COFC

L2569163-COFC

Report To	Contact and company name below will appear on the final report
Company:	Farallon Consulting
Contact:	Amber Bailey
Phone:	206-735-6178
	Company address below will appear on the final report
Street:	975 5th Ave. NW
City/Province:	Issaquah, WA
Postal Code:	98027
Invoice To	Same as Report To [X] YES [ ] NO
	Copy of Invoice with Report [X] YES [ ] NO
Company:	
Contact:	AP@farallonconsulting.com

Report Format / Distribution

Select Report Format: [X] PDF [X] EXCEL [X] EDD (DIGITAL)
Quality Control (QC) Report with Report [ ] YES [ ] NO
[ ] Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: [X] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax abailey@farallonconsulting.com
Email 2 spatterson@farallonconsulting.com
Email 3

Invoice Distribution

Select Invoice Distribution: [X] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax AP@farallonconsulting.com
Email 2

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] [X] Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] [ ] | 3 day [P3-25%] [ ] | 2 day [P2-50%] [ ]

EMERGENCY: 1 Business day [E - 100%] [ ] | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:
Job #:
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	EPA Method 1668 PCBs	EPA Method 8290A Dioxins	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	L2542414-6	18-Mar-21	0954	Air	1	X	X		
2	L2542414-2		1023		1	X	X		
3	L2542414-3		1046		1	X	X		
4	L2542414-4		1054		1	X	X		
5	L2542414-5		1111		1	X	X		

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ] YES [ ] NO
Are samples for human consumption/ use? [ ] YES [ ] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Analyze samples - composite samples submitted on 1/18/21, 2/23/21, and 3/18/21.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] | SIF Observations Yes [ ] No [X]
Ice Packs [X] Ice Cubes [ ] | Custody seal intact Yes [X] No [ ]
Cooling Initiated [X]

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
19.7°C							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	3/19/21	1300	AARON BOLTON	22-March-2021	12:45			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Sample Receiving Log

Date/Time Received	Client ID	Number/Description of Containers	Temp. on Receipt*	Condition of Samples, Courier & Tracking Information	Receiver's Initials	Date/Time Login Completed	Submission ID	Sample ID Range
21-JAN-2024 17:05	FARALLON	5 x PUFs	2.0°C	Good FedEx 7726 5156 8645	NJ	22-JAN-2024 10:30	L2550875	-1-5

*Temperatures were recorded using :

☑ VWR Traceable dedicated I.R. gun (model 36934-178 SN 192108143)

☐ Other (specify): _____

Sample Receiving Log

Date/Time Received	Client ID	Number/Description of Containers	Temp. on Receipt*	Condition of Samples, Courier & Tracking Information	Receiver's Initials	Date/Time Login Completed	Submission ID	Sample ID Range
25-FEB-2024 15:15	FARALLON	5 x PUFs	5.6°C	Good FedEx 7725 5235 1958	NG	26-FEB-2024 9:45	L2561344	-+5

*Temperatures were recorded using:

☑ VWR Traceable dedicated I.R. gun (model 36934-178 SN 192108143)

☐ Other (specify): _____

Sample Receiving Log

Date/Time Received	Client ID	Number/Description of Containers	Temp. on Receipt*	Condition of Samples, Courier & Tracking Information	Receiver's Initials	Date/Time Login Completed	Submission ID	Sample ID Range
22-mar-2024 12:45	FARALLON	5 x PUFs	19.7°C	Good FedEx 7728 8650 5869	NJ	22-mar-2024 15:40	L2569160 L2569163	-1-5 -1-5

*Temperatures were recorded u

☑ VWR Traceable dedicated I.R. gun (model 36934-178 SN 192108143)

☐ Other (specify): _____