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

SVOC DATA PACKAGE

Client Project Information

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

ALSE Project Information

Project ID: FAR100
Contact: Claire Kocharakkal
Submission ID(s): L2491640

Final Package Review by: _____

Date Reviewed: 15-Sep-20

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

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SECTION 1: PROJECT NARRATIVE

ALSE Project Information

Project ID: FAR100
Contact: Claire Kocharakkal
Submission ID(s): L2491640

Client Project Information

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

Analytical Method: PCDD/F by EPA M23

ALS Sample ID	Client Sample Descriptions	Matrix	Date Sampled	Date Received	Temp/degrees C. on receipt	Date Extracted	Date Analyzed
L2482298-1	L2472405-12-1	PUF	29-Jul-20	31-Jul-20	8.1	n/a	n/a
L2485375-1	L2472405-20-1	PUF	4-Aug-20	7-Aug-20	15.8	n/a	n/a
L2488764-1	L2472405-17-1	PUF	11-Aug-20	14-Aug-20	21.5	n/a	n/a
L2491634-1	L2472405-9-1	PUF	18-Aug-20	19-Aug-20	5.2	n/a	n/a
L2491640-1	**SITE 1 - COMPOSITE 2 (AUGUST)**	**PUF**	**n/a**	**n/a**	**n/a**	**26-Aug-20**	**13-Sep-20**
L2482298-2	L2472405-11-2	PUF	29-Jul-20	31-Jul-20	8.1	n/a	n/a
L2485375-2	L2472405-13-2	PUF	4-Aug-20	7-Aug-20	15.8	n/a	n/a
L2488764-2	L2472405-10-2	PUF	11-Aug-20	14-Aug-20	21.5	n/a	n/a
L2491634-2	L2472405-15-2	PUF	18-Aug-20	19-Aug-20	5.2	n/a	n/a
L2491640-2	**SITE 2 - COMPOSITE 2 (AUGUST)**	**PUF**	**n/a**	**n/a**	**n/a**	**26-Aug-20**	**13-Sep-20**
L2482298-3	L2472405-4-3	PUF	29-Jul-20	31-Jul-20	8.1	n/a	n/a
L2485375-3	L2472405-2-3	PUF	4-Aug-20	7-Aug-20	15.8	n/a	n/a
L2488764-3	L2472405-7-3	PUF	11-Aug-20	14-Aug-20	21.5	n/a	n/a
L2491634-3	L2472405-3-3	PUF	18-Aug-20	19-Aug-20	5.2	n/a	n/a
L2491640-3	**SITE 3 - COMPOSITE 2 (AUGUST)**	**PUF**	**n/a**	**n/a**	**n/a**	**26-Aug-20**	**13-Sep-20**
L2482298-4	L2472405-19-4	PUF	29-Jul-20	31-Jul-20	8.1	n/a	n/a
L2485375-4	L2472405-5-4	PUF	4-Aug-20	7-Aug-20	15.8	n/a	n/a
L2488764-4	L2472405-16-4	PUF	11-Aug-20	14-Aug-20	21.5	n/a	n/a
L2491634-4	L2472405-14-4	PUF	18-Aug-20	19-Aug-20	5.2	n/a	n/a
L2491640-4	**SITE 4 - COMPOSITE 2 (AUGUST)**	**PUF**	**n/a**	**n/a**	**n/a**	**26-Aug-20**	**13-Sep-20**
L2482298-5	L2472405-1-5	PUF	29-Jul-20	31-Jul-20	8.1	n/a	n/a
L2485375-5	L2472405-6-5	PUF	4-Aug-20	7-Aug-20	15.8	n/a	n/a
L2488764-5	L2472405-8-5	PUF	11-Aug-20	14-Aug-20	21.5	n/a	n/a
L2491634-5	L2472405-18-5	PUF	18-Aug-20	19-Aug-20	5.2	n/a	n/a
L2491640-5	**SITE 5 - COMPOSITE 2 (AUGUST)**	**PUF**	**n/a**	**n/a**	**n/a**	**26-Aug-20**	**13-Sep-20**
WG3389564-1	**Method Blank**	**MEDIA**	**n/a**	**n/a**	**n/a**	**26-Aug-20**	**13-Sep-20**
WG3389564-4	**Method Blank**	**REAGENT**	**n/a**	**n/a**	**n/a**	**26-Aug-20**	**13-Sep-20**
WG3389564-2	**Laboratory Control Sample**	**QC**	**n/a**	**n/a**	**n/a**	**26-Aug-20**	**13-Sep-20**

Comments and Notes:
a) Sample Integrity:

The samples were received on 4 different dates as noted above. The four 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

15-Sep-20
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:	Claire Kocharakkal	**Client Name:**	Farallon Consulting, L.L.C.
ALS Project ID:	FAR100	**Client Address:**	975 5th Avenue Northwest
ALS WO#:	L2491640		Issaquah,WA 98027
Date of Report	16-Sep-20		USA
Date of Sample Receipt	19-Aug-20	**Client Contact:**	Amber Bailey
		Client Project ID:	1466-004 SEATTLE IRON & METALS

COMMENTS: **PCDD/F by EPA TO9A**

Certified by:

Steve Kennedy
Technical Supervisor

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	SITE 1 - COMPOSITE 2 (AUGUST)	SITE 2 - COMPOSITE 2 (AUGUST)	SITE 3 - COMPOSITE 2 (AUGUST)	SITE 4 - COMPOSITE 2 (AUGUST)	SITE 5 - COMPOSITE 2 (AUGUST)
ALS Sample ID	L2491640-1	L2491640-2	L2491640-3	L2491640-4	L2491640-5
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	26-Aug-20	26-Aug-20	26-Aug-20	26-Aug-20	26-Aug-20
Target Analytes	**pg**	**pg**	**pg**	**pg**	**pg**
2,3,7,8-TCDD	<1.3	<1.5	<0.91	<0.91	<0.98
1,2,3,7,8-PeCDD	<0.74	<1.1	<0.55	<0.50	<1.0
1,2,3,4,7,8-HxCDD	<0.79	<1.1	<0.74	<0.80	<0.88
1,2,3,6,7,8-HxCDD	<0.56	<0.91	<0.53	<0.74	<0.97
1,2,3,7,8,9-HxCDD	<0.70	<0.94	<0.66	<0.71	<0.78
1,2,3,4,6,7,8-HpCDD	5.10	18.6	12.0	23.2	35.9
OCDD	23.8	109	58.2	154	235
2,3,7,8-TCDF	<1.2	<1.4	<0.79	<0.69	<1.2
1,2,3,7,8-PeCDF	<0.68	1.60	<0.92	1.25	1.56
2,3,4,7,8-PeCDF	1.11	<1.5	0.650	1.47	<1.6
1,2,3,4,7,8-HxCDF	<0.46	1.14	<0.43	0.520	0.750
1,2,3,6,7,8-HxCDF	<0.34	0.920	<0.32	<0.45	0.750
2,3,4,6,7,8-HxCDF	<0.48	<0.80	<0.45	<0.52	<0.55
1,2,3,7,8,9-HxCDF	<0.62	<1.0	<0.58	<0.67	<0.62
1,2,3,4,6,7,8-HpCDF	<1.6	<5.1	2.64	<5.1	6.38
1,2,3,4,7,8,9-HpCDF	<0.55	<1.4	<0.44	<1.0	<1.0
OCDF	<1.3	<3.4	2.08	5.65	6.60
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	112	116	114	113	114
13C12-1,2,3,4,7,8-HxCDD	81	84	82	78	92
13C12-2,3,4,7,8-PeCDF	125	132	130	131	131
13C12-1,2,3,4,7,8-HxCDF	65	71	75	70	67
13C12-1,2,3,4,7,8,9-HpCDF	124	119	118	123	114
Extraction Standards					
13C12-2,3,7,8-TCDD	75	56	102	92	88
13C12-1,2,3,7,8-PeCDD	124	96	164	144	138
13C12-1,2,3,6,7,8-HxCDD	91	70	116	106	91
13C12-1,2,3,4,6,7,8-HpCDD	87	68	108	94	94
13C12-OCDD	92	64	112	94	93
13C12-2,3,7,8-TCDF	88	69	118	109	106
13C12-1,2,3,7,8-PeCDF	105	76	139	123	121
13C12-1,2,3,6,7,8-HxCDF	103	76	117	112	118
13C12-1,2,3,4,6,7,8-HpCDF	74	60	96	83	85
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	65	52	82	78	69
Homologue Group Totals	**pg**	**pg**	**pg**	**pg**	**pg**
Total-TCDD	<1.3	<1.5	<0.91	<0.91	1.41
Total-PeCDD	<0.74	<1.1	<0.55	1.75	1.11
Total-HxCDD	<0.79	3.17	1.75	4.08	8.26
Total-HpCDD	14.3	40.7	12.0	49.4	78.8
Total-TCDF	2.21	26.6	3.93	11.5	13.7
Total-PeCDF	1.11	14.4	0.650	2.72	1.56
Total-HxCDF	<0.62	2.06	<0.58	3.69	6.24
Total-HpCDF	<0.55	4.83	2.64	5.47	11.9
Toxic Equivalency - (WHO 2005)					
Lower Bound PCDD/F TEQ (WHO 2005)	0.391	0.473	0.359	0.810	0.692
Mid Point PCDD/F TEQ (WHO 2005)	1.70	2.63	1.34	1.86	2.55
Upper Bound PCDD/F TEQ (WHO 2005)	2.99	4.20	2.30	2.74	3.66

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Quality Control Summary Report

