



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

SVOC DATA PACKAGE

Client Project Information

Project ID: 1466-004 SEATTLE IRON & METALS
Project Description:
Contact: Molly Alar

ALSE Project Information

Project ID: FAR100
Contact: Breanne Dusureault
Submission ID(s): L2602390

Final Package Review by:

A handwritten signature in black ink, appearing to read "R.A. Myer".

Date Reviewed:

28-Jul-21



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: Breanne Dusureault
 Submission ID(s): L2602390

Client Project Information

Project ID: 1466-004 SEATTLE IRON & METALS
 Project Description:
 Contact: Molly Alar

Analytical Method: PCDD/F by EPA M23

ALS Sample ID	Client Sample Descriptions	Matrix	Date Sampled	Date Received	Date Extracted	Date Analyzed
L2602390-1	SITE 1 - COMPOSITE 6 (WET SEASON - APR, MAY, JUN)	Puf	Composite	Composite	23-Jun-21	24-Jul-21
L2602390-2	SITE 2 - COMPOSITE 6 (WET SEASON - APR, MAY, JUN)	Puf	Composite	Composite	23-Jun-21	11-Jul-21
L2602390-3	SITE 3 - COMPOSITE 6 (WET SEASON - APR, MAY, JUN)	Puf	Composite	Composite	23-Jun-21	11-Jul-21
L2602390-4	SITE 4 - COMPOSITE 6 (WET SEASON - APR, MAY, JUN)	Puf	Composite	Composite	23-Jun-21	11-Jul-21
L2602390-5	SITE 5 - COMPOSITE 6 (WET SEASON - APR, MAY, JUN)	Puf	Composite	Composite	23-Jun-21	11-Jul-21
L2577435-1 to -5	April Individual Samples	PUFs	15-Apr-21	16-Apr-21	23-Jun-21	composited
L2588195-1 to -5	May Individual Samples	PUFs	13-May-21	14-May-21	23-Jun-21	composited
L2602387-1 to -5	June Individual Samples	PUFs	15-Jun-21	16-Jun-21	23-Jun-21	composited
WG3559668-1	Media Blank	Qc	n/a	n/a	23-Jun-21	10-Jul-21
WG3559668-4	Method Blank	Qc	n/a	n/a	23-Jun-21	10-Jul-21
WG3559668-2	Laboratory Control Sample	Qc	n/a	n/a	23-Jun-21	10-Jul-21

Comments and Notes:

a) Sample Integrity:

Samples sets L2577435, L2588195 & L2602387 were received in good condition at temperatures of 7.3, 6.0 and 15.8 deg C respectively

b) Prep & Instrumental Analysis:

Samples were co-extracted for PCB and PCDD/F targets. The raw extracts were split prior to cleanups for the respective analyses.

The CS#2 standard in the initial calibration run 9-210709A was a misinjection. That calibration utilized the CS#0 in lieu to create a 5-point calibration.

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.

Reviewer and Title

28-Jul-21

Date

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SECTION 2: DATA SUMMARY REPORT



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

Certificate of Analysis

ALS Project Contact:	Breanne Dusureault	Client Name:	Farallon Consulting, L.L.C.
ALS Project ID:	FAR100	Client Address:	975 5th Avenue Northwest
ALS WO#:	L2602390		Issaquah
Date of Report	28-Jul-21		WA 98027
Date of Sample Receipt	16-Jun-21	Client Contact:	Molly Alar
		Client Project ID:	1466-004 SEATTLE IRON & METALS

COMMENTS: PCDD/F by EPA M23

The CS#2 standard in the initial calibration run 9-210709A was a misinjection. That calibration utilized the CS#0 in lieu to create a 5-point calibration.

Certified by:

A handwritten signature in black ink, appearing to read "R. A. McLeod", is written over a horizontal line.

Ron McLeod, PhD
Director, Air Toxics & Special Chemistries, Life Sciences

Results in this certificate relate only to the samples as submitted to the laboratory.

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Sample Analysis Summary Report

Sample Name	SITE 1 - COMPOSITE 6 (WET SEASON - APR. MAY. JUN) L2602390-1	SITE 2 - COMPOSITE 6 (WET SEASON - APR. MAY. JUN) L2602390-2	SITE 3 - COMPOSITE 6 (WET SEASON - APR. MAY. JUN) L2602390-3	SITE 4 - COMPOSITE 6 (WET SEASON - APR. MAY. JUN) L2602390-4	SITE 5 - COMPOSITE 6 (WET SEASON - APR. MAY. JUN) L2602390-5
ALS Sample ID					
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	23-Jun-21	23-Jun-21	23-Jun-21	23-Jun-21	23-Jun-21
Target Analytes	pg	pg	pg	pg	pg
2,3,7,8-TCDD	<1.4	<2.5	<1.9	<1.8	<1.6
1,2,3,7,8-PeCDD	<2.1	<1.7	<1.3	<1.2	<0.87
1,2,3,4,7,8-HxCDD	<2.5	<2.2	<2.0	<3.0	<1.4
1,2,3,6,7,8-HxCDD	<2.1	<2.1	4.60	<2.6	5.01
1,2,3,7,8,9-HxCDD	<2.2	<2.9	<1.7	<2.8	2.14
1,2,3,4,6,7,8-HpCDD	40.5	52.2	86.2	58.2	76.5
OCDD	198	267	507	341	471
2,3,7,8-TCDF	<2.1	<4.0	<2.6	<2.3	<1.8
1,2,3,7,8-PeCDF	<2.2	4.60	<1.5	<1.5	2.03
2,3,4,7,8-PeCDF	<2.5	7.84	<2.6	<3.0	<2.8
1,2,3,4,7,8-HxCDF	<1.3	<4.8	<3.4	3.13	3.17
1,2,3,6,7,8-HxCDF	<1.2	4.40	<2.5	<1.9	<2.8
2,3,4,6,7,8-HxCDF	<1.3	6.53	<2.0	<1.9	2.51
1,2,3,7,8,9-HxCDF	<1.4	<1.6	<2.0	<2.5	<1.9
1,2,3,4,6,7,8-HpCDF	<6.8	<23	29.7	<14	15.8
1,2,3,4,7,8,9-HpCDF	<1.6	<3.4	<1.8	<1.3	<1.6
OCDF	17.3	<19	30.7	26.1	23.6
Field Spike Standards	% Rec	% Rec	% Rec	% Rec	% Rec
37C14-2,3,7,8-TCDD	103	94	97	97	98
13C12-1,2,3,4,7,8-HxCDD	86	95	98	86	97
13C12-2,3,4,7,8-PeCDF	110	118	116	119	118
13C12-1,2,3,4,7,8-HxCDF	78	100	101	82	95
13C12-1,2,3,4,7,8,9-HpCDF	78	110	119	109	109
Extraction Standards					
13C12-2,3,7,8-TCDD	55	53	51	45	56
13C12-1,2,3,7,8-PeCDD	55	64	62	56	79
13C12-1,2,3,6,7,8-HxCDD	78	73	62	60	80
13C12-1,2,3,4,6,7,8-HpCDD	46	67	61	48	72
13C12-OCDD	33	65	62	47	71
13C12-2,3,7,8-TCDF	59	59	55	49	66
13C12-1,2,3,7,8-PeCDF	53	57	57	52	74
13C12-1,2,3,6,7,8-HxCDF	85	65	55	57	75
13C12-1,2,3,4,6,7,8-HpCDF	56	66	58	47	71
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	55	72	67	59	80
Homologue Group Totals	pg	pg	pg	pg	pg
Total-TCDD	<1.4	24.5	<1.9	6.81	<1.6
Total-PeCDD	<2.1	5.72	3.66	<1.2	3.65
Total-HxCDD	<2.5	<2.2	21.3	14.2	16.0
Total-HpCDD	99.3	124	183	123	168
Total-TCDF	<2.1	61.4	22.8	19.5	13.6
Total-PeCDF	4.46	92.3	23.9	5.30	36.9
Total-HxCDF	2.01	13.7	22.2	14.3	18.1
Total-HpCDF	<1.6	12.5	50.7	12.6	30.9
Toxic Equivalency - (WHO 2005)					
Lower Bound PCDD/F TEQ (WHO 2005)	0.470	4.19	1.78	1.01	2.42
Mid Point PCDD/F TEQ (WHO 2005)	3.85	8.96	5.50	4.52	5.11
Upper Bound PCDD/F TEQ (WHO 2005)	6.28	10.4	7.44	6.80	6.53

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Quality Control Summary Report