Sample Name	Method Blank	Method Blank	Laboratory Control Sample
ALS Sample ID	WG3389564-1	WG3389564-4	WG3389564-2
Sample Size	1	1	1
Sample size units	sample	sample	n/a
Percent Moisture	n/a	n/a	n/a
Sample Matrix	MEDIA	REAGENT	QC
Sampling Date	n/a	n/a	n/a
Extraction Date	26-Aug-20	26-Aug-20	26-Aug-20
Target Analytes	**pg**	**pg**	**% Rec**
2,3,7,8-TCDD	<1.3	<1.2	96
1,2,3,7,8-PeCDD	0.960	<0.49	113
1,2,3,4,7,8-HxCDD	<1.1	<0.89	128
1,2,3,6,7,8-HxCDD	<0.77	<0.64	127
1,2,3,7,8,9-HxCDD	<0.96	<0.80	156
1,2,3,4,6,7,8-HpCDD	0.890	0.810	110
OCDD	<2.5	1.86	100
2,3,7,8-TCDF	<0.80	<0.68	100
1,2,3,7,8-PeCDF	<0.71	<0.51	108
2,3,4,7,8-PeCDF	<0.71	<0.51	119
1,2,3,4,7,8-HxCDF	<0.66	<0.40	118
1,2,3,6,7,8-HxCDF	<0.49	<0.30	129
2,3,4,6,7,8-HxCDF	<0.69	<0.42	130
1,2,3,7,8,9-HxCDF	<0.92	1.26	127
1,2,3,4,6,7,8-HpCDF	<0.42	<0.39	105
1,2,3,4,7,8,9-HpCDF	<0.46	<0.57	97
OCDF	<0.80	<0.63	90
Field Spike Standards			
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	67	72	90
13C12-1,2,3,7,8-PeCDD	113	124	145
13C12-1,2,3,6,7,8-HxCDD	62	64	78
13C12-1,2,3,4,6,7,8-HpCDD	111	115	131
13C12-OCDD	106	112	125
13C12-2,3,7,8-TCDF	80	84	110
13C12-1,2,3,7,8-PeCDF	94	105	123
13C12-1,2,3,6,7,8-HxCDF	64	70	83
13C12-1,2,3,4,6,7,8-HpCDF	102	105	125
Cleanup Standard			
13C12-1,2,3,7,8,9-HxCDF	76	86	96
Homologue Group Totals	**pg**	**pg**	
Total-TCDD	<1.3	<1.2	
Total-PeCDD	0.960	<0.49	
Total-HxCDD	<1.1	<0.89	
Total-HpCDD	0.890	0.810	
Total-TCDF	<0.80	<0.68	
Total-PeCDF	<0.71	<0.51	
Total-HxCDF	<0.88	1.26	
Total-HpCDF	<0.46	<0.57	
Toxic Equivalency - (WHO 2005)			
Lower Bound PCDD/F TEQ (WHO 2005)	0.969	0.135	
Mid Point PCDD/F TEQ (WHO 2005)	2.11	1.28	
Upper Bound PCDD/F TEQ (WHO 2005)	3.15	2.42	

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Continuing Calibration Summary Report

Sample Name	CVS	CCV	CCV
ALS Sample ID	H9-20-RS#1-0630	H9-20-CCV-0641	H9-20-CCV-0642
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	91	100	103
1,2,3,7,8-PeCDD	103	102	101
1,2,3,4,7,8-HxCDD	106	105	111
1,2,3,6,7,8-HxCDD	98	105	106
1,2,3,7,8,9-HxCDD	107	108	121
1,2,3,4,6,7,8-HpCDD	95	103	101
OCDD	91	97	101
2,3,7,8-TCDF	94	101	97
1,2,3,7,8-PeCDF	100	100	102
2,3,4,7,8-PeCDF	90	103	102
1,2,3,4,7,8-HxCDF	102	109	115
1,2,3,6,7,8-HxCDF	100	102	107
2,3,4,6,7,8-HxCDF	94	107	123
1,2,3,7,8,9-HxCDF	99	114	128
1,2,3,4,6,7,8-HpCDF	102	99	103
1,2,3,4,7,8,9-HpCDF	102	105	120
OCDF	97	108	100
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	116	93	94
13C12-1,2,3,4,7,8-HxCDD	108	103	109
13C12-2,3,4,7,8-PeCDF	95	102	103
13C12-1,2,3,4,7,8-HxCDF	104	107	114
13C12-1,2,3,4,7,8,9-HpCDF	101	105	128
Extraction Standards			
13C12-2,3,7,8-TCDD	94	100	103
13C12-1,2,3,7,8-PeCDD	89	109	132
13C12-1,2,3,6,7,8-HxCDD	93	95	88
13C12-1,2,3,4,6,7,8-HpCDD	100	115	133
13C12-OCDD	95	112	142
13C12-2,3,7,8-TCDF	98	109	110
13C12-1,2,3,7,8-PeCDF	91	114	135
13C12-1,2,3,6,7,8-HxCDF	100	98	85
13C12-1,2,3,4,6,7,8-HpCDF	98	116	114
Cleanup Standard			
13C12-1,2,3,7,8,9-HxCDF	97	110	104

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Sample Analysis Report

Sample Name	**SITE 1 - COMPOSITE 2 (AUGUST)**	Sampling Date	n/a		
ALS Sample ID	L2491640-1	Extraction Date	26-Aug-20		Approved:
Analysis Method	EPA TO9A	Sample Size	1	sample	*Ella Gdyczynski*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	4		14-Sep-2020

Run Information	**Run 1**
Filename	9-200913A21
Run Date	13-Sep-20 11:27
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-9 DB5ms USO287835H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.3	1.3	U		20
1,2,3,7,8-PeCDD	1	NotFnd	<0.74	0.74	U		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.79	0.79	U		100
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.56	0.56	U		100
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.70	0.70	U		100
1,2,3,4,6,7,8-HpCDD	0.01	35.37	5.10	0.63	M,J,B		100
OCDD	0.0003	36.82	23.8	0.96	M,J		200
2,3,7,8-TCDF	0.1	NotFnd	<1.2	1.2	U		20
1,2,3,7,8-PeCDF	0.03	30.62	<0.68	0.68	M,U	0.65	100
2,3,4,7,8-PeCDF	0.3	31.37	1.11	0.69	M,J		100
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.46	0.46	U		100
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.34	0.34	U		100
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.48	0.48	U		100
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.62	0.62	U		100
1,2,3,4,6,7,8-HpCDF	0.01	34.83	<1.6	0.38	M,J,R	1.6	100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.55	0.55	U		100
OCDF	0.0003	36.92	<1.3	0.77	J,R	1.3	200

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	27.05	112	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	33.72	81	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.37	125	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.22	65	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	35.60	124	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	4000	27.02	75	40-130
13C12-1,2,3,7,8-PeCDD	4000	31.60	124	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	33.77	91	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.36	87	25-130
13C12-OCDD	8000	36.82	92	25-130
13C12-2,3,7,8-TCDF	4000	26.11	88	40-130
13C12-1,2,3,7,8-PeCDF	4000	30.59	105	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.28	103	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	34.82	74	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.04	65	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<1.3	1.3	U	20
Total-PeCDD	0	<0.74	0.74	U	100
Total-HxCDD	0	<0.79	0.79	U	100
Total-HpCDD	2	14.3	0.63		100
Total-TCDF	1	2.21	1.2		20
Total-PeCDF	1	1.11	0.69		100
Total-HxCDF	0	<0.62	0.62	U	100
Total-HpCDF	0	<0.55	0.55	U	100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.391
Mid Point PCDD/F TEQ (WHO 2005)	1.70
Upper Bound PCDD/F TEQ (WHO 2005)	2.99

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 2 (AUGUST)**	Sampling Date	n/a		
ALS Sample ID	L2491640-2	Extraction Date	26-Aug-20		Approved:
Analysis Method	EPA TO9A	Sample Size	1	sample	*Ella Gdyczynski*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	4		14-Sep-2020

Run Information	**Run 1**
Filename	9-200913A22
Run Date	13-Sep-20 12:09
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-9 DB5ms USO287835H

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		20
1,2,3,7,8-PeCDD	1	NotFnd	<1.1	1.1	U		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<1.1	1.1	U		100
1,2,3,6,7,8-HxCDD	0.1	33.79	<0.91	0.75	M,J,R	0.91	100
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.94	0.94	U		100
1,2,3,4,6,7,8-HpCDD	0.01	35.36	18.6	1.2	M,J		100
OCDD	0.0003	36.81	109	2.0	M,J		200
2,3,7,8-TCDF	0.1	NotFnd	<1.4	1.4	U		20
1,2,3,7,8-PeCDF	0.03	30.60	1.60	1.1	M,J		100
2,3,4,7,8-PeCDF	0.3	31.28	<1.5	1.1	M,J,R	1.5	100
1,2,3,4,7,8-HxCDF	0.1	33.21	1.14	0.77	M,J		100
1,2,3,6,7,8-HxCDF	0.1	33.28	0.920	0.57	J		100
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.80	0.80	U		100
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<1.0	1.0	U		100
1,2,3,4,6,7,8-HpCDF	0.01	34.82	<5.1	0.96	M,J,R	5.1	100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.4	1.4	U		100
OCDF	0.0003	36.89	<3.4	1.4	J,R	3.4	200

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	27.04	116	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	33.72	84	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.36	132	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.20	71	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	35.59	119	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	4000	27.01	56	40-130
13C12-1,2,3,7,8-PeCDD	4000	31.59	96	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	33.77	70	40-130 R
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.35	68	25-130
13C12-OCDD	8000	36.80	64	25-130
13C12-2,3,7,8-TCDF	4000	26.10	69	40-130
13C12-1,2,3,7,8-PeCDF	4000	30.58	76	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.28	76	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	34.80	60	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.03	52	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<1.5	1.5	U	20
Total-PeCDD	0	<1.1	1.1	U	100
Total-HxCDD	1	3.17	1.1		100
Total-HpCDD	2	40.7	1.2		100
Total-TCDF	7	26.6	1.4		20
Total-PeCDF	5	14.4	1.1		100
Total-HxCDF	2	2.06	1.0		100
Total-HpCDF	1	4.83	1.4		100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.473
Mid Point PCDD/F TEQ (WHO 2005)	2.63
Upper Bound PCDD/F TEQ (WHO 2005)	4.20

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 Equivalenc
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

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Sample Analysis Report

Sample Name	**SITE 3 - COMPOSITE 2 (AUGUST)**	Sampling Date	n/a		
ALS Sample ID	L2491640-3	Extraction Date	26-Aug-20		Approved:
Analysis Method	EPA TO9A	Sample Size	1	sample	*Ella Gdyczynski*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	4		14-Sep-2020

Run Information	**Run 1**
Filename	9-200913A23
Run Date	13-Sep-20 12:52
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-9 DB5ms USO287835H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<0.91	0.91	U		20
1,2,3,7,8-PeCDD	1	NotFnd	<0.55	0.55	U		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.74	0.74	U		100
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.53	0.53	U		100
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.66	0.66	U		100
1,2,3,4,6,7,8-HpCDD	0.01	35.36	12.0	0.64	M,J		100
OCDD	0.0003	36.82	58.2	0.95	M,J		200
2,3,7,8-TCDF	0.1	NotFnd	<0.79	0.79	U		20
1,2,3,7,8-PeCDF	0.03	30.60	<0.92	0.57	M,J,R	0.92	100
2,3,4,7,8-PeCDF	0.3	31.38	0.650	0.57	M,J		100
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.43	0.43	U		100
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.32	0.32	U		100
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.45	0.45	U		100
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.58	0.58	U		100
1,2,3,4,6,7,8-HpCDF	0.01	34.82	2.64	0.30	J		100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.44	0.44	U		100
OCDF	0.0003	36.90	2.08	0.61	M,J		200

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	27.04	114	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	33.72	82	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.37	130	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.21	75	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	35.60	118	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	4000	27.02	102	40-130
13C12-1,2,3,7,8-PeCDD	4000	31.59	164	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	33.77	116	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.36	108	25-130
13C12-OCDD	8000	36.81	112	25-130
13C12-2,3,7,8-TCDF	4000	26.11	118	40-130
13C12-1,2,3,7,8-PeCDF	4000	30.59	139	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.28	117	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	34.82	96	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.04	82	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<0.91	0.91	U	20
Total-PeCDD	0	<0.55	0.55	U	100
Total-HxCDD	1	1.75	0.74		100
Total-HpCDD	1	12.0	0.64		100
Total-TCDF	2	3.93	0.79		20
Total-PeCDF	1	0.650	0.57		100
Total-HxCDF	0	<0.58	0.58	U	100
Total-HpCDF	1	2.64	0.44		100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.359
Mid Point PCDD/F TEQ (WHO 2005)	1.34
Upper Bound PCDD/F TEQ (WHO 2005)	2.30

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 Equivalenc
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

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Sample Analysis Report

Sample Name	**SITE 4 - COMPOSITE 2 (AUGUST)**	Sampling Date	n/a		
ALS Sample ID	L2491640-4	Extraction Date	26-Aug-20		Approved:
Analysis Method	EPA TO9A	Sample Size	1	sample	*Ella Gdyczynski*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	4		14-Sep-2020

Run Information	**Run 1**
Filename	9-200913A24
Run Date	13-Sep-20 13:34
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-9 DB5ms USO287835H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<0.91	0.91	U		20
1,2,3,7,8-PeCDD	1	NotFnd	<0.50	0.50	U		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.80	0.80	U		100
1,2,3,6,7,8-HxCDD	0.1	33.77	<0.74	0.57	M,J,R	0.74	100
1,2,3,7,8,9-HxCDD	0.1	33.90	<0.71	0.71	M,U	0.48	100
1,2,3,4,6,7,8-HpCDD	0.01	35.36	23.2	1.5	J		100
OCDD	0.0003	36.81	154	1.6	M,J		200
2,3,7,8-TCDF	0.1	NotFnd	<0.69	0.69	U		20
1,2,3,7,8-PeCDF	0.03	30.59	1.25	0.69	M,J		100
2,3,4,7,8-PeCDF	0.3	31.38	1.47	0.69	M,J		100
1,2,3,4,7,8-HxCDF	0.1	33.21	0.520	0.50	M,J		100
1,2,3,6,7,8-HxCDF	0.1	33.29	<0.45	0.37	J,R	0.45	100
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.52	0.52	U		100
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.67	0.67	U		100
1,2,3,4,6,7,8-HpCDF	0.01	34.82	<5.1	0.72	M,J,R	5.1	100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.0	1.0	U		100
OCDF	0.0003	36.89	5.65	1.0	M,J		200

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	27.04	113	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	33.72	78	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.36	131	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.20	70	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	35.59	123	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	4000	27.01	92	40-130
13C12-1,2,3,7,8-PeCDD	4000	31.59	144	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	33.76	106	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.35	94	25-130
13C12-OCDD	8000	36.80	94	25-130
13C12-2,3,7,8-TCDF	4000	26.10	109	40-130
13C12-1,2,3,7,8-PeCDF	4000	30.58	123	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.28	112	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	34.80	83	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.03	78	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<0.91	0.91	U	20
Total-PeCDD	1	1.75	0.50		100
Total-HxCDD	1	4.08	0.80		100
Total-HpCDD	2	49.4	1.5		100
Total-TCDF	6	11.5	0.69		20
Total-PeCDF	2	2.72	0.69		100
Total-HxCDF	2	3.69	0.67		100
Total-HpCDF	1	5.47	1.0		100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.810
Mid Point PCDD/F TEQ (WHO 2005)	1.86
Upper Bound PCDD/F TEQ (WHO 2005)	2.74

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 Equivalenc
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

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Sample Analysis Report

Sample Name	**SITE 5 - COMPOSITE 2 (AUGUST)**	Sampling Date	n/a		
ALS Sample ID	L2491640-5	Extraction Date	26-Aug-20		Approved:
Analysis Method	EPA TO9A	Sample Size	1	sample	*Ella Gdyczynski*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	4		14-Sep-2020

Run Information	**Run 1**
Filename	9-200913A25
Run Date	13-Sep-20 14:17
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-9 DB5ms USO287835H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<0.98	0.98	U		20
1,2,3,7,8-PeCDD	1	NotFnd	<1.0	1.0	U		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.88	0.88	U		100
1,2,3,6,7,8-HxCDD	0.1	33.77	<0.97	0.63	M,J,R	0.97	100
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.78	0.78	U		100
1,2,3,4,6,7,8-HpCDD	0.01	35.36	35.9	1.9	J		100
OCDD	0.0003	36.81	235	1.9	M		200
2,3,7,8-TCDF	0.1	26.11	<1.2	0.68	M,J,R	1.2	20
1,2,3,7,8-PeCDF	0.03	30.60	1.56	0.85	M,J		100
2,3,4,7,8-PeCDF	0.3	31.37	<1.6	0.85	M,J,R	1.6	100
1,2,3,4,7,8-HxCDF	0.1	33.22	0.750	0.46	M,J		100
1,2,3,6,7,8-HxCDF	0.1	33.28	0.750	0.35	M,J		100
2,3,4,6,7,8-HxCDF	0.1	33.61	<0.55	0.48	M,J,R	0.55	100
1,2,3,7,8,9-HxCDF	0.1	34.04	<0.62	0.62	M,U	0.60	100
1,2,3,4,6,7,8-HpCDF	0.01	34.82	6.38	0.72	M,J		100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.0	1.0	U		100
OCDF	0.0003	36.89	6.60	1.2	M,J		200

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	27.04	114	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	33.72	92	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.36	131	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.20	67	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	35.59	114	70-130

Extraction Standards				
13C12-2,3,7,8-TCDD	4000	27.01	88	40-130
13C12-1,2,3,7,8-PeCDD	4000	31.59	138	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	33.77	91	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.35	94	25-130
13C12-OCDD	8000	36.80	93	25-130
13C12-2,3,7,8-TCDF	4000	26.10	106	40-130
13C12-1,2,3,7,8-PeCDF	4000	30.59	121	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.28	118	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	34.80	85	25-130

Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.04	69	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**	
Total-TCDD	1	1.41	0.98	20
Total-PeCDD	1	1.11	1.0	100
Total-HxCDD	2	8.26	0.88	100
Total-HpCDD	2	78.8	1.9	100
Total-TCDF	5	13.7	0.68	20
Total-PeCDF	1	1.56	0.85	100
Total-HxCDF	5	6.24	0.62	100
Total-HpCDF	2	11.9	1.0	100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.692
Mid Point PCDD/F TEQ (WHO 2005)	2.55
Upper Bound PCDD/F TEQ (WHO 2005)	3.66

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 Equivalenc
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

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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	9-200909A05	09-Sep-2020 19:56
CS-2	9-200909A04	09-Sep-2020 19:13
CS-3	9-200909A01	09-Sep-2020 16:50
CS-4	9-200909A03	09-Sep-2020 18:31
CS-5	9-200909A02	09-Sep-2020 17:49