Sample Name	Media Blank	Method Blank	Laboratory Control Sample
ALS Sample ID	WG3559668-1	WG3559668-4	WG3559668-2
Sample Size	1	1	1
Sample size units	sample	sample	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	23-Jun-21	23-Jun-21	23-Jun-21
Target Analytes	pg	pg	% Rec
2,3,7,8-TCDD	<1.3	<1.1	88
1,2,3,7,8-PeCDD	<0.79	<0.79	105
1,2,3,4,7,8-HxCDD	<0.75	<0.70	107
1,2,3,6,7,8-HxCDD	<0.67	<0.62	99
1,2,3,7,8,9-HxCDD	<0.70	<0.65	104
1,2,3,4,6,7,8-HpCDD	<2.3	1.96	94
OCDD	9.38	<4.4	90
2,3,7,8-TCDF	<0.83	<1.0	94
1,2,3,7,8-PeCDF	<0.98	<0.76	106
2,3,4,7,8-PeCDF	<0.91	<0.71	99
1,2,3,4,7,8-HxCDF	0.780	<0.71	99
1,2,3,6,7,8-HxCDF	<0.59	0.780	103
2,3,4,6,7,8-HxCDF	<0.79	<0.75	109
1,2,3,7,8,9-HxCDF	<1.1	<0.98	114
1,2,3,4,6,7,8-HpCDF	<0.95	<0.77	96
1,2,3,4,7,8,9-HpCDF	<1.3	<1.1	107
OCDF	<2.5	<1.6	90
Field Spike Standards	% Rec	% Rec	% Rec
37Cl4-2,3,7,8-TCDD	NS	NS	NS
13C12-1,2,3,4,7,8-HxCDD	NS	NS	NS
13C12-2,3,4,7,8-PeCDF	NS	NS	NS
13C12-1,2,3,4,7,8-HxCDF	NS	NS	NS
13C12-1,2,3,4,7,8,9-HpCDF	NS	NS	NS
Extraction Standards			
13C12-2,3,7,8-TCDD	56	54	65
13C12-1,2,3,7,8-PeCDD	63	63	72
13C12-1,2,3,6,7,8-HxCDD	63	63	73
13C12-1,2,3,4,6,7,8-HpCDD	68	68	76
13C12-OCDD	73	67	89
13C12-2,3,7,8-TCDF	63	59	68
13C12-1,2,3,7,8-PeCDF	59	58	69
13C12-1,2,3,6,7,8-HxCDF	59	57	71
13C12-1,2,3,4,6,7,8-HpCDF	71	68	77
Cleanup Standard			
13C12-1,2,3,7,8,9-HxCDF	69	67	79
Homologue Group Totals	pg	pg	
Total-TCDD	<1.3	<1.1	
Total-PeCDD	<0.79	<0.79	
Total-HxCDD	<0.75	<0.70	
Total-HpCDD	<0.66	1.96	
Total-TCDF	<0.83	<1.0	
Total-PeCDF	<0.98	<0.76	
Total-HxCDF	<0.84	<0.98	
Total-HpCDF	<1.3	<1.1	
Toxic Equivalency - (WHO 2005)			
Lower Bound PCDD/F TEQ (WHO 2005)	0.0808	0.0976	
Mid Point PCDD/F TEQ (WHO 2005)	1.68	1.44	
Upper Bound PCDD/F TEQ (WHO 2005)	3.06	2.78	

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Continuing Calibration Summary Report

Sample Name	CCV	CCV	CCV	CCV	CCV	CCV
ALS Sample ID	H9-21-CCV-582	H9-21-CCV-584	H9-21-CCV-585	H9-21-CCV-586	H9-21-CCV-622	H9-21-CCV-615
Sample Size	1	1	1	1	1	1
Sample size units	n/a	n/a	n/a	n/a	n/a	n/a
Percent Moisture	n/a	n/a	n/a	n/a	n/a	n/a
Sample Matrix	QC	QC	QC	QC	QC	QC
Sampling Date	n/a	n/a	n/a	n/a	n/a	n/a
Extraction Date	n/a	n/a	n/a	n/a	n/a	n/a
Target Analytes	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
2,3,7,8-TCDD	96	97	99	99	111	111
1,2,3,7,8-PeCDD	98	98	99	99	102	103
1,2,3,4,7,8-HxCDD	101	98	97	95	95	98
1,2,3,6,7,8-HxCDD	95	99	98	91	101	96
1,2,3,7,8,9-HxCDD	96	95	97	87	96	93
1,2,3,4,6,7,8-HpCDD	94	98	96	96	106	104
OCDD	93	95	92	92	87	86
2,3,7,8-TCDF	101	105	108	105	124	123
1,2,3,7,8-PeCDF	101	99	101	98	106	105
2,3,4,7,8-PeCDF	102	100	102	99	105	107
1,2,3,4,7,8-HxCDF	98	100	96	94	100	99
1,2,3,6,7,8-HxCDF	96	101	98	100	108	105
2,3,4,6,7,8-HxCDF	100	101	98	97	102	101
1,2,3,7,8,9-HxCDF	100	114	105	100	93	97
1,2,3,4,6,7,8-HpCDF	96	95	93	94	101	103
1,2,3,4,7,8,9-HpCDF	96	104	100	101	101	97
OCDF	93	100	98	98	100	100
Field Spike Standards	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
37Cl4-2,3,7,8-TCDD	93	93	92	93	95	95
13C12-1,2,3,4,7,8-HxCDD	101	97	97	92	96	100
13C12-2,3,4,7,8-PeCDF	105	102	105	102	101	104
13C12-1,2,3,4,7,8-HxCDF	103	103	101	97	94	92
13C12-1,2,3,4,7,8,9-HpCDF	99	109	106	107	98	99
Extraction Standards						
13C12-2,3,7,8-TCDD	103	104	101	101	104	101
13C12-1,2,3,7,8-PeCDD	137	110	109	98	99	97
13C12-1,2,3,6,7,8-HxCDD	99	105	104	105	109	107
13C12-1,2,3,4,6,7,8-HpCDD	98	103	101	97	108	104
13C12-OCDD	103	108	102	94	117	107
13C12-2,3,7,8-TCDF	103	104	101	101	103	98
13C12-1,2,3,7,8-PeCDF	101	107	104	98	97	93
13C12-1,2,3,6,7,8-HxCDF	95	98	99	100	112	110
13C12-1,2,3,4,6,7,8-HpCDF	100	104	103	97	120	115
Cleanup Standard						
13C12-1,2,3,7,8,9-HxCDF	98	110	107	104	104	103

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Sample Analysis Report

Sample Name	SITE 1 - COMPOSITE 6 (WET SEASON - APR, MAY, JUN)	Sampling Date	n/a	
ALS Sample ID	L2602390-1	Extraction Date	23-Jun-21	
Analysis Method	EPA M23	Sample Size	1	sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	PUF	Split Ratio	4	

Approved:
Ella Gdyczynski
--e-signature--
13-Jul-2021

Run Information		Run 1
Filename	9-210724A09	
Run Date	24-Jul-21 11:02	
Final Volume	10	uL
Dilution Factor	1	
Analysis Units	pg	
Instrument - Column	HRMS-9 DB5ms US1144784H	

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
2,3,7,8-TCDD	1	NotFnd	<1.4	1.4	U		4.0
1,2,3,7,8-PeCDD	1	NotFnd	<2.1	2.1	U		20
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<2.5	2.5	U		20
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<2.1	2.1	U		20
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<2.2	2.2	U		20
1,2,3,4,6,7,8-HpCDD	0.01	35.92	40.5	1.8			20
OCDD	0.0003	37.32	198	2.6			40
2,3,7,8-TCDF	0.1	26.26	<2.1	2.1	U	0.76	4.0
1,2,3,7,8-PeCDF	0.03	NotFnd	<2.2	2.2	U		20
2,3,4,7,8-PeCDF	0.3	31.75	<2.5	2.1	J,R	2.5	20
1,2,3,4,7,8-HxCDF	0.1	33.73	<1.3	1.3	J,R	1.3	20
1,2,3,6,7,8-HxCDF	0.1	33.80	<1.2	1.2	U	0.93	20
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<1.3	1.3	U		20
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<1.4	1.4	U		20
1,2,3,4,6,7,8-HpCDF	0.01	35.37	<6.8	1.3	J,R	6.8	20
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.6	1.6	U		20
OCDF	0.0003	37.41	17.3	2.2	J		40
Field Spike Standards	pg	% Rec	Limits				
37Cl4-2,3,7,8-TCDD	1800	27.12	103	70-130			
13C12-1,2,3,4,7,8-HxCDD	18000	34.25	86	70-130			
13C12-2,3,4,7,8-PeCDF	18000	31.80	110	70-130			
13C12-1,2,3,4,7,8-HxCDF	18000	33.72	78	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	18000	36.13	78	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	4000	27.11	55	40-130			
13C12-1,2,3,7,8-PeCDD	4000	32.05	55	40-130			
13C12-1,2,3,6,7,8-HxCDD	4000	34.31	78	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.90	46	25-130			
13C12-OCDD	8000	37.31	33	25-130			
13C12-2,3,7,8-TCDF	4000	26.21	59	40-130			
13C12-1,2,3,7,8-PeCDF	4000	30.97	53	40-130			
13C12-1,2,3,6,7,8-HxCDF	4000	33.80	85	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.36	56	25-130			
Cleanup Standard	pg						
13C12-1,2,3,7,8,9-HxCDF	4000	34.59	55	40-130			
Homologue Group Totals	# peaks	Conc.	EDL				
		pg	pg				
Total-TCDD	0	<1.4	1.4	U		4.0	
Total-PeCDD	0	<2.1	2.1	U		20	
Total-HxCDD	0	<2.5	2.5	U		20	
Total-HpCDD	2	99.3	1.8			20	
Total-TCDF	0	<2.1	2.1	U		4.0	
Total-PeCDF	2	4.46	2.2			20	
Total-HxCDF	1	2.01	1.4			20	
Total-HpCDF	0	<1.6	1.6	U		20	

Toxic Equivalency - (WHO 2005)	pg
Lower Bound PCDD/F TEQ (WHO 2005)	0.470
Mid Point PCDD/F TEQ (WHO 2005)	3.85
Upper Bound PCDD/F TEQ (WHO 2005)	6.28

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
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 2 - COMPOSITE 6 (WET SEASON - APR, MAY, JUN)	Sampling Date	n/a	
ALS Sample ID	L2602390-2	Extraction Date	23-Jun-21	
Analysis Method	EPA M23	Sample Size	1	sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	PUF	Split Ratio	4	

Approved:
Ella Gdyczynski
--e-signature--
13-Jul-2021

Run Information		Run 1
Filename	9-210710A13	
Run Date	11-Jul-21 00:20	
Final Volume	10 uL	
Dilution Factor	1	
Analysis Units	pg	
Instrument - Column	HRMS-9 DB5ms US1144784H	

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
2,3,7,8-TCDD	1	NotFnd	<2.5	2.5	U		4.0
1,2,3,7,8-PeCDD	1	32.05	<1.7	1.3	J,R	1.7	20
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<2.2	2.2	U		20
1,2,3,6,7,8-HxCDD	0.1	34.28	<2.1	2.0	J,R	2.1	20
1,2,3,7,8,9-HxCDD	0.1	34.39	<2.9	2.1	J,R	2.9	20
1,2,3,4,6,7,8-HpCDD	0.01	35.85	52.2	1.3			20
OCDD	0.0003	37.26	267	1.6			40
2,3,7,8-TCDF	0.1	26.32	<4.0	3.0	R	4.0	4.0
1,2,3,7,8-PeCDF	0.03	30.99	4.60	2.0	M,J		20
2,3,4,7,8-PeCDF	0.3	31.81	7.84	1.9	J		20
1,2,3,4,7,8-HxCDF	0.1	33.69	<4.8	1.1	M,J,R	4.8	20
1,2,3,6,7,8-HxCDF	0.1	33.78	4.40	1.1	M,J		20
2,3,4,6,7,8-HxCDF	0.1	34.13	6.53	1.2	M,J		20
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<1.6	1.6	U		20
1,2,3,4,6,7,8-HpCDF	0.01	35.30	<23	2.4	M,R	23	20
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<3.4	3.4	U		20
OCDF	0.0003	37.34	<19	1.4	J,R	19	40
Field Spike Standards	pg		% Rec	Limits			
37Cl4-2,3,7,8-TCDD	1800	27.23	94	70-130			
13C12-1,2,3,4,7,8-HxCDD	18000	34.21	95	70-130			
13C12-2,3,4,7,8-PeCDF	18000	31.80	118	70-130			
13C12-1,2,3,4,7,8-HxCDF	18000	33.69	100	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	18000	36.08	110	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	4000	27.20	53	40-130			
13C12-1,2,3,7,8-PeCDD	4000	32.04	64	40-130			
13C12-1,2,3,6,7,8-HxCDD	4000	34.26	73	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.83	67	25-130			
13C12-OCDD	8000	37.25	65	25-130			
13C12-2,3,7,8-TCDF	4000	26.30	59	40-130			
13C12-1,2,3,7,8-PeCDF	4000	30.97	57	40-130			
13C12-1,2,3,6,7,8-HxCDF	4000	33.76	65	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.30	66	25-130			
Cleanup Standard	pg						
13C12-1,2,3,7,8,9-HxCDF	4000	34.53	72	40-130			
Homologue Group Totals		# peaks	Conc. pg	EDL pg			
Total-TCDD		2	24.5	2.5			4.0
Total-PeCDD		1	5.72	1.3			20
Total-HxCDD		0	<2.2	2.2	U		20
Total-HpCDD		2	124	1.3			20
Total-TCDF		6	61.4	3.0			4.0
Total-PeCDF		7	92.3	2.0			20
Total-HxCDF		3	13.7	1.6			20
Total-HpCDF		1	12.5	3.4			20

Toxic Equivalency - (WHO 2005)	pg
Lower Bound PCDD/F TEQ (WHO 2005)	4.19
Mid Point PCDD/F TEQ (WHO 2005)	8.96
Upper Bound PCDD/F TEQ (WHO 2005)	10.4

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
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

ALS Life Sciences

Sample Analysis Report

Sample Name	SITE 3 - COMPOSITE 6 (WET SEASON - APR, MAY, JUN)	Sampling Date	n/a	
ALS Sample ID	L2602390-3	Extraction Date	23-Jun-21	
Analysis Method	EPA M23	Sample Size	1	sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	PUF	Split Ratio	4	

Approved:
Ella Gdyczynski
--e-signature--
13-Jul-2021

Run Information		Run 1
Filename	9-210710A14	
Run Date	11-Jul-21 01:03	
Final Volume	10 uL	
Dilution Factor	1	
Analysis Units	pg	
Instrument - Column	HRMS-9 DB5ms US1144784H	

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
2,3,7,8-TCDD	1	NotFnd	<1.9	1.9	U		4.0
1,2,3,7,8-PeCDD	1	NotFnd	<1.3	1.3	U		20
1,2,3,4,7,8-HxCDD	0.1	34.21	<2.0	1.8	M,J,R	2.0	20
1,2,3,6,7,8-HxCDD	0.1	34.27	4.60	1.6	M,J		20
1,2,3,7,8,9-HxCDD	0.1	34.41	<1.7	1.7	M,U	1.0	20
1,2,3,4,6,7,8-HpCDD	0.01	35.83	86.2	1.1			20
OCDD	0.0003	37.25	507	1.7			40
2,3,7,8-TCDF	0.1	NotFnd	<2.6	2.6	U		4.0
1,2,3,7,8-PeCDF	0.03	NotFnd	<1.5	1.5	U		20
2,3,4,7,8-PeCDF	0.3	31.80	<2.6	1.4	M,J,R	2.6	20
1,2,3,4,7,8-HxCDF	0.1	33.69	<3.4	1.5	M,J,R	3.4	20
1,2,3,6,7,8-HxCDF	0.1	33.77	<2.5	1.4	M,J,R	2.5	20
2,3,4,6,7,8-HxCDF	0.1	34.11	<2.0	1.5	M,J,R	2.0	20
1,2,3,7,8,9-HxCDF	0.1	34.53	<2.0	2.0	M,U		20
1,2,3,4,6,7,8-HpCDF	0.01	35.30	29.7	1.3			20
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.8	1.8	U		20
OCDF	0.0003	37.33	30.7	1.2	J		40
Field Spike Standards	pg	% Rec	Limits				
37Cl4-2,3,7,8-TCDD	1800	27.21	97	70-130			
13C12-1,2,3,4,7,8-HxCDD	18000	34.20	98	70-130			
13C12-2,3,4,7,8-PeCDF	18000	31.78	116	70-130			
13C12-1,2,3,4,7,8-HxCDF	18000	33.68	101	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	18000	36.06	119	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	4000	27.20	51	40-130			
13C12-1,2,3,7,8-PeCDD	4000	32.03	62	40-130			
13C12-1,2,3,6,7,8-HxCDD	4000	34.26	62	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.83	61	25-130			
13C12-OCDD	8000	37.24	62	25-130			
13C12-2,3,7,8-TCDF	4000	26.30	55	40-130			
13C12-1,2,3,7,8-PeCDF	4000	30.97	57	40-130			
13C12-1,2,3,6,7,8-HxCDF	4000	33.75	55	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.29	58	25-130			
Cleanup Standard	pg						
13C12-1,2,3,7,8,9-HxCDF	4000	34.53	67	40-130			
Homologue Group Totals	# peaks	Conc.	EDL				
		pg	pg				
Total-TCDD	0	<1.9	1.9	U			
Total-PeCDD	1	3.66	1.3				
Total-HxCDD	2	21.3	1.8				
Total-HpCDD	2	183	1.1				
Total-TCDF	5	22.8	2.6				
Total-PeCDF	2	23.9	1.5				
Total-HxCDF	2	22.2	2.0				
Total-HpCDF	2	50.7	1.8				

Toxic Equivalency - (WHO 2005)	pg
Lower Bound PCDD/F TEQ (WHO 2005)	1.78
Mid Point PCDD/F TEQ (WHO 2005)	5.50
Upper Bound PCDD/F TEQ (WHO 2005)	7.44

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

ALS Life Sciences

Sample Analysis Report

Sample Name	SITE 4 - COMPOSITE 6 (WET SEASON - APR, MAY, JUN)	Sampling Date	n/a	
ALS Sample ID	L2602390-4	Extraction Date	23-Jun-21	
Analysis Method	EPA M23	Sample Size	1	sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	PUF	Split Ratio	4	

Approved:
Ella Gdyczynski
--e-signature--
13-Jul-2021

Run Information		Run 1	
Filename	9-210710A23		
Run Date	11-Jul-21 07:40		
Final Volume	10 uL		
Dilution Factor	1		
Analysis Units	pg		
Instrument - Column	HRMS-9 DB5ms US1144784H		

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
2,3,7,8-TCDD	1	27.23	<1.8	1.8	M,U	1.5	4.0
1,2,3,7,8-PeCDD	1	NotFnd	<1.2	1.2	U		20
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<3.0	3.0	U		20
1,2,3,6,7,8-HxCDD	0.1	34.27	<2.6	2.6	U	2.3	20
1,2,3,7,8,9-HxCDD	0.1	34.40	<2.8	2.8	M,U	1.8	20
1,2,3,4,6,7,8-HpCDD	0.01	35.85	58.2	1.4			20
OCDD	0.0003	37.25	341	2.0			40
2,3,7,8-TCDF	0.1	NotFnd	<2.3	2.3	U		4.0
1,2,3,7,8-PeCDF	0.03	NotFnd	<1.5	1.5	U		20
2,3,4,7,8-PeCDF	0.3	31.82	<3.0	1.4	M,J,R	3.0	20
1,2,3,4,7,8-HxCDF	0.1	33.69	3.13	1.8	J,B		20
1,2,3,6,7,8-HxCDF	0.1	33.76	<1.9	1.8	M,J,R	1.9	20
2,3,4,6,7,8-HxCDF	0.1	34.12	<1.9	1.9	M,U	1.5	20
1,2,3,7,8,9-HxCDF	0.1	34.55	<2.5	2.5	M,U	1.5	20
1,2,3,4,6,7,8-HpCDF	0.01	35.30	<14	0.91	M,J,R	14	20
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.3	1.3	U		20
OCDF	0.0003	37.33	26.1	1.3	J		40