Approved: *Ella Gdyczynski*
--e-signature--
14-Sep-2020

Relative Response Factors

Target Analytes	CS-1	CS-2	CS-3	CS-4	CS-5	Mean	% RSD
2,3,7,8-TCDD	0.852	0.820	0.860	0.908	0.953	0.879	6%
1,2,3,7,8-PeCDD	0.761	0.822	0.798	0.899	0.909	0.838	8%
1,2,3,4,7,8-HxCDD	0.625	0.621	0.560	0.675	0.661	0.628	7%
1,2,3,6,7,8-HxCDD	0.727	0.843	0.896	0.964	0.967	0.879	11%
1,2,3,7,8,9-HxCDD	0.592	0.674	0.715	0.801	0.750	0.706	11%
1,2,3,4,6,7,8-HpCDD	0.711	0.853	0.904	0.927	0.940	0.867	11%
OCDD	0.783	0.941	0.899	0.968	1.017	0.922	10%
2,3,7,8-TCDF	0.782	0.858	0.787	0.877	0.911	0.843	7%
1,2,3,7,8-PeCDF	0.760	0.836	0.893	0.988	0.980	0.891	11%
2,3,4,7,8-PeCDF	0.768	0.836	0.886	0.948	1.006	0.889	10%
1,2,3,4,7,8-HxCDF	0.724	0.769	0.708	0.823	0.809	0.767	7%
1,2,3,6,7,8-HxCDF	0.869	1.005	1.030	1.098	1.130	1.026	10%
2,3,4,6,7,8-HxCDF	0.660	0.690	0.717	0.817	0.798	0.736	9%
1,2,3,7,8,9-HxCDF	0.486	0.537	0.519	0.653	0.657	0.570	14%
1,2,3,4,6,7,8-HpCDF	0.813	0.884	0.908	0.967	1.009	0.916	8%
1,2,3,4,7,8,9-HpCDF	0.625	0.587	0.619	0.668	0.668	0.633	5%
OCDF	1.081	1.113	1.134	1.266	1.361	1.191	10%
Field Spike Standards							
37Cl4-2,3,7,8-TCDD	0.961	0.871	0.880	0.948	1.027	0.937	7%
13C12-1,2,3,4,7,8-HxCDD	0.739	0.726	0.622	0.702	0.682	0.694	7%
13C12-2,3,4,7,8-PeCDF	0.871	0.871	0.897	0.908	0.940	0.897	3%
13C12-1,2,3,4,7,8-HxCDF	0.754	0.744	0.653	0.706	0.684	0.708	6%
13C12-1,2,3,4,7,8,9-HpCDF	0.658	0.636	0.681	0.658	0.659	0.658	2%
Extraction Standards							
13C12-2,3,7,8-TCDD	0.882	0.904	0.925	0.955	1.022	0.938	6%
13C12-1,2,3,7,8-PeCDD	0.401	0.427	0.470	0.491	0.588	0.475	15%
13C12-1,2,3,6,7,8-HxCDD	1.048	1.074	1.123	1.141	1.254	1.128	7%
13C12-1,2,3,4,6,7,8-HpCDD	0.629	0.665	0.600	0.634	0.592	0.624	5%
13C12-OCDD	0.474	0.505	0.470	0.524	0.535	0.502	6%
13C12-2,3,7,8-TCDF	1.137	1.121	1.150	1.159	1.212	1.156	3%
13C12-1,2,3,7,8-PeCDF	0.659	0.689	0.714	0.753	0.871	0.737	11%
13C12-1,2,3,6,7,8-HxCDF	1.442	1.456	1.513	1.488	1.539	1.488	3%
13C12-1,2,3,4,6,7,8-HpCDF	0.811	0.895	0.788	0.847	0.812	0.831	5%
Cleanup Standard							
13C12-1,2,3,7,8,9-HxCDF	0.813	0.810	0.806	0.861	0.874	0.833	4%

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Calibration Report

ALS Sample ID **H9-20-CS#1-0630**
Analysis Method EPA TO9A
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*Ella Gdyczynski*
9-200909A05	HRMS-9	COL#DB5MS-SN#US0287835H	09-Sep-2020 19:56		--e-signature-- 14-Sep-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.08	0.67	0.50	2.38E+03	0.852
1,2,3,7,8-PeCDD	31.63	1.74	2.50	4.85E+03	0.761
1,2,3,4,7,8-HxCDD	33.73	1.25	2.50	3.37E+03	0.625
1,2,3,6,7,8-HxCDD	33.79	1.13	2.50	3.92E+03	0.727
1,2,3,7,8,9-HxCDD	33.92	1.27	2.50	3.19E+03	0.592
1,2,3,4,6,7,8-HpCDD	35.37	1.17	2.50	2.30E+03	0.711
OCDD	36.82	0.90	5.00	3.82E+03	0.783
2,3,7,8-TCDF	26.19	0.68	0.50	2.82E+03	0.782
1,2,3,7,8-PeCDF	30.63	1.63	2.50	7.95E+03	0.760
2,3,4,7,8-PeCDF	31.4	1.67	2.50	8.03E+03	0.768
1,2,3,4,7,8-HxCDF	33.22	1.08	2.50	5.37E+03	0.724
1,2,3,6,7,8-HxCDF	33.3	1.24	2.50	6.44E+03	0.869
2,3,4,6,7,8-HxCDF	33.64	1.28	2.50	4.89E+03	0.660
1,2,3,7,8,9-HxCDF	34.06	1.17	2.50	3.61E+03	0.486
1,2,3,4,6,7,8-HpCDF	34.83	1.90	2.50	3.39E+03	0.813
1,2,3,4,7,8,9-HpCDF	35.61	2.14	2.50	2.61E+03	0.625
OCDF	36.9	0.88	5.00	5.27E+03	1.081
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.1	0.00	0.50	2.69E+03	0.961
13C12-1,2,3,4,7,8-HxCDD	33.73	1.26	100.00	1.59E+05	0.739
13C12-2,3,4,7,8-PeCDF	31.39	1.55	100.00	3.65E+05	0.871
13C12-1,2,3,4,7,8-HxCDF	33.22	0.51	100.00	2.24E+05	0.754
13C12-1,2,3,4,7,8,9-HpCDF	35.6	0.43	100.00	1.10E+05	0.658
Extraction Standards					
13C12-2,3,7,8-TCDD	27.07	0.755	100	5.60E+05	0.882
13C12-1,2,3,7,8-PeCDD	31.61	1.588	100	2.55E+05	0.401
13C12-1,2,3,6,7,8-HxCDD	33.78	1.2	100	2.16E+05	1.048
13C12-1,2,3,4,6,7,8-HpCDD	35.36	1.028	100	1.29E+05	0.629
13C12-OCDD	36.81	0.858	200	1.95E+05	0.474
13C12-2,3,7,8-TCDF	26.16	0.756	100	7.22E+05	1.137
13C12-1,2,3,7,8-PeCDF	30.62	1.581	100	4.18E+05	0.659
13C12-1,2,3,6,7,8-HxCDF	33.29	0.504	100	2.96E+05	1.442
13C12-1,2,3,4,6,7,8-HpCDF	34.81	0.427	100	1.67E+05	0.811
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.04	0.481	100	1.67E+05	0.813
Injection Standards					
13C12-1234-TCDD IS	26.4	0.779	100	634751.4	6347.514
13C12-123789-HxCDD IS	33.91	1.19	100.00	2.06E+05	2055.900

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-20-CS#2-0630**
Analysis Method EPA TO9A
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*Ella Gdyczynski*
9-200909A04	HRMS-9	COL#DB5MS-SN#US0287835H	09-Sep-2020 19:13		--e-signature--
					14-Sep-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.1	0.77	2.00	1.02E+04	0.820
1,2,3,7,8-PeCDD	31.63	1.76	10.00	2.42E+04	0.822
1,2,3,4,7,8-HxCDD	33.73	1.29	10.00	1.60E+04	0.621
1,2,3,6,7,8-HxCDD	33.79	1.35	10.00	2.17E+04	0.843
1,2,3,7,8,9-HxCDD	33.92	1.26	10.00	1.73E+04	0.674
1,2,3,4,6,7,8-HpCDD	35.37	0.97	10.00	1.36E+04	0.853
OCDD	36.82	0.85	20.00	2.28E+04	0.941
2,3,7,8-TCDF	26.17	0.74	2.00	1.33E+04	0.858
1,2,3,7,8-PeCDF	30.63	1.56	10.00	3.97E+04	0.836
2,3,4,7,8-PeCDF	31.4	1.54	10.00	3.97E+04	0.836
1,2,3,4,7,8-HxCDF	33.23	1.19	10.00	2.68E+04	0.769
1,2,3,6,7,8-HxCDF	33.3	1.16	10.00	3.50E+04	1.005
2,3,4,6,7,8-HxCDF	33.64	1.19	10.00	2.40E+04	0.690
1,2,3,7,8,9-HxCDF	34.06	1.19	10.00	1.87E+04	0.537
1,2,3,4,6,7,8-HpCDF	34.83	1.87	10.00	1.89E+04	0.884
1,2,3,4,7,8,9-HpCDF	35.61	1.89	10.00	1.26E+04	0.587
OCDF	36.9	0.92	20.00	2.69E+04	1.113
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.1	0.00	2.00	1.09E+04	0.871
13C12-1,2,3,4,7,8-HxCDD	33.73	1.24	100.00	1.87E+05	0.726
13C12-2,3,4,7,8-PeCDF	31.39	1.58	100.00	4.14E+05	0.871
13C12-1,2,3,4,7,8-HxCDF	33.22	0.51	100.00	2.59E+05	0.744
13C12-1,2,3,4,7,8,9-HpCDF	35.6	0.43	100.00	1.36E+05	0.636
Extraction Standards					
13C12-2,3,7,8-TCDD	27.07	0.756	100	6.23E+05	0.904
13C12-1,2,3,7,8-PeCDD	31.62	1.668	100	2.95E+05	0.427
13C12-1,2,3,6,7,8-HxCDD	33.79	1.25	100	2.57E+05	1.074
13C12-1,2,3,4,6,7,8-HpCDD	35.36	1.076	100	1.59E+05	0.665
13C12-OCDD	36.81	0.87	200	2.42E+05	0.505
13C12-2,3,7,8-TCDF	26.16	0.762	100	7.73E+05	1.121
13C12-1,2,3,7,8-PeCDF	30.62	1.572	100	4.75E+05	0.689
13C12-1,2,3,6,7,8-HxCDF	33.3	0.516	100	3.48E+05	1.456
13C12-1,2,3,4,6,7,8-HpCDF	34.82	0.434	100	2.14E+05	0.895
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.05	0.534	100	1.94E+05	0.81
Injection Standards					
13C12-1234-TCDD IS	26.4	0.772	100	689675.4	6896.754
13C12-123789-HxCDD IS	33.91	1.27	100.00	2.39E+05	2393.169

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-20-CCV-0630**
Analysis Method EPA TO9A
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*Ella Gdyczynski*
9-200909A01	HRMS-9	COL#DB5MS-SN#US0287835H	09-Sep-2020 16:50		--e-signature--
					14-Sep-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.11	0.72	10.00	7.77E+04	0.860
1,2,3,7,8-PeCDD	31.65	1.57	50.00	1.83E+05	0.798
1,2,3,4,7,8-HxCDD	33.75	1.22	50.00	1.18E+05	0.560
1,2,3,6,7,8-HxCDD	33.81	1.25	50.00	1.89E+05	0.896
1,2,3,7,8,9-HxCDD	33.93	1.28	50.00	1.50E+05	0.715
1,2,3,4,6,7,8-HpCDD	35.38	1.04	50.00	1.02E+05	0.904
OCDD	36.83	0.88	100.00	1.58E+05	0.899
2,3,7,8-TCDF	26.11	0.75	10.00	8.84E+04	0.787
1,2,3,7,8-PeCDF	30.65	1.61	50.00	3.11E+05	0.893
2,3,4,7,8-PeCDF	31.42	1.55	50.00	3.09E+05	0.886
1,2,3,4,7,8-HxCDF	33.24	1.25	50.00	2.01E+05	0.708
1,2,3,6,7,8-HxCDF	33.31	1.17	50.00	2.92E+05	1.030
2,3,4,6,7,8-HxCDF	33.65	1.13	50.00	2.03E+05	0.717
1,2,3,7,8,9-HxCDF	34.07	1.29	50.00	1.47E+05	0.519
1,2,3,4,6,7,8-HpCDF	34.84	1.93	50.00	1.34E+05	0.908
1,2,3,4,7,8,9-HpCDF	35.62	2.01	50.00	9.14E+04	0.619
OCDF	36.91	0.88	100.00	2.00E+05	1.134
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.11	0.00	10.00	7.95E+04	0.880
13C12-1,2,3,4,7,8-HxCDD	33.74	1.22	100.00	2.62E+05	0.622
13C12-2,3,4,7,8-PeCDF	31.4	1.52	100.00	6.26E+05	0.897
13C12-1,2,3,4,7,8-HxCDF	33.24	0.50	100.00	3.70E+05	0.653
13C12-1,2,3,4,7,8,9-HpCDF	35.61	0.43	100.00	2.01E+05	0.681
Extraction Standards					
13C12-2,3,7,8-TCDD	27.1	0.769	100	9.03E+05	0.925
13C12-1,2,3,7,8-PeCDD	31.63	1.682	100	4.59E+05	0.47
13C12-1,2,3,6,7,8-HxCDD	33.8	1.27	100	4.21E+05	1.123
13C12-1,2,3,4,6,7,8-HpCDD	35.37	1.086	100	2.25E+05	0.6
13C12-OCDD	36.82	0.905	200	3.52E+05	0.47
13C12-2,3,7,8-TCDF	26.19	0.771	100	1.12E+06	1.15
13C12-1,2,3,7,8-PeCDF	30.64	1.604	100	6.98E+05	0.714
13C12-1,2,3,6,7,8-HxCDF	33.31	0.509	100	5.67E+05	1.513
13C12-1,2,3,4,6,7,8-HpCDF	34.83	0.422	100	2.95E+05	0.788
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.06	0.49	100	3.02E+05	0.806
Injection Standards					
13C12-1234-TCDD IS	26.41	0.782	100	976693.3	9766.933
13C12-123789-HxCDD IS	33.92	1.30	100.00	3.75E+05	3746.985

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-20-CS#4-0630**
Analysis Method EPA TO9A
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*Ella Gdyczynski*
9-200909A03	HRMS-9	COL#DB5MS-SN#US0287835H	09-Sep-2020 18:31		--e-signature--
					14-Sep-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.1	0.74	40.00	2.47E+05	0.908
1,2,3,7,8-PeCDD	31.64	1.60	200.00	6.30E+05	0.899
1,2,3,4,7,8-HxCDD	33.75	1.22	200.00	4.46E+05	0.675
1,2,3,6,7,8-HxCDD	33.8	1.25	200.00	6.38E+05	0.964
1,2,3,7,8,9-HxCDD	33.92	1.22	200.00	5.29E+05	0.801
1,2,3,4,6,7,8-HpCDD	35.38	1.04	200.00	3.41E+05	0.927
OCDD	36.83	0.92	400.00	5.88E+05	0.968
2,3,7,8-TCDF	26.19	0.75	40.00	2.90E+05	0.877
1,2,3,7,8-PeCDF	30.64	1.55	200.00	1.06E+06	0.988
2,3,4,7,8-PeCDF	31.42	1.56	200.00	1.02E+06	0.948
1,2,3,4,7,8-HxCDF	33.24	1.18	200.00	7.10E+05	0.823
1,2,3,6,7,8-HxCDF	33.31	1.14	200.00	9.48E+05	1.098
2,3,4,6,7,8-HxCDF	33.65	1.17	200.00	7.05E+05	0.817
1,2,3,7,8,9-HxCDF	34.06	1.20	200.00	5.64E+05	0.653
1,2,3,4,6,7,8-HpCDF	34.84	2.03	200.00	4.75E+05	0.967
1,2,3,4,7,8,9-HpCDF	35.61	2.00	200.00	3.28E+05	0.668
OCDF	36.91	0.89	400.00	7.69E+05	1.266
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.1	0.00	40.00	2.58E+05	0.948
13C12-1,2,3,4,7,8-HxCDD	33.74	1.24	100.00	2.32E+05	0.702
13C12-2,3,4,7,8-PeCDF	31.4	1.57	100.00	4.88E+05	0.908
13C12-1,2,3,4,7,8-HxCDF	33.23	0.51	100.00	3.05E+05	0.706
13C12-1,2,3,4,7,8,9-HpCDF	35.61	0.44	100.00	1.62E+05	0.658
Extraction Standards					
13C12-2,3,7,8-TCDD	27.08	0.761	100	6.81E+05	0.955
13C12-1,2,3,7,8-PeCDD	31.63	1.639	100	3.50E+05	0.491
13C12-1,2,3,6,7,8-HxCDD	33.79	1.25	100	3.31E+05	1.141
13C12-1,2,3,4,6,7,8-HpCDD	35.37	1.062	100	1.84E+05	0.634
13C12-OCDD	36.82	0.874	200	3.04E+05	0.524
13C12-2,3,7,8-TCDF	26.17	0.777	100	8.27E+05	1.159
13C12-1,2,3,7,8-PeCDF	30.63	1.625	100	5.37E+05	0.753
13C12-1,2,3,6,7,8-HxCDF	33.3	0.519	100	4.31E+05	1.488
13C12-1,2,3,4,6,7,8-HpCDF	34.83	0.431	100	2.46E+05	0.847
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.06	0.487	100	2.50E+05	0.861
Injection Standards					
13C12-1234-TCDD IS	26.41	0.759	100	713083.1	7130.831
13C12-123789-HxCDD IS	33.92	1.22	100.00	2.90E+05	2899.565

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-20-CS#5-0630**
Analysis Method EPA TO9A
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*Ella Gdyczynski*
9-200909A02	HRMS-9	COL#DB5MS-SN#US0287835H	09-Sep-2020 17:49		--e-signature-- 14-Sep-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.12	0.76	200.00	1.34E+06	0.953
1,2,3,7,8-PeCDD	31.64	1.65	1000.00	3.67E+06	0.909
1,2,3,4,7,8-HxCDD	33.75	1.23	1000.00	2.74E+06	0.661
1,2,3,6,7,8-HxCDD	33.8	1.22	1000.00	4.00E+06	0.967
1,2,3,7,8,9-HxCDD	33.93	1.23	1000.00	3.10E+06	0.750
1,2,3,4,6,7,8-HpCDD	35.39	1.04	1000.00	1.84E+06	0.940
OCDD	36.83	0.89	2000.00	3.59E+06	1.017
2,3,7,8-TCDF	26.2	0.76	200.00	1.52E+06	0.911
1,2,3,7,8-PeCDF	30.64	1.55	1000.00	5.86E+06	0.980
2,3,4,7,8-PeCDF	31.41	1.53	1000.00	6.01E+06	1.006
1,2,3,4,7,8-HxCDF	33.25	1.18	1000.00	4.10E+06	0.809
1,2,3,6,7,8-HxCDF	33.32	1.13	1000.00	5.74E+06	1.130
2,3,4,6,7,8-HxCDF	33.65	1.18	1000.00	4.05E+06	0.798
1,2,3,7,8,9-HxCDF	34.07	1.18	1000.00	3.33E+06	0.657
1,2,3,4,6,7,8-HpCDF	34.84	1.92	1000.00	2.70E+06	1.009
1,2,3,4,7,8,9-HpCDF	35.63	1.88	1000.00	1.79E+06	0.668
OCDF	36.91	0.91	2000.00	4.81E+06	1.361
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.12	0.00	200.00	1.44E+06	1.027
13C12-1,2,3,4,7,8-HxCDD	33.74	1.26	100.00	2.82E+05	0.682
13C12-2,3,4,7,8-PeCDF	31.4	1.56	100.00	5.62E+05	0.940
13C12-1,2,3,4,7,8-HxCDF	33.23	0.51	100.00	3.47E+05	0.684
13C12-1,2,3,4,7,8,9-HpCDF	35.62	0.41	100.00	1.77E+05	0.659
Extraction Standards					
13C12-2,3,7,8-TCDD	27.09	0.744	100	7.02E+05	1.022
13C12-1,2,3,7,8-PeCDD	31.63	1.702	100	4.04E+05	0.588
13C12-1,2,3,6,7,8-HxCDD	33.79	1.235	100	4.14E+05	1.254
13C12-1,2,3,4,6,7,8-HpCDD	35.37	1.003	100	1.95E+05	0.592
13C12-OCDD	36.82	0.86	200	3.53E+05	0.535
13C12-2,3,7,8-TCDF	26.18	0.771	100	8.32E+05	1.212
13C12-1,2,3,7,8-PeCDF	30.63	1.613	100	5.98E+05	0.871
13C12-1,2,3,6,7,8-HxCDF	33.31	0.504	100	5.08E+05	1.539
13C12-1,2,3,4,6,7,8-HpCDF	34.83	0.404	100	2.68E+05	0.812
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.06	0.511	100	2.88E+05	0.874
Injection Standards					
13C12-1234-TCDD IS	26.42	0.776	100	686424.6	6864.246
13C12-123789-HxCDD IS	33.92	1.24	100.00	3.30E+05	3298.546

ALS Life Sciences

Second Source Calibration Verification Report

Sample Name	**CVS**	Sampling Date	n/a		
ALS Sample ID	H9-20-RS#1-0630	Extraction Date	n/a		Approved:
Analysis Method	EPA TO9A	Sample Size	1	n/a	*Ella Gdyczynski*
Analysis Type	CCV	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		14-Sep-2020

Run Information	**Run 1**
Filename	9-200909A08
Run Date	09-Sep-20 22:03
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-9 DB5ms USO287835H