Field Spike Standards	pg	% Rec	Limits
37C14-2,3,7,8-TCDD	1800	27.23	97 70-130
13C12-1,2,3,4,7,8-HxCDD	18000	34.21	86 70-130
13C12-2,3,4,7,8-PeCDF	18000	31.80	119 70-130
13C12-1,2,3,4,7,8-HxCDF	18000	33.68	82 70-130
13C12-1,2,3,4,7,8,9-HpCDF	18000	36.06	109 70-130

Extraction Standards	pg	Conc.	EDL
13C12-2,3,7,8-TCDD	4000	27.20	45 40-130
13C12-1,2,3,7,8-PeCDD	4000	32.03	56 40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.26	60 40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.83	48 25-130
13C12-OCDD	8000	37.25	47 25-130
13C12-2,3,7,8-TCDF	4000	26.30	49 40-130
13C12-1,2,3,7,8-PeCDF	4000	30.97	52 40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.76	57 40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.30	47 25-130

Cleanup Standard	pg	Conc.	EDL
13C12-1,2,3,7,8,9-HxCDF	4000	34.53	59 40-130

Homologue Group Totals	# peaks	Conc. pg	EDL pg
Total-TCDD	1	6.81	1.8
Total-PeCDD	0	<1.2	1.2
Total-HxCDD	2	14.2	3.0
Total-HpCDD	2	123	1.4
Total-TCDF	4	19.5	2.3
Total-PeCDF	1	5.30	1.5
Total-HxCDF	3	14.3	2.5
Total-HpCDF	1	12.6	1.3

Toxic Equivalency - (WHO 2005)	pg
Lower Bound PCDD/F TEQ (WHO 2005)	1.01
Mid Point PCDD/F TEQ (WHO 2005)	4.52
Upper Bound PCDD/F TEQ (WHO 2005)	6.80

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

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Sample Analysis Report

Sample Name	SITE 5 - COMPOSITE 6 (WET SEASON - APR, MAY, JUN)	Sampling Date	n/a	
ALS Sample ID	L2602390-5	Extraction Date	23-Jun-21	
Analysis Method	EPA M23	Sample Size	1	sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	PUF	Split Ratio	4	

Approved:
Ella Gdyczynski
--e-signature--
13-Jul-2021

Run Information		Run 1
Filename	9-210710A24	
Run Date	11-Jul-21 08:23	
Final Volume	10 uL	
Dilution Factor	1	
Analysis Units	pg	
Instrument - Column	HRMS-9 DB5ms US1144784H	

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
2,3,7,8-TCDD	1	NotFnd	<1.6	1.6	U		4.0
1,2,3,7,8-PeCDD	1	NotFnd	<0.87	0.87	U		20
1,2,3,4,7,8-HxCDD	0.1	34.21	<1.4	1.3	M,J,R	1.4	20
1,2,3,6,7,8-HxCDD	0.1	34.26	5.01	1.2	J		20
1,2,3,7,8,9-HxCDD	0.1	34.39	2.14	1.2	M,J		20
1,2,3,4,6,7,8-HpCDD	0.01	35.85	76.5	1.1			20
OCDD	0.0003	37.26	471	1.4			40
2,3,7,8-TCDF	0.1	26.35	<1.8	1.8	U	0.88	4.0
1,2,3,7,8-PeCDF	0.03	31.00	2.03	1.8	M,J		20
2,3,4,7,8-PeCDF	0.3	31.81	<2.8	1.7	J,R	2.8	20
1,2,3,4,7,8-HxCDF	0.1	33.69	3.17	1.4	M,J,B		20
1,2,3,6,7,8-HxCDF	0.1	33.77	<2.8	1.4	J,R	2.8	20
2,3,4,6,7,8-HxCDF	0.1	34.13	2.51	1.5	M,J		20
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<1.9	1.9	U		20
1,2,3,4,6,7,8-HpCDF	0.01	35.31	15.8	0.96	J		20
1,2,3,4,7,8,9-HpCDF	0.01	36.09	<1.6	1.3	J,R	1.6	20
OCDF	0.0003	37.34	23.6	0.91	M,J		40
Field Spike Standards	pg	% Rec	Limits				
37Cl4-2,3,7,8-TCDD	1800	27.23	98	70-130			
13C12-1,2,3,4,7,8-HxCDD	18000	34.21	97	70-130			
13C12-2,3,4,7,8-PeCDF	18000	31.80	118	70-130			
13C12-1,2,3,4,7,8-HxCDF	18000	33.69	95	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	18000	36.08	109	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	4000	27.20	56	40-130			
13C12-1,2,3,7,8-PeCDD	4000	32.04	79	40-130			
13C12-1,2,3,6,7,8-HxCDD	4000	34.26	80	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.85	72	25-130			
13C12-OCDD	8000	37.25	71	25-130			
13C12-2,3,7,8-TCDF	4000	26.30	66	40-130			
13C12-1,2,3,7,8-PeCDF	4000	30.99	74	40-130			
13C12-1,2,3,6,7,8-HxCDF	4000	33.77	75	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.30	71	25-130			
Cleanup Standard	pg						
13C12-1,2,3,7,8,9-HxCDF	4000	34.53	80	40-130			
Homologue Group Totals		# peaks	Conc. pg	EDL pg			
Total-TCDD		0	<1.6	1.6	U		4.0
Total-PeCDD		1	3.65	0.87			20
Total-HxCDD		3	16.0	1.3			20
Total-HpCDD		2	168	1.1			20
Total-TCDF		5	13.6	1.8			4.0
Total-PeCDF		6	36.9	1.8			20
Total-HxCDF		3	18.1	1.9			20
Total-HpCDF		3	30.9	1.3			20

Toxic Equivalency - (WHO 2005)	pg
Lower Bound PCDD/F TEQ (WHO 2005)	2.42
Mid Point PCDD/F TEQ (WHO 2005)	5.11
Upper Bound PCDD/F TEQ (WHO 2005)	6.53

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
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

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 Limits:

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 ¹³C₁₂-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	Method 1613B RRT
		Solids/ Waters Quantitation Reference	
Compounds using 1,2,3,4-TCDD-¹³C₁₂ 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-¹³C₁₂ 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-¹³C₁₂ and 1,2,3,6,7,8-HxCDD-¹³C₁₂ while 1,2,3,6,7,8-HxCDD-¹³C₁₂ is the RT reference.