Target Analytes	**pg/uL**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	10	27.11	91	75-125	
1,2,3,7,8-PeCDD	50	31.64	103	75-125	
1,2,3,4,7,8-HxCDD	50	33.75	106	75-125	
1,2,3,6,7,8-HxCDD	50	33.80	98	75-125	
1,2,3,7,8,9-HxCDD	50	33.93	107	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.38	95	75-125	
OCDD	100	36.83	91	75-125	
2,3,7,8-TCDF	10	26.20	94	75-125	
1,2,3,7,8-PeCDF	50	30.64	100	75-125	
2,3,4,7,8-PeCDF	50	31.42	90	75-125	
1,2,3,4,7,8-HxCDF	50	33.24	102	75-125	
1,2,3,6,7,8-HxCDF	50	33.31	100	75-125	
2,3,4,6,7,8-HxCDF	50	33.65	94	75-125	
1,2,3,7,8,9-HxCDF	50	34.06	99	75-125	
1,2,3,4,6,7,8-HpCDF	50	34.84	102	75-125	
1,2,3,4,7,8,9-HpCDF	50	35.62	102	75-125	
OCDF	100	36.91	97	70-130	
Field Spike Standards	**pg/uL**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	10	27.11	116	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	33.74	108	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.40	95	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.23	104	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	35.61	101	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	27.08	94	75-125	
13C12-1,2,3,7,8-PeCDD	100	31.63	89	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	33.79	93	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.37	100	70-130	
13C12-OCDD	200	36.82	95	70-130	
13C12-2,3,7,8-TCDF	100	26.17	98	70-130	
13C12-1,2,3,7,8-PeCDF	100	30.63	91	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.30	100	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	34.83	98	70-130	
Cleanup Standard	**pg/uL**				
13C12-1,2,3,7,8,9-HxCDF	100	34.06	97	40-130	

Continuing Calibration Report

Sample Name	**CCV**	Sampling Date	n/a		
ALS Sample ID	H9-20-CCV-0641	Extraction Date	n/a		Approved:
Analysis Method	EPA TO9A	Sample Size	1	n/a	*Ella Gdyczynski*
Analysis Type	CCV	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		14-Sep-2020

Run Information	**Run 1**
Filename	9-200913A15
Run Date	13-Sep-20 07:04
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-9 DB5ms USO287835H

Target Analytes	**pg/uL**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	10	27.05	100	75-125	
1,2,3,7,8-PeCDD	50	31.61	102	75-125	
1,2,3,4,7,8-HxCDD	50	33.73	105	75-125	
1,2,3,6,7,8-HxCDD	50	33.79	105	75-125	
1,2,3,7,8,9-HxCDD	50	33.92	108	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.38	103	75-125	
OCDD	100	36.85	97	75-125	
2,3,7,8-TCDF	10	26.05	101	75-125	
1,2,3,7,8-PeCDF	50	30.62	100	75-125	
2,3,4,7,8-PeCDF	50	31.38	103	75-125	
1,2,3,4,7,8-HxCDF	50	33.23	109	75-125	
1,2,3,6,7,8-HxCDF	50	33.30	102	75-125	
2,3,4,6,7,8-HxCDF	50	33.64	107	75-125	
1,2,3,7,8,9-HxCDF	50	34.06	114	75-125	
1,2,3,4,6,7,8-HpCDF	50	34.84	99	75-125	
1,2,3,4,7,8,9-HpCDF	50	35.61	105	75-125	
OCDF	100	36.93	108	70-130	
Field Spike Standards	**pg/uL**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	10	27.05	93	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	33.73	103	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.38	102	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.22	107	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	35.61	105	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	27.02	100	75-125	
13C12-1,2,3,7,8-PeCDD	100	31.60	109	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	33.79	95	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.38	115	70-130	
13C12-OCDD	200	36.84	112	70-130	
13C12-2,3,7,8-TCDF	100	26.11	109	70-130	
13C12-1,2,3,7,8-PeCDF	100	30.60	114	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.30	98	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	34.83	116	70-130	
Cleanup Standard	**pg/uL**				
13C12-1,2,3,7,8,9-HxCDF	100	34.05	110	40-130	

ALS Life Sciences

Continuing Calibration Report

Sample Name	**CCV**	Sampling Date	n/a		
ALS Sample ID	H9-20-CCV-0642	Extraction Date	n/a		Approved:
Analysis Method	EPA TO9A	Sample Size	1	n/a	*Ella Gdyczynski*
Analysis Type	CCV	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		14-Sep-2020

Run Information	**Run 1**
Filename	9-200913A26
Run Date	13-Sep-20 14:59
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-9 DB5ms USO287835H

Target Analytes	**pg/uL**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	10	27.04	103	75-125	
1,2,3,7,8-PeCDD	50	31.62	101	75-125	
1,2,3,4,7,8-HxCDD	50	33.73	111	75-125	
1,2,3,6,7,8-HxCDD	50	33.78	106	75-125	
1,2,3,7,8,9-HxCDD	50	33.91	121	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.38	101	75-125	
OCDD	100	36.84	101	75-125	
2,3,7,8-TCDF	10	26.05	97	75-125	
1,2,3,7,8-PeCDF	50	30.60	102	75-125	
2,3,4,7,8-PeCDF	50	31.38	102	75-125	
1,2,3,4,7,8-HxCDF	50	33.22	115	75-125	
1,2,3,6,7,8-HxCDF	50	33.30	107	75-125	
2,3,4,6,7,8-HxCDF	50	33.63	123	75-125	
1,2,3,7,8,9-HxCDF	50	34.05	128	75-125	
1,2,3,4,6,7,8-HpCDF	50	34.83	103	75-125	
1,2,3,4,7,8,9-HpCDF	50	35.61	120	75-125	
OCDF	100	36.92	100	70-130	
Field Spike Standards	**pg/uL**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	10	27.04	94	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	33.72	109	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.37	103	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.21	114	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	35.60	128	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	27.02	103	75-125	
13C12-1,2,3,7,8-PeCDD	100	31.60	132	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	33.77	88	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.37	133	70-130	
13C12-OCDD	200	36.84	142	70-130	
13C12-2,3,7,8-TCDF	100	26.11	110	70-130	
13C12-1,2,3,7,8-PeCDF	100	30.59	135	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.28	85	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	34.83	114	70-130	
Cleanup Standard	**pg/uL**				
13C12-1,2,3,7,8,9-HxCDF	100	34.05	104	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	WG3389564-1	Extraction Date	26-Aug-20		Approved:
Analysis Method	EPA TO9A	Sample Size	1	Sample	*Ella Gdyczynski*
Analysis Type	Blank	Percent Moisture	n/a		--e-signature--
Sample Matrix	MEDIA	Split Ratio	4		14-Sep-2020

Run Information	**Run 1**
Filename	9-200913A19
Run Date	13-Sep-20 10:02
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-9 DB5ms USO287835H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.3	1.3	U		20
1,2,3,7,8-PeCDD	1	31.63	0.960	0.64	M,J		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<1.1	1.1	U		100
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.77	0.77	U		100
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.96	0.96	U		100
1,2,3,4,6,7,8-HpCDD	0.01	35.37	0.890	0.50	M,J		100
OCDD	0.0003	36.81	<2.5	0.88	M,J,R	2.5	200
2,3,7,8-TCDF	0.1	NotFnd	<0.80	0.80	U		20
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.71	0.71	U		100
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.71	0.71	U		100
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.66	0.66	U		100
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.49	0.49	U		100
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.69	0.69	U		100
1,2,3,7,8,9-HxCDF	0.1	34.06	<0.92	0.88	M,J,R	0.92	100
1,2,3,4,6,7,8-HpCDF	0.01	34.81	<0.42	0.32	M,J,R	0.42	100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.46	0.46	U		100
OCDF	0.0003	NotFnd	<0.80	0.80	U		200
Field Spike Standards							
37Cl4-2,3,7,8-TCDD			NS				
13C12-1,2,3,4,7,8-HxCDD			NS				
13C12-2,3,4,7,8-PeCDF			NS				
13C12-1,2,3,4,7,8-HxCDF			NS				
13C12-1,2,3,4,7,8,9-HpCDF			NS				
Extraction Standards							
13C12-2,3,7,8-TCDD	4000	27.02	67	40-130			
13C12-1,2,3,7,8-PeCDD	4000	31.59	113	40-130			
13C12-1,2,3,6,7,8-HxCDD	4000	33.77	62	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.36	111	25-130			
13C12-OCDD	8000	36.81	106	25-130			
13C12-2,3,7,8-TCDF	4000	26.11	80	40-130			
13C12-1,2,3,7,8-PeCDF	4000	30.59	94	40-130			
13C12-1,2,3,6,7,8-HxCDF	4000	33.28	64	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	4000	34.80	102	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	4000	34.04	76	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<1.3	1.3	U	20
Total-PeCDD	1	0.960	0.64		100
Total-HxCDD	0	<1.1	1.1	U	100
Total-HpCDD	1	0.890	0.50		100
Total-TCDF	0	<0.80	0.80	U	20
Total-PeCDF	0	<0.71	0.71	U	100
Total-HxCDF	0	<0.88	0.88	U	100
Total-HpCDF	0	<0.46	0.46	U	100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.969
Mid Point PCDD/F TEQ (WHO 2005)	2.11
Upper Bound PCDD/F TEQ (WHO 2005)	3.15

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	WG3389564-4	Extraction Date	26-Aug-20		Approved:
Analysis Method	EPA TO9A	Sample Size	1	Sample	*Ella Gdyczynski*
Analysis Type	Blank	Percent Moisture	n/a		--e-signature--
Sample Matrix	REAGENT	Split Ratio	4		14-Sep-2020