Table 5: HRMS Instrumental Descriptor Parameters

Descriptor	Exact M/Z	M/Z Type	Elemental Composition	Substance	Type	Theoretical	Ion Ratio QC Limits		
						Ion Ratio	Upper	Lower	
1	303.9016	M	$^{12}\text{C}_{12} \text{H}_4 \text{Cl}_4 \text{O}$	TCDF	Native	0.77	0.65	0.89	
	305.8987	M+2	$^{12}\text{C}_{12} \text{H}_4 \text{Cl}_3 \text{Cl} \text{O}$	TCDF	Native				
	315.9419	M	$^{13}\text{C}_{12} \text{H}_4 \text{Cl}_4 \text{O}$	TCDF	^{13}C	0.77	0.65	0.89	
	317.9389	M+2	$^{13}\text{C}_{12} \text{H}_4 \text{Cl}_3 \text{Cl} \text{O}$	TCDF	^{13}C				
	316.9824	Lock	$^{12}\text{C}_9 \text{F}_{11}$	PFK	Lock				
	319.8965	M	$^{12}\text{C}_{12} \text{H}_4 \text{Cl}_4 \text{O}_2$	TCDD	Native	0.77	0.65	0.89	
	321.8936	M+2	$^{12}\text{C}_{12} \text{H}_4 \text{Cl}_3 \text{Cl} \text{O}_2$	TCDD	Native				
	327.8847	M+8	$^{12}\text{C}_{12} \text{H}_4 \text{Cl}_4 \text{O}_2$	TCDD	^{37}Cl				
	331.9368	M	$^{13}\text{C}_{12} \text{H}_4 \text{Cl}_4 \text{O}_2$	TCDD	^{13}C	0.77	0.65	0.89	
	333.9339	M+2	$^{13}\text{C}_{12} \text{H}_4 \text{Cl}_3 \text{Cl} \text{O}_2$	TCDD	^{13}C				
	339.8597	M+2	$^{12}\text{C}_{12} \text{H}_3 \text{Cl}_4 \text{Cl} \text{O}$	PeCDF	Native	1.55	1.32	1.78	
	341.8568	M+4	$^{12}\text{C}_{12} \text{H}_3 \text{Cl}_3 \text{Cl}_2 \text{O}$	PeCDF	Native				
	351.9	M+2	$^{13}\text{C}_{12} \text{H}_3 \text{Cl}_4 \text{Cl} \text{O}$	PeCDF	^{13}C	1.55	1.32	1.78	
	353.897	M+4	$^{13}\text{C}_{12} \text{H}_3 \text{Cl}_3 \text{Cl}_2 \text{O}$	PeCDF	^{13}C				
	375.8364	M+2	$^{12}\text{C}_{12} \text{H}_4 \text{Cl}_5 \text{Cl} \text{O}$	HxCDFPE	CI-DPE				
	409.7974	M+2	$^{12}\text{C}_{12} \text{H}_3 \text{Cl}_6 \text{Cl} \text{O}$	HpCDFPE	CI-DPE				
	2	339.8597	M+2	$^{12}\text{C}_{12} \text{H}_3 \text{Cl}_4 \text{Cl} \text{O}$	PeCDF	Native	1.55	1.32	1.78
		341.8568	M+4	$^{12}\text{C}_{12} \text{H}_3 \text{Cl}_3 \text{Cl}_2 \text{O}$	PeCDF	Native			
		351.9	M+2	$^{13}\text{C}_{12} \text{H}_3 \text{Cl}_4 \text{Cl} \text{O}$	PeCDF	^{13}C	1.55	1.32	1.78
		353.897	M+4	$^{13}\text{C}_{12} \text{H}_3 \text{Cl}_3 \text{Cl}_2 \text{O}$	PeCDF	^{13}C			
353.8576		M	$^{12}\text{C}_{12} \text{H}_3 \text{Cl}_5 \text{O}_2$	PeCDD	Native	0.63	0.54	0.72	
355.8546		M+2	$^{12}\text{C}_{12} \text{H}_3 \text{Cl}_4 \text{Cl} \text{O}_2$	PeCDD	Native				
366.9792		Lock	$^{12}\text{C}_{10} \text{F}_{13}$	PFK	Lock				
365.8978		M	$^{13}\text{C}_{12} \text{H}_3 \text{Cl}_5 \text{O}_2$	PeCDD	^{13}C	0.63	0.54	0.72	
367.8949		M+2	$^{13}\text{C}_{12} \text{H}_3 \text{Cl}_4 \text{Cl} \text{O}_2$	PeCDD	^{13}C				
409.7974		M+2	$^{12}\text{C}_{12} \text{H}_3 \text{Cl}_6 \text{Cl} \text{O}$	HpCDFPE	CI-DPE				
3		373.8207	M+2	$^{12}\text{C}_{12} \text{H}_2 \text{Cl}_5 \text{Cl} \text{O}$	HxCDF	Native	1.24	1.05	1.43
		375.8178	M+4	$^{12}\text{C}_{12} \text{H}_2 \text{Cl}_4 \text{Cl}_2 \text{O}$	HxCDF	Native			
	380.976	Lock	$^{12}\text{C}_8 \text{F}_5$	PFK	Lock				
	383.8639	M	$^{13}\text{C}_{12} \text{H}_2 \text{Cl}_6 \text{O}$	HxCDF	^{13}C	0.51	0.43	0.59	
	385.861	M+2	$^{13}\text{C}_{12} \text{H}_2 \text{Cl}_5 \text{Cl} \text{O}$	HxCDF	^{13}C				
	389.8156	M+2	$^{12}\text{C}_{12} \text{H}_2 \text{Cl}_5 \text{Cl} \text{O}_2$	HxCDD	Native	1.24	1.05	1.43	
	391.8127	M+4	$^{12}\text{C}_{12} \text{H}_2 \text{Cl}_4 \text{Cl}_2 \text{O}_2$	HxCDD	Native				
	401.8559	M+2	$^{13}\text{C}_{12} \text{H}_2 \text{Cl}_5 \text{Cl} \text{O}_2$	HxCDD	^{13}C	1.24	1.05	1.43	
	403.853	M+4	$^{13}\text{C}_{12} \text{H}_2 \text{Cl}_4 \text{Cl}_2 \text{O}_2$	HxCDD	^{13}C				
	445.7555	M+4	$^{12}\text{C}_{12} \text{H}_2 \text{Cl}_6 \text{Cl}_2 \text{O}$	OCDFPE	CI-DPE				
4	409.7789	M+4	$^{12}\text{C}_{12} \text{H} \text{Cl}_5 \text{Cl}_2 \text{O}$	HpCDF	Native	1.88	1.60	2.16	
	411.7759	M+6	$^{12}\text{C}_{12} \text{H} \text{Cl}_4 \text{Cl}_3 \text{O}$	HpCDF	Native				
	417.8253	M	$^{13}\text{C}_{12} \text{H} \text{Cl}_7 \text{O}$	HpCDF	^{13}C	0.44	0.37	0.51	
	419.822	M+2	$^{13}\text{C}_{12} \text{H} \text{Cl}_6 \text{Cl} \text{O}$	HpCDF	^{13}C				
	423.7767	M+2	$^{12}\text{C}_{12} \text{H} \text{Cl}_6 \text{Cl} \text{O}_2$	HpCDD	Native	1.04	0.88	1.20	
	425.7737	M+4	$^{12}\text{C}_{12} \text{H} \text{Cl}_5 \text{Cl}_2 \text{O}_2$	HpCDD	Native				
	430.9728	Lock	$^{12}\text{C}_9 \text{F}_{17}$	PFK	Lock				
	435.8169	M+2	$^{13}\text{C}_{12} \text{H} \text{Cl}_6 \text{Cl} \text{O}_2$	HpCDD	^{13}C	1.04	0.88	1.20	
	437.814	M+4	$^{13}\text{C}_{12} \text{H} \text{Cl}_5 \text{Cl}_2 \text{O}_2$	HpCDD	^{13}C				
	479.7165	M+4	$^{12}\text{C}_{12} \text{H} \text{Cl}_7 \text{Cl}_2 \text{O}$	NCDPE	CI-DPE				
5	441.7428	M+2	$^{12}\text{C}_{12} \text{Cl}_5 \text{Cl}_7 \text{O}$	OCDF	Native	0.89	0.76	1.02	
	443.7399	M+4	$^{12}\text{C}_{12} \text{Cl}_6 \text{Cl}_2 \text{O}$	OCDF	Native				
	454.9728	Lock	$^{12}\text{C}_{11} \text{F}_{17}$	PFK	Lock				
	457.7377	M+2	$^{12}\text{C}_{12} \text{Cl}_7 \text{Cl} \text{O}_2$	OCDD	Native	0.89	0.76	1.02	
	459.7348	M+4	$^{12}\text{C}_{12} \text{Cl}_6 \text{Cl}_2 \text{O}_2$	OCDD	Native				
	469.778	M+2	$^{13}\text{C}_{12} \text{Cl}_7 \text{Cl} \text{O}_2$	OCDD	^{13}C	0.89	0.76	1.02	
	471.775	M+4	$^{13}\text{C}_{12} \text{Cl}_6 \text{Cl}_2 \text{O}_2$	OCDD	^{13}C				
	513.6775	M+4	$^{12}\text{C}_{12} \text{Cl}_8 \text{Cl}_2 \text{O}$	DCDFPE	CI-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.

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

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.

$$\text{Amount in sample (pg)} = \frac{(A1_n + A2_n) Q_i}{(A1_i + A2_i) (\text{RRF}_{av})} \quad \text{Equ. 9.2}$$

$$\text{Concentration in sample (pg/g or pg/l)} = \frac{(A1_n + A2_n) Q_i}{(A1_i + A2_i) (\text{RRF}_{av}) (W_s)} \quad \text{Equ. 9.3}$$

Where,

Q_i = 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.

$$\% \text{ Recovery} = \frac{\text{Amount in sample}}{\text{Amount added to sample}} \times 100 \quad \text{Equ. 9.4}$$

c) Estimated Detection Limit

$$\text{EDL} = \frac{2.5 \times H_x \times Q_{\text{es}}}{H_{\text{es}} \times W \times \text{RRF}_{\text{av}}} \quad \text{Equ. 9.5}$$

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:

AAYYMMDDCC

Example:

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-substituted 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 may be 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.

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-0	9-210709A06	09-Jul-2021 22:09
CS-1	9-210709A05	09-Jul-2021 21:26
CS-2		
CS-3	9-210709A02A	09-Jul-2021 19:18
CS-4	9-210709A09	10-Jul-2021 00:19
CS-5	9-210709A08	09-Jul-2021 23:36

Approved:	<i>Ella Gdyczynski</i> --e-signature-- 13-Jul-2021
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Target Analytes	Relative Response Factors					Mean	% RSD	
	CS-0	CS-1	CS-2	CS-3	CS-4			CS-5
2,3,7,8-TCDD	1.192	0.849		0.937	1.007	1.000	0.997	13%
1,2,3,7,8-PeCDD	0.991	0.893		0.926	0.976	0.972	0.952	4%
1,2,3,4,7,8-HxCDD	0.739	0.860		0.874	0.981	0.957	0.882	11%
1,2,3,6,7,8-HxCDD	0.991	0.980		0.932	1.029	1.017	0.990	4%
1,2,3,7,8,9-HxCDD	1.043	0.890		0.877	0.971	0.958	0.948	7%
1,2,3,4,6,7,8-HpCDD	1.199	0.953		0.988	0.969	0.962	1.014	10%
OCDD	1.202	0.983		1.006	1.035	1.047	1.055	8%
2,3,7,8-TCDF	1.009	0.900		0.984	0.976	0.990	0.972	4%
1,2,3,7,8-PeCDF	0.929	0.874		0.982	1.028	1.013	0.965	7%
2,3,4,7,8-PeCDF	1.036	0.929		1.040	1.081	1.094	1.036	6%
1,2,3,4,7,8-HxCDF	1.154	0.993		1.109	1.118	1.100	1.095	6%
1,2,3,6,7,8-HxCDF	1.159	1.044		1.129	1.190	1.171	1.139	5%
2,3,4,6,7,8-HxCDF	0.982	0.992		1.056	1.081	1.077	1.038	5%
1,2,3,7,8,9-HxCDF	0.786	0.703		0.759	0.847	0.901	0.799	10%
1,2,3,4,6,7,8-HpCDF	1.076	0.981		1.012	1.071	1.058	1.040	4%
1,2,3,4,7,8,9-HpCDF	0.781	0.706		0.670	0.757	0.818	0.746	8%
OCDF	1.234	0.972		1.008	1.257	1.289	1.152	13%
Field Spike Standards								
37Cl4-2,3,7,8-TCDD	1.155	0.935		0.914	0.965	1.006	0.995	10%
13C12-1,2,3,4,7,8-HxCDD	0.937	0.918		0.880	0.944	0.924	0.921	3%
13C12-2,3,4,7,8-PeCDF	0.974	0.953		0.967	0.966	0.980	0.968	1%
13C12-1,2,3,4,7,8-HxCDF	0.919	0.909		0.898	0.896	0.882	0.901	2%
13C12-1,2,3,4,7,8,9-HpCDF	0.672	0.676		0.658	0.706	0.772	0.697	7%
Extraction Standards								
13C12-2,3,7,8-TCDD	1.116	1.088		1.164	1.116	1.239	1.145	5%
13C12-1,2,3,7,8-PeCDD	0.720	0.716		0.752	0.747	0.931	0.773	12%
13C12-1,2,3,6,7,8-HxCDD	0.951	0.973		1.021	0.977	1.008	0.986	3%
13C12-1,2,3,4,6,7,8-HpCDD	0.756	0.690		0.722	0.724	0.815	0.741	6%
13C12-OCDD	0.548	0.520		0.552	0.528	0.710	0.572	14%
13C12-2,3,7,8-TCDF	1.416	1.380		1.442	1.409	1.507	1.431	3%
13C12-1,2,3,7,8-PeCDF	1.065	1.087		1.122	1.124	1.344	1.148	10%
13C12-1,2,3,6,7,8-HxCDF	1.294	1.299		1.313	1.319	1.300	1.308	1%
13C12-1,2,3,4,6,7,8-HpCDF	0.885	0.869		0.891	0.861	0.916	0.884	3%
Cleanup Standard								
13C12-1,2,3,7,8,9-HxCDF	0.892	0.889		0.888	0.936	0.982	0.924	5%