Run Information	**Run 1**
Filename	9-200913A20
Run Date	13-Sep-20 10:44
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-9 DB5ms USO287835H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.2	1.2	U		20
1,2,3,7,8-PeCDD	1	NotFnd	<0.49	0.49	U		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.89	0.89	U		100
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.64	0.64	U		100
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.80	0.80	U		100
1,2,3,4,6,7,8-HpCDD	0.01	35.36	0.810	0.67	M,J,B		100
OCDD	0.0003	36.81	1.86	0.71	M,J		200
2,3,7,8-TCDF	0.1	NotFnd	<0.68	0.68	U		20
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.51	0.51	U		100
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.51	0.51	U		100
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.40	0.40	U		100
1,2,3,6,7,8-HxCDF	0.1	33.29	<0.30	0.30	M,U	0.25	100
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.42	0.42	U		100
1,2,3,7,8,9-HxCDF	0.1	34.04	1.26	0.54	M,J		100
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<0.39	0.39	U		100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.57	0.57	U		100
OCDF	0.0003	NotFnd	<0.63	0.63	U		200
Field Spike Standards							
37Cl4-2,3,7,8-TCDD			NS				
13C12-1,2,3,4,7,8-HxCDD			NS				
13C12-2,3,4,7,8-PeCDF			NS				
13C12-1,2,3,4,7,8-HxCDF			NS				
13C12-1,2,3,4,7,8,9-HpCDF			NS				
Extraction Standards							
13C12-2,3,7,8-TCDD	4000	27.02	72	40-130			
13C12-1,2,3,7,8-PeCDD	4000	31.59	124	40-130			
13C12-1,2,3,6,7,8-HxCDD	4000	33.77	64	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.35	115	25-130			
13C12-OCDD	8000	36.80	112	25-130			
13C12-2,3,7,8-TCDF	4000	26.11	84	40-130			
13C12-1,2,3,7,8-PeCDF	4000	30.59	105	40-130			
13C12-1,2,3,6,7,8-HxCDF	4000	33.28	70	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	4000	34.80	105	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	4000	34.04	86	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		**LQL**
Total-TCDD	0	<1.2	1.2	U	20
Total-PeCDD	0	<0.49	0.49	U	100
Total-HxCDD	0	<0.89	0.89	U	100
Total-HpCDD	1	0.810	0.67		100
Total-TCDF	0	<0.68	0.68	U	20
Total-PeCDF	0	<0.51	0.51	U	100
Total-HxCDF	1	1.26	0.54		100
Total-HpCDF	0	<0.57	0.57	U	100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.135
Mid Point PCDD/F TEQ (WHO 2005)	1.28
Upper Bound PCDD/F TEQ (WHO 2005)	2.42

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	WG3389564-2	Extraction Date	26-Aug-20		Approved:
Analysis Method	EPA TO9A	Sample Size	1	n/a	*Ella Gdyczynski*
Analysis Type	LCS	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	4		14-Sep-2020

Run Information	**Run 1**
Filename	9-200913A16
Run Date	13-Sep-20 07:55
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-9 DB5ms USO287835H

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	400	27.05	96	70-130	
1,2,3,7,8-PeCDD	2000	31.61	113	70-130	
1,2,3,4,7,8-HxCDD	2000	33.73	128	70-130	
1,2,3,6,7,8-HxCDD	2000	33.79	127	70-130	
1,2,3,7,8,9-HxCDD	2000	33.92	156	70-130	
1,2,3,4,6,7,8-HpCDD	2000	35.37	110	70-130	
OCDD	4000	36.82	100	70-130	
2,3,7,8-TCDF	400	26.14	100	70-130	
1,2,3,7,8-PeCDF	2000	30.62	108	70-130	
2,3,4,7,8-PeCDF	2000	31.38	119	70-130	
1,2,3,4,7,8-HxCDF	2000	33.22	118	70-130	
1,2,3,6,7,8-HxCDF	2000	33.30	129	70-130	
2,3,4,6,7,8-HxCDF	2000	33.63	130	70-130	M
1,2,3,7,8,9-HxCDF	2000	34.05	127	70-130	M
1,2,3,4,6,7,8-HpCDF	2000	34.83	105	70-130	
1,2,3,4,7,8,9-HpCDF	2000	35.61	97	70-130	
OCDF	4000	36.90	90	70-130	
Field Spike Standards					
37Cl4-2,3,7,8-TCDD			NS		
13C12-1,2,3,4,7,8-HxCDD			NS		
13C12-2,3,4,7,8-PeCDF			NS		
13C12-1,2,3,4,7,8-HxCDF			NS		
13C12-1,2,3,4,7,8,9-HpCDF			NS		
Extraction Standards					
13C12-2,3,7,8-TCDD	4000	27.04	90	40-130	
13C12-1,2,3,7,8-PeCDD	4000	31.60	145	40-130	
13C12-1,2,3,6,7,8-HxCDD	4000	33.78	78	40-130	
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.36	131	25-130	
13C12-OCDD	8000	36.82	125	25-130	
13C12-2,3,7,8-TCDF	4000	26.13	110	40-130	
13C12-1,2,3,7,8-PeCDF	4000	30.60	123	40-130	
13C12-1,2,3,6,7,8-HxCDF	4000	33.29	83	40-130	
13C12-1,2,3,4,6,7,8-HpCDF	4000	34.82	125	25-130	
Cleanup Standard	**pg**				
13C12-1,2,3,7,8,9-HxCDF	4000	34.04	96	40-130	

M	Indicates that a peak has been manually integrated.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
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:

8D

Extraction Workup Sheet

Batch ID:	WG3389564
WG3389564	

Analysis:	PUFS - M23/1668A (HR)

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

Analyst:	Saurin Patel

Date:	26-Aug-20

SUBSAMPLING

Sample I.D.	Client I.D.	Media Prep L#
WG3389564-1	Method Blank	L2472405-21
WG3389564-2	Laboratory Control Sample	L2472405-22
WG3389564-3	Extraction and Injection STD.	—
WG3389564-4	Method Blank(Reagent)	S.S
L2491640-1	SITE 1 - COMPOSITE 2 (AUGUST)	L2472405-7,-9,-12,-20
L2491640-2	SITE 2 - COMPOSITE 2 (AUGUST)	L2472405-15,-16,-10,-13
L2491640-3	SITE 3 - COMPOSITE 2 (AUGUST)	L2472405-4,-7,-2,-3
L2491640-4	SITE 4 - COMPOSITE 2 (AUGUST)	L2472405-16,-14,-5,-19
L2491640-5	SITE 5 - COMPOSITE 2 (AUGUST)	L2472405-1,-6,-8,-18

BATCH TRACKING

	Date/Time/Initials
Client Labels Checked:	26-Aug-20 SP
Media transfer to soxhlet:	SP 26-Aug-20
	—
	—
	—
Soxhlet Start Time:	26-Aug-20 SP 2:30PM
Soxhlets Reflux Properly:	SP
Soxhlet End Time:	27-Aug-20 SP 7:50AM
	—
	—
	—
	—
Rotovap Reduction + verify temp:	MM 3-Sep-2020
Extract split:	MM 3-Sep-2020
Acid Silica Column:	MM 3-Sep-2020
Solvent exchange:	8-Sep-2020 NB
Alumina Column:	8-Sep-2020 NB
Split Carbon Col.	8-Sep-2020 NB 9-Sep-2020 KS
Micro/Robo Vial:	8-Sep-20 NB 9-Sep-2020 KS
Update to LIMS:	9-Sep-20 KS

@ see comments MM 3-Sep-2020

DXPCB STACK PREP
3-OCt-18 / MSM RS
Page 1 of 9

Batch ID:	WG3389564

DX Extraction Standard:

Sample I.D.	Volume (ul)	Spiked (Checkmark)
WG3389564-1	40	✓
WG3389564-2	40	✓
WG3389564-3	40	✓
WG3389564-4	40	✓
L2491640-1	40	✓
L2491640-2	40	✓
L2491640-3	40	✓
L2491640-4	40	✓
L2491640-5	40	✓
	40	
	40	
	40	

Syringe ID:	320
Standard:	**M23-ES#2-** 039B
Spike Date:	26 AUG 2020

Spike Witnessing

	Chemist's Initials
Chemist:	SP
	Witness's Initials
Witness:	DS
Correct Syringe Obtained:	DS
Correct Standard Obtained:	DS
Correct Technique Followed:	DS

DXPCB STACK PREP
3-OCt-18 / MSM RS
Page 2 of 9

PCB Extraction Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3389564-1	40	✓
WG3389564-2	40	✓
WG3389564-3	40	✓
WG3389564-4	40	✓
L2491640-1	40	✓
L2491640-2	40	✓
L2491640-3	40	✓
L2491640-4	40	✓
L2491640-5	40	✓
	40	
	40	

Syringe ID: 382

Standard: 1668A-ES#2- 063B

Spike Date: 26-AUG-2020

Spike Witnessing

Chemist: (Chemist's Initials) SP

Witness: (Witness's Initials) [illegible]

Correct Syringe Obtained: (Witness's Initials) [illegible]

Correct Standard Obtained: (Witness's Initials) [illegible]

Correct Technique Followed: (Witness's Initials) [illegible]

Batch ID:	WG3389564

Batch ID:	WG3389564

V = 20 uL

DX Native Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3389564-2	40	✓✓
WG3389564-3	40	✓✓

Syringe ID: 383

Standard: 1613B-NS#3- 028D

Date & Initials: 26 AUG 2020 SP

PCB Native Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3389564-2	40	✓
WG3389564-3	40	✓

Syringe ID: 394

Standard: 1668A-NS#1- 038A

Date & Initials: 26-AUG-2020 SP

DX Cleanup Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3389564-1	20	✓
WG3389564-2	20	✓
WG3389564-3	N/A	N/A
WG3389564-4	20	✓
L2491640-1	20	✓
L2491640-2	20	✓
L2491640-3	20	✓
L2491640-4	20	✓
L2491640-5	20	✓
	20	
	20	

Syringe ID: 357

Standard: M23-CL#1- 036D

Date & Initials: 3-Sep-2020 MM

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

PCB Cleanup Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3389564-1	20	✓
WG3389564-2	20	✓
WG3389564-3	N/A	N/A
WG3389564-4	20	✓
L2491640-1	20	✓
L2491640-2	20	✓
L2491640-3	20	✓
L2491640-4	20	✓
L2491640-5	20	✓
	20	
	20	

Syringe ID: 378

Standard: 1668A-CL#2-036I

Date & Initials: 3-Sep-2020 MM

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

Batch ID:	WG3389564

DX Injection Standard:

Sample I.D.	Volume (ul)	Spiked (Checkmark)
WG3389564-1	10	✓
WG3389564-2	10	✓
WG3389564-3	10	✓
WG3389564-4	10	✓
L2491640-1	10	✓
L2491640-2	10	✓
L2491640-3	10	✓
L2491640-4	10	✓
L2491640-5	10	✓
	10	
	10	
	10	
	10	
	10	
	10	
	10	

Syringe ID: 392

Standard: 1613B-IS#1- 084H

Date & Initials: 9-Sep-2020 KB

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

PCB Injection Standard:

Sample I.D.	Volume (ul)	Spiked (Checkmark)
WG3389564-1	5	✓
WG3389564-2	5	✓
WG3389564-3	5	✓
WG3389564-4	5	✓
L2491640-1	5	✓
L2491640-2	5	✓
L2491640-3	5	✓
L2491640-4	5	✓
L2491640-5	5	✓
	5	✓
	5	
	5	
	5	
	5	
	5	
	5	

Syringe ID: 365

Standard: 1668A-IS#2- 013A

Date & Initials: 8-Sep-2020 NB

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

Batch ID:	WG3389564

Reagent Lot Numbers:

Reagent	Lot#	Manufacturer
Acetone	105484	
Hexane	105456	
DCM	105532	
Toluene	~~105532~~ 105355 Exp. 2020	
Nonane	ORG-WAKONON-055	
1:1 DCM:HEX	ORG-DH2- 145	
Sodium Sulphate	ORG-SSU- 2349, 2353	
Acid Silica	ORG-ASI- 9708	
Neutral Silica	ORG-NSI- 2378	
Alumina	ORG-ALU- 473	
1% Deactivated Silica	ORG-2%DAS- —	
Chromacarb	ORG-CC- 277	

Batch ID:	WG3389564

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 the XAD in to a precleaned thimble and transfer to soxhlet body

- Spike with Extraction Standard (plus Native for LCS and ENI).
- Soxhlet extract in DCM for 16 hours

Rotovap:

- Rotovap and reduce to ~5mL.
- Transfer to a calibrated c-tube (marked at 1ml, 2ml) with 3x2ml hexane
- Mix well then quantitatively spilt the extract **1/2 DX/PCB** **1/2 Archive**

Batch ID:	WG3389564

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:	WG3389564

Comments:

NOTE: Label and Save All Columns including Acid Silica Columns
W2 → water present in flask (~2mL) Roto-vapped down to ~5mL. Put water in separate
c-tube, Rinsed x3 w/ 1mL Hexane. Transferred to W2 c-tube and combined. 3-Sep-2020 MM
→ Water portion is archived in cupboard, under roto-vaps. 3-Sep-2020 MM

Approval of Deviation from Standard Method

(Batch Writer): _____

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

WG3389564			Prep Analyst:		
PUFS - 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					

ALS Life Sciences

Sample Calculation Report

Approved: *Ella Gdyczynski* --e-signature-- 14-Sep-2020

CS3 RRF Check

RRF = (Response of 2,3,7,8-TCDD / Response of 13C12-2,3,7,8-TCDD) x (Concentration of 13C12-2,3,7,8-TCDD / Concentration of TCDD)

						Calculated Value	Value from TargetLynx
RRF	=	**77672.50** / **903279.60**	x	**100** / **10**	=	**0.860**	**0.860**

Calculation of OCDD amount in L2491640-1

pg = (Response of OCDD / Response of 13C12-OCDD) x (pg of 13C12-OCDD spiked / Mean RRF * Sample Size)

pg	=	**3357.8** / **1225507.3**	x	**8000** / **0.9216** * **1.00**	=	**23.8**	**23.8**	

Calculation of 13C12-2,3,7,8-TCDD Recovery in L2491640-1

% Recovery = (Response of 13C12-2,3,7,8-TCDD / Response of 13C12-1,2,3,4-TCDD) x (pg of 13C12-1,2,3,4-TCDD spiked * 100 / Mean RRF * Amount Spiked)

% Recovery	=	**1013832.6** / **1445093.4**	x	**2000** * **100** / **0.94** * **2000**	=	**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:

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2482298-COFC

COC Number: 17 - 792164

Page of

Composite WO: L2491640

Report To	Contact and company name below will appear on the final report
Company:	Farallon Consulting LLC
Contact:	Amber Bailey
Phone:	206-910-4320
	Company address below will appear on the final report
Street:	975 5th Ave NW
City/Province:	Issaquah, WA
Postal Code:	98059
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@farallonconsulting.com

Email 2

Email 3

Invoice Distribution

Select Invoice Distribution: [X] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax AP@farallonconsulting.com

Email 2 abailey@farallonconsulting.com

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		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:

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	PCBs EPA Method 1668C	Dioxins EPA Method 8290A	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	LZ472405-12-1	7/29/20	0831	Air	1	X	X		
2	LZ472405-11-2		0852		1	X	X		
3	LZ472405-4-3		0919		1	X	X		
4	LZ472405-19-4		0931		1	X	X		
5	LZ472405-1-5		0941		1	X	X		

N/A

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)

Please hold samples for monthly 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			
8.1°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:
	7/29/2020	1530	[illegible]	31-July-2020	11:20			

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**.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com
Canada Toll Free: 1 800 668 9878

L2485375-COFC

COC Number: 17 - 792149

Page 1 of 1

Composite WO: L2491640

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:	Farallon Consulting LLC	Select Report Format:	[X] PDF [X] EXCEL [ ] EDD (DIGITAL)	Regular [R] [X] 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:	206-910-4320	[ ] 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:	[X] 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@farallonconsulting.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Issaquah, WA	Email 2		
Postal Code:	98059	Email 3		
Invoice To	Same as Report To [X] YES [ ] NO	**Invoice Distribution**		
	Copy of Invoice with Report [X] YES [ ] NO	Select Invoice Distribution:	[X] EMAIL [ ] MAIL [ ] FAX	
Company:		Email 1 or Fax	AP@farallonconsulting.com	
Contact:		Email 2	abailey@farallonconsulting.com	

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:

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	PCB's EPA Method 1668B	Dioxins EPA Method 8290A	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	L2472405-20-1	8/4/20	1028	Air	1	X	X		
2	L2472405-13-2	"	1001	"	1	X	X		
3	L2472405-2-3	"	0939	"	1	X	X		
4	L2472405-5-4	"	0926	"	1	X	X		
5	L2472405-16-5	"	0917	"	1	X	X		

MA

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	Please hold samples for monthly composite
Are samples for human consumption/ use? [ ] YES [ ] NO	

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			
15.8°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:
Mda Cla	8/4/20	1153	AARON BURTON	7-Aug-2020	11:40			

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**

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2488764-COFC

COC Number: 17 - 792150

Page 1 of 1

Composite WO: L2491640

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:	Faralon Consulting	Select Report Format: [X] PDF [X] EXCEL [ ] EDD (DIGITAL)	Regular [R] [X] 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:	206-910-4320	[ ] 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: [X] 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@faralonconsulting.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Issaquah, WA	Email 2	
Postal Code:	98059	Email 3	
Invoice To	Same as Report To [X] YES [ ] NO	**Invoice Distribution**	**Analysis Request**
	Copy of Invoice with Report [X] YES [ ] NO	Select Invoice Distribution: [X] EMAIL [ ] MAIL [ ] FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax AP@faralonconsulting.com	
Contact:		Email 2 abailey@faralonconsulting.com	

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 EPA Method 1668A; Dioxins EPA Method 8290A	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	L2472405-17-1	8/11/20	0901	Air			
2	L2472405-10-2	"	0933	"			
3	L2472405-7-3	"	1001	"			
4	L2472405-16-4	"	1035	"			
5	L2472405-8-5	"	1050	"			

N/A

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	Please composite all 4 sets of samples from previous weeks
Are samples for human consumption/ use? [ ] YES [ ] NO	

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			
25.1°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:
[signature]	8/11/20	1217	TARA BRATON	14-Aug-2020	10:40			

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**.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2491634-COFC

COC Number: 17 - 792151

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Composite WO: L2491640

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:	Farallon consulting	Select Report Format: [X] PDF [X] EXCEL [ ] EDD (DIGITAL)	Regular [R] [X] 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 6178	[ ] 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: [X] 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@farallonconsulting.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Issaquah WA	Email 2	
Postal Code:	98059	Email 3	

Invoice To			Invoice Distribution	
	Same as Report To	[X] YES [ ] NO	Select Invoice Distribution:	[X] EMAIL [ ] MAIL [ ] FAX
	Copy of Invoice with Report	[X] YES [ ] NO	Email 1 or Fax	AP@farallonconsulting.com
Company:			Email 2	
Contact:				

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 EPA method 1668	Dioxins EPA method 8290A	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	L2472405-9-1	8/18/20	1047	Air	2	X	X	X	
2	L2472405-15-2		1116		2	X	X	X	
3	L2472405-3-3		1143		2	X	X	X	
4	L2472405-14-4		1152		2	X	X	X	
5	L2472405-18-5		1201		2	X	X	X	

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

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	Please hold samples for monthly composite.
Are samples for human consumption/ use? [ ] YES [ ] NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

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

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
5.2°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:
	8/18/20	1330	ARRAN BURTON	19-Aug-2020	14:45			

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
[redacted]								
31-July-2020 11:20	FARALLON Consulting	5 x PUFS	8.1°C	Good FedEx 7910 [redacted] 1531	NJ	31-July-2020 11:50	L2482298	-1-5
[redacted]								

*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
7-Aug-2020 11:40	FARALLON	5 x PUFs	15.8°C	Good Fedex 7910 6540 9775	MJ	7-Aug 2020 13:45	L2485375	-1-5

*Temperatures were recorded using :

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

☐ Other (specify): _____

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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
14-Aug-2020 10:40	FARALLON	5 x PUFs	25.1°C	Good FedEx 791068174265	NG	14-Aug-2020 11:45	L2488764	-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
[redacted]								
19-Aug-2020 14:45	FARALLON	5 x PUFs	5.2°C	Good FedEx 7712 2337 8758	MG	20-Aug-2020 12:00	L2491634	1-5

*Temperatures were recorded using :

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

☐ Other (specify): _____

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