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-21-CS#0-581**
 Analysis Method EPA M23
 Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:
9-210709A06	HRMS-?	COL#-SN#	09-Jul-2021 22:09	<i>Ella Gdyczynski</i> --e-signature-- 13-Jul-2021

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD					
	27.24	0.66	0.10	1.20E+03	1.192
1,2,3,7,8-PeCDD					
	32.04	1.71	0.50	3.23E+03	0.991
1,2,3,4,7,8-HxCDD					
	34.21	1.27	0.50	2.16E+03	0.739
1,2,3,6,7,8-HxCDD					
	34.26	1.32	0.50	2.90E+03	0.991
1,2,3,7,8,9-HxCDD					
	34.39	1.19	0.50	3.05E+03	1.043
1,2,3,4,6,7,8-HpCDD					
	35.83	1.19	0.50	2.79E+03	1.199
OCDD					
	37.25	0.98	1.00	4.05E+03	1.202
2,3,7,8-TCDF					
	26.33	0.76	0.10	1.29E+03	1.009
1,2,3,7,8-PeCDF					
	30.99	1.68	0.50	4.47E+03	0.929
2,3,4,7,8-PeCDF					
	31.81	1.46	0.50	4.99E+03	1.036
1,2,3,4,7,8-HxCDF					
	33.69	1.25	0.50	4.59E+03	1.154
1,2,3,6,7,8-HxCDF					
	33.76	1.40	0.50	4.62E+03	1.159
2,3,4,6,7,8-HxCDF					
	34.11	1.20	0.50	3.91E+03	0.982
1,2,3,7,8,9-HxCDF					
	34.53	1.26	0.50	3.13E+03	0.786
1,2,3,4,6,7,8-HpCDF					
	35.3	1.87	0.50	2.93E+03	1.076
1,2,3,4,7,8,9-HpCDF					
	36.08	1.61	0.50	2.13E+03	0.781
OCDF					
	37.33	1.01	1.00	4.16E+03	1.234
Field Spike Standards					
37Cl4-2,3,7,8-TCDD					
	27.21	0.00	0.10	1.17E+03	1.155
13C12-1,2,3,4,7,8-HxCDD					
	34.2	1.25	100.00	5.48E+05	0.937
13C12-2,3,4,7,8-PeCDF					
	31.8	1.59	100.00	9.37E+05	0.974
13C12-1,2,3,4,7,8-HxCDF					
	33.68	0.51	100.00	7.32E+05	0.919
13C12-1,2,3,4,7,8,9-HpCDF					
	36.06	0.46	100.00	3.66E+05	0.672
Extraction Standards					
13C12-2,3,7,8-TCDD					
	27.21	0.761	100	1.01E+06	1.116
13C12-1,2,3,7,8-PeCDD					
	32.03	1.626	100	6.51E+05	0.72
13C12-1,2,3,6,7,8-HxCDD					
	34.26	1.225	100	5.85E+05	0.951
13C12-1,2,3,4,6,7,8-HpCDD					
	35.83	1.064	100	4.65E+05	0.756
13C12-OCDD					
	37.24	0.897	200	6.75E+05	0.548
13C12-2,3,7,8-TCDF					
	26.3	0.787	100	1.28E+06	1.416
13C12-1,2,3,7,8-PeCDF					
	30.97	1.567	100	9.62E+05	1.065
13C12-1,2,3,6,7,8-HxCDF					
	33.75	0.533	100	7.96E+05	1.294
13C12-1,2,3,4,6,7,8-HpCDF					
	35.29	0.448	100	5.45E+05	0.885
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF					
	34.52	0.513	100	5.49E+05	0.892
Injection Standards					
13C12-1234-TCDD IS					
	26.53	0.765	100	903866.2	9038.662
13C12-123789-HxCDD IS					
	34.38	1.25	100.00	6.16E+05	6155.951

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-21-CS#1-581**
 Analysis Method EPA M23
 Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:
9-210709A05	HRMS-?	COL#-SN#	09-Jul-2021 21:26	<i>Ella Gdyczynski</i> --e-signature-- 13-Jul-2021

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD					
	27.23	0.67	0.50	4.05E+03	0.849
1,2,3,7,8-PeCDD					
	32.04	1.58	2.50	1.40E+04	0.893
1,2,3,4,7,8-HxCDD					
	34.21	1.21	2.50	1.25E+04	0.860
1,2,3,6,7,8-HxCDD					
	34.26	1.39	2.50	1.42E+04	0.980
1,2,3,7,8,9-HxCDD					
	34.39	1.30	2.50	1.29E+04	0.890
1,2,3,4,6,7,8-HpCDD					
	35.83	0.99	2.50	9.81E+03	0.953
OCDD					
	37.25	0.91	5.00	1.53E+04	0.983
2,3,7,8-TCDF					
	26.35	0.67	0.50	5.44E+03	0.900
1,2,3,7,8-PeCDF					
	30.99	1.55	2.50	2.08E+04	0.874
2,3,4,7,8-PeCDF					
	31.81	1.55	2.50	2.21E+04	0.929
1,2,3,4,7,8-HxCDF					
	33.69	1.27	2.50	1.93E+04	0.993
1,2,3,6,7,8-HxCDF					
	33.77	1.17	2.50	2.02E+04	1.044
2,3,4,6,7,8-HxCDF					
	34.11	1.20	2.50	1.92E+04	0.992
1,2,3,7,8,9-HxCDF					
	34.53	1.30	2.50	1.36E+04	0.703
1,2,3,4,6,7,8-HpCDF					
	35.3	1.82	2.50	1.27E+04	0.981
1,2,3,4,7,8,9-HpCDF					
	36.08	1.73	2.50	9.15E+03	0.706
OCDF					
	37.33	0.95	5.00	1.51E+04	0.972
Field Spike Standards					
37Cl4-2,3,7,8-TCDD					
	27.23	0.00	0.50	4.46E+03	0.935
13C12-1,2,3,4,7,8-HxCDD					
	34.21	1.25	100.00	5.33E+05	0.918
13C12-2,3,4,7,8-PeCDF					
	31.8	1.58	100.00	9.08E+05	0.953
13C12-1,2,3,4,7,8-HxCDF					
	33.68	0.53	100.00	7.05E+05	0.909
13C12-1,2,3,4,7,8,9-HpCDF					
	36.06	0.45	100.00	3.51E+05	0.676
Extraction Standards					
13C12-2,3,7,8-TCDD					
	27.21	0.76	100	9.54E+05	1.088
13C12-1,2,3,7,8-PeCDD					
	32.03	1.616	100	6.27E+05	0.716
13C12-1,2,3,6,7,8-HxCDD					
	34.26	1.244	100	5.81E+05	0.973
13C12-1,2,3,4,6,7,8-HpCDD					
	35.83	1.036	100	4.12E+05	0.69
13C12-OCDD					
	37.24	0.891	200	6.21E+05	0.52
13C12-2,3,7,8-TCDF					
	26.32	0.779	100	1.21E+06	1.38
13C12-1,2,3,7,8-PeCDF					
	30.97	1.562	100	9.53E+05	1.087
13C12-1,2,3,6,7,8-HxCDF					
	33.75	0.514	100	7.76E+05	1.299
13C12-1,2,3,4,6,7,8-HpCDF					
	35.29	0.453	100	5.19E+05	0.869
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF					
	34.53	0.525	100	5.30E+05	0.889
Injection Standards					
13C12-1234-TCDD IS					
	26.54	0.767	100	876238.7	8762.387
13C12-123789-HxCDD IS					
	34.39	1.20	100.00	5.97E+05	5969.655

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-21-CCV-581**
 Analysis Method EPA M23
 Analysis Type Calibration

Filename 9-210709A02A Inst # HRMS-? Column COL#-SN#

Run Date 09-Jul-2021 19:18

Approved: *Ella Gdyczynski*
 --e-signature--
 13-Jul-2021

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.26	0.77	10.00	1.00E+05	0.937
1,2,3,7,8-PeCDD	32.06	1.64	50.00	3.20E+05	0.926
1,2,3,4,7,8-HxCDD	34.22	1.31	50.00	2.79E+05	0.874
1,2,3,6,7,8-HxCDD	34.28	1.21	50.00	2.98E+05	0.932
1,2,3,7,8,9-HxCDD	34.41	1.25	50.00	2.80E+05	0.877
1,2,3,4,6,7,8-HpCDD	35.86	1.04	50.00	2.23E+05	0.988
OCDD	37.27	0.88	100.00	3.48E+05	1.006
2,3,7,8-TCDF	26.35	0.68	10.00	1.30E+05	0.984
1,2,3,7,8-PeCDF	31.01	1.56	50.00	5.07E+05	0.982
2,3,4,7,8-PeCDF	31.83	1.57	50.00	5.36E+05	1.040
1,2,3,4,7,8-HxCDF	33.71	1.19	50.00	4.55E+05	1.109
1,2,3,6,7,8-HxCDF	33.78	1.20	50.00	4.64E+05	1.129
2,3,4,6,7,8-HxCDF	34.13	1.24	50.00	4.34E+05	1.056
1,2,3,7,8,9-HxCDF	34.55	1.22	50.00	3.12E+05	0.759
1,2,3,4,6,7,8-HpCDF	35.31	1.89	50.00	2.82E+05	1.012
1,2,3,4,7,8,9-HpCDF	36.09	1.92	50.00	1.87E+05	0.670
OCDF	37.35	0.90	100.00	3.48E+05	1.008
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.26	0.00	10.00	9.78E+04	0.914
13C12-1,2,3,4,7,8-HxCDD	34.22	1.28	100.00	5.62E+05	0.880
13C12-2,3,4,7,8-PeCDF	31.82	1.57	100.00	9.97E+05	0.967
13C12-1,2,3,4,7,8-HxCDF	33.7	0.53	100.00	7.38E+05	0.898
13C12-1,2,3,4,7,8,9-HpCDF	36.09	0.45	100.00	3.67E+05	0.658
Extraction Standards					
13C12-2,3,7,8-TCDD	27.23	0.771	100	1.07E+06	1.164
13C12-1,2,3,7,8-PeCDD	32.05	1.612	100	6.92E+05	0.752
13C12-1,2,3,6,7,8-HxCDD	34.28	1.255	100	6.39E+05	1.021
13C12-1,2,3,4,6,7,8-HpCDD	35.85	1.048	100	4.52E+05	0.722
13C12-OCDD	37.26	0.885	200	6.91E+05	0.552
13C12-2,3,7,8-TCDF	26.33	0.785	100	1.33E+06	1.442
13C12-1,2,3,7,8-PeCDF	31	1.594	100	1.03E+06	1.122
13C12-1,2,3,6,7,8-HxCDF	33.77	0.518	100	8.21E+05	1.313
13C12-1,2,3,4,6,7,8-HpCDF	35.31	0.449	100	5.58E+05	0.891
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.54	0.517	100	5.56E+05	0.888
Injection Standards					
13C12-1234-TCDD IS	26.56	0.766	100	919395.8	9193.958
13C12-123789-HxCDD IS	34.4	1.22	100.00	6.26E+05	6257.414

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-21-CS#4-581**
 Analysis Method EPA M23
 Analysis Type Calibration

Filename 9-210709A09	Inst # HRMS-?	Column COL#-SN#	Run Date 10-Jul-2021 00:19	Approved: <i>Ella Gdyczynski</i> --e-signature-- 13-Jul-2021
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Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.24	0.78	40.00	3.99E+05	1.007
1,2,3,7,8-PeCDD	32.05	1.62	200.00	1.29E+06	0.976
1,2,3,4,7,8-HxCDD	34.22	1.23	200.00	1.17E+06	0.981
1,2,3,6,7,8-HxCDD	34.28	1.25	200.00	1.23E+06	1.029
1,2,3,7,8,9-HxCDD	34.4	1.24	200.00	1.16E+06	0.971
1,2,3,4,6,7,8-HpCDD	35.85	1.04	200.00	8.57E+05	0.969
OCDD	37.26	0.89	400.00	1.33E+06	1.035
2,3,7,8-TCDF	26.35	0.77	40.00	4.88E+05	0.976
1,2,3,7,8-PeCDF	31	1.59	200.00	2.05E+06	1.028
2,3,4,7,8-PeCDF	31.82	1.57	200.00	2.16E+06	1.081
1,2,3,4,7,8-HxCDF	33.7	1.21	200.00	1.80E+06	1.118
1,2,3,6,7,8-HxCDF	33.77	1.21	200.00	1.92E+06	1.190
2,3,4,6,7,8-HxCDF	34.12	1.21	200.00	1.74E+06	1.081
1,2,3,7,8,9-HxCDF	34.55	1.20	200.00	1.36E+06	0.847
1,2,3,4,6,7,8-HpCDF	35.31	1.86	200.00	1.13E+06	1.071
1,2,3,4,7,8,9-HpCDF	36.09	1.87	200.00	7.96E+05	0.757
OCDF	37.34	0.91	400.00	1.62E+06	1.257
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.24	0.00	40.00	3.82E+05	0.965
13C12-1,2,3,4,7,8-HxCDD	34.21	1.27	100.00	5.63E+05	0.944
13C12-2,3,4,7,8-PeCDF	31.81	1.58	100.00	9.63E+05	0.966
13C12-1,2,3,4,7,8-HxCDF	33.69	0.53	100.00	7.21E+05	0.896
13C12-1,2,3,4,7,8,9-HpCDF	36.08	0.44	100.00	3.71E+05	0.706
Extraction Standards					
13C12-2,3,7,8-TCDD	27.21	0.761	100	9.90E+05	1.116
13C12-1,2,3,7,8-PeCDD	32.04	1.614	100	6.62E+05	0.747
13C12-1,2,3,6,7,8-HxCDD	34.27	1.253	100	5.97E+05	0.977
13C12-1,2,3,4,6,7,8-HpCDD	35.85	1.036	100	4.42E+05	0.724
13C12-OCDD	37.26	0.906	200	6.45E+05	0.528
13C12-2,3,7,8-TCDF	26.32	0.787	100	1.25E+06	1.409
13C12-1,2,3,7,8-PeCDF	30.99	1.562	100	9.97E+05	1.124
13C12-1,2,3,6,7,8-HxCDF	33.77	0.518	100	8.05E+05	1.319
13C12-1,2,3,4,6,7,8-HpCDF	35.3	0.451	100	5.26E+05	0.861
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.53	0.523	100	5.72E+05	0.936
Injection Standards					
13C12-1234-TCDD IS	26.54	0.772	100	886829.5	8868.295
13C12-123789-HxCDD IS	34.39	1.24	100.00	6.11E+05	6108.025

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-21-CS#5-581**
 Analysis Method EPA M23
 Analysis Type Calibration

Filename 9-210709A08	Inst # HRMS-?	Column COL#-SN#	Run Date 09-Jul-2021 23:36	Approved: <i>Ella Gdyczynski</i> --e-signature-- 13-Jul-2021
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Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.23	0.77	200.00	2.24E+06	1.000
1,2,3,7,8-PeCDD	32.05	1.62	1000.00	8.17E+06	0.972
1,2,3,4,7,8-HxCDD	34.22	1.24	1000.00	7.93E+06	0.957
1,2,3,6,7,8-HxCDD	34.27	1.25	1000.00	8.43E+06	1.017
1,2,3,7,8,9-HxCDD	34.4	1.23	1000.00	7.93E+06	0.958
1,2,3,4,6,7,8-HpCDD	35.85	1.04	1000.00	6.45E+06	0.962
OCDD	37.26	0.89	2000.00	1.22E+07	1.047
2,3,7,8-TCDF	26.33	0.78	200.00	2.69E+06	0.990
1,2,3,7,8-PeCDF	31	1.58	1000.00	1.23E+07	1.013
2,3,4,7,8-PeCDF	31.81	1.57	1000.00	1.33E+07	1.094
1,2,3,4,7,8-HxCDF	33.7	1.22	1000.00	1.18E+07	1.100
1,2,3,6,7,8-HxCDF	33.77	1.22	1000.00	1.25E+07	1.171
2,3,4,6,7,8-HxCDF	34.11	1.22	1000.00	1.15E+07	1.077
1,2,3,7,8,9-HxCDF	34.54	1.22	1000.00	9.63E+06	0.901
1,2,3,4,6,7,8-HpCDF	35.3	1.89	1000.00	7.97E+06	1.058
1,2,3,4,7,8,9-HpCDF	36.08	1.90	1000.00	6.16E+06	0.818
OCDF	37.34	0.91	2000.00	1.50E+07	1.289
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.23	0.00	200.00	2.25E+06	1.006
13C12-1,2,3,4,7,8-HxCDD	34.21	1.26	100.00	7.66E+05	0.924
13C12-2,3,4,7,8-PeCDF	31.81	1.58	100.00	1.19E+06	0.980
13C12-1,2,3,4,7,8-HxCDF	33.69	0.52	100.00	9.43E+05	0.882
13C12-1,2,3,4,7,8,9-HpCDF	36.08	0.45	100.00	5.81E+05	0.772
Extraction Standards					
13C12-2,3,7,8-TCDD	27.21	0.754	100	1.12E+06	1.239
13C12-1,2,3,7,8-PeCDD	32.04	1.626	100	8.40E+05	0.931
13C12-1,2,3,6,7,8-HxCDD	34.26	1.241	100	8.28E+05	1.008
13C12-1,2,3,4,6,7,8-HpCDD	35.83	1.059	100	6.70E+05	0.815
13C12-OCDD	37.26	0.882	200	1.17E+06	0.71
13C12-2,3,7,8-TCDF	26.32	0.782	100	1.36E+06	1.507
13C12-1,2,3,7,8-PeCDF	30.99	1.561	100	1.21E+06	1.344
13C12-1,2,3,6,7,8-HxCDF	33.76	0.528	100	1.07E+06	1.3
13C12-1,2,3,4,6,7,8-HpCDF	35.3	0.454	100	7.53E+05	0.916
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.53	0.535	100	8.08E+05	0.982
Injection Standards					
13C12-1234-TCDD IS	26.54	0.766	100	903003.8	9030.038
13C12-123789-HxCDD IS	34.39	1.26	100.00	8.22E+05	8219.021

ALS Life Sciences

Calibration Summary Report

Calibration Level	Filename	Run Date
CS-1	9-210720B03	20-Jul-2021 18:47
CS-2	9-210720B02	20-Jul-2021 18:05
CS-3	9-210720B01B	20-Jul-2021 17:14
CS-4	9-210720B08	20-Jul-2021 22:33
CS-5	9-210720B07	20-Jul-2021 21:48

Approved:	<i>Ella Gdyczynski</i> --e-signature-- 13-Jul-2021
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Target Analytes	Relative Response Factors					Mean	% RSD
	CS-1	CS-2	CS-3	CS-4	CS-5		
2,3,7,8-TCDD	0.847	0.945	1.090	1.022	1.034	0.988	10%
1,2,3,7,8-PeCDD	0.971	0.990	1.009	1.032	1.034	1.007	3%
1,2,3,4,7,8-HxCDD	0.836	0.863	0.864	0.997	0.986	0.909	8%
1,2,3,6,7,8-HxCDD	1.024	1.090	1.078	1.102	1.113	1.081	3%
1,2,3,7,8,9-HxCDD	0.978	1.011	1.002	1.059	1.065	1.023	4%
1,2,3,4,6,7,8-HpCDD	1.144	1.074	1.082	1.068	1.038	1.081	4%
OCDD	1.671	1.339	1.108	1.166	1.050	1.267	20%
2,3,7,8-TCDF	0.913	1.007	1.356	1.115	1.099	1.098	15%
1,2,3,7,8-PeCDF	0.956	1.016	1.007	1.059	1.057	1.019	4%
2,3,4,7,8-PeCDF	1.037	1.090	1.106	1.151	1.173	1.111	5%
1,2,3,4,7,8-HxCDF	0.896	0.985	0.996	1.050	1.098	1.005	8%
1,2,3,6,7,8-HxCDF	0.982	1.068	1.068	1.132	1.142	1.078	6%
2,3,4,6,7,8-HxCDF	0.932	0.998	0.998	1.029	1.086	1.009	6%
1,2,3,7,8,9-HxCDF	0.801	0.895	0.872	0.916	0.957	0.888	7%
1,2,3,4,6,7,8-HpCDF	0.957	0.954	0.937	0.975	0.927	0.950	2%
1,2,3,4,7,8,9-HpCDF	0.784	0.800	0.792	0.819	0.783	0.796	2%
OCDF	1.695	1.642	1.456	1.593	1.467	1.571	7%
Field Spike Standards							
37Cl4-2,3,7,8-TCDD	0.857	1.016	0.964	0.989	1.030	0.971	7%
13C12-1,2,3,4,7,8-HxCDD	0.811	0.800	0.803	0.870	0.878	0.832	5%
13C12-2,3,4,7,8-PeCDF	0.992	0.995	0.994	1.003	1.006	0.998	1%
13C12-1,2,3,4,7,8-HxCDF	0.829	0.855	0.868	0.894	0.920	0.873	4%
13C12-1,2,3,4,7,8,9-HpCDF	0.828	0.797	0.834	0.831	0.836	0.825	2%
Extraction Standards							
13C12-2,3,7,8-TCDD	1.160	1.114	1.199	1.169	1.315	1.191	6%
13C12-1,2,3,7,8-PeCDD	0.747	0.748	0.819	0.797	1.073	0.837	16%
13C12-1,2,3,6,7,8-HxCDD	1.010	0.999	1.046	0.977	0.989	1.004	3%
13C12-1,2,3,4,6,7,8-HpCDD	0.792	0.830	0.849	0.842	0.859	0.834	3%
13C12-OCDD	0.574	0.553	0.639	0.600	0.698	0.613	9%
13C12-2,3,7,8-TCDF	1.694	1.682	1.789	1.698	1.852	1.743	4%
13C12-1,2,3,7,8-PeCDF	1.339	1.312	1.441	1.396	1.824	1.462	14%
13C12-1,2,3,6,7,8-HxCDF	1.614	1.573	1.631	1.527	1.443	1.558	5%
13C12-1,2,3,4,6,7,8-HpCDF	1.089	1.096	1.157	1.076	1.119	1.107	3%
Cleanup Standard							
13C12-1,2,3,7,8,9-HxCDF	1.255	1.289	1.311	1.233	1.239	1.265	3%

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-21-CS#1-611**
 Analysis Method EPA M23
 Analysis Type Calibration

Filename 9-210720B03 Inst # HRMS-? Column COL#-SN# Run Date 20-Jul-2021 18:47

Approved: *Ella Gdyczynski*
 --e-signature--
 13-Jul-2021

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.18	0.76	0.50	8.80E+03	0.847
1,2,3,7,8-PeCDD	32.08	1.77	2.50	3.25E+04	0.971
1,2,3,4,7,8-HxCDD	34.29	1.32	2.50	3.03E+04	0.836
1,2,3,6,7,8-HxCDD	34.34	1.21	2.50	3.71E+04	1.024
1,2,3,7,8,9-HxCDD	34.47	1.31	2.50	3.54E+04	0.978
1,2,3,4,6,7,8-HpCDD	35.93	1.01	2.50	3.25E+04	1.144
OCDD	37.33	0.90	5.00	6.88E+04	1.671
2,3,7,8-TCDF	26.29	0.74	0.50	1.39E+04	0.913
1,2,3,7,8-PeCDF	31.02	1.57	2.50	5.73E+04	0.956
2,3,4,7,8-PeCDF	31.85	1.51	2.50	6.22E+04	1.037
1,2,3,4,7,8-HxCDF	33.76	1.28	2.50	5.19E+04	0.896
1,2,3,6,7,8-HxCDF	33.83	1.12	2.50	5.68E+04	0.982
2,3,4,6,7,8-HxCDF	34.18	1.24	2.50	5.40E+04	0.932
1,2,3,7,8,9-HxCDF	34.61	1.20	2.50	4.63E+04	0.801
1,2,3,4,6,7,8-HpCDF	35.38	1.87	2.50	3.74E+04	0.957
1,2,3,4,7,8,9-HpCDF	36.16	1.89	2.50	3.07E+04	0.784
OCDF	37.41	0.95	5.00	6.98E+04	1.695
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.18	0.00	0.50	8.90E+03	0.857
13C12-1,2,3,4,7,8-HxCDD	34.28	1.27	100.00	1.18E+06	0.811
13C12-2,3,4,7,8-PeCDF	31.84	1.61	100.00	2.38E+06	0.992
13C12-1,2,3,4,7,8-HxCDF	33.75	0.53	100.00	1.92E+06	0.829
13C12-1,2,3,4,7,8,9-HpCDF	36.15	0.45	100.00	1.29E+06	0.828
Extraction Standards					
13C12-2,3,7,8-TCDD	27.15	0.764	100	2.08E+06	1.16
13C12-1,2,3,7,8-PeCDD	32.07	1.559	100	1.34E+06	0.747
13C12-1,2,3,6,7,8-HxCDD	34.33	1.259	100	1.45E+06	1.01
13C12-1,2,3,4,6,7,8-HpCDD	35.92	1.074	100	1.14E+06	0.792
13C12-OCDD	37.32	0.879	200	1.65E+06	0.574
13C12-2,3,7,8-TCDF	26.27	0.794	100	3.04E+06	1.694
13C12-1,2,3,7,8-PeCDF	31	1.621	100	2.40E+06	1.339
13C12-1,2,3,6,7,8-HxCDF	33.82	0.524	100	2.32E+06	1.614
13C12-1,2,3,4,6,7,8-HpCDF	35.37	0.442	100	1.56E+06	1.089
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.6	0.522	100	1.80E+06	1.255
Injection Standards					
13C12-1234-TCDD IS	26.48	0.772	100	1792246.1	17922.461
13C12-123789-HxCDD IS	34.46	1.26	100.00	1.44E+06	14350.009

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-21-CS#2-611**
 Analysis Method EPA M23
 Analysis Type Calibration

Filename 9-210720B02 Inst # HRMS-? Column COL#-SN# Run Date 20-Jul-2021 18:05

Approved: *Ella Gdyczynski*
 --e-signature--
 13-Jul-2021

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.18	0.72	2.00	4.17E+04	0.945
1,2,3,7,8-PeCDD	32.1	1.60	10.00	1.47E+05	0.990
1,2,3,4,7,8-HxCDD	34.29	1.28	10.00	1.34E+05	0.863
1,2,3,6,7,8-HxCDD	34.34	1.32	10.00	1.69E+05	1.090
1,2,3,7,8,9-HxCDD	34.47	1.33	10.00	1.57E+05	1.011
1,2,3,4,6,7,8-HpCDD	35.93	1.05	10.00	1.39E+05	1.074
OCDD	37.34	0.90	20.00	2.30E+05	1.339
2,3,7,8-TCDF	26.29	0.81	2.00	6.71E+04	1.007
1,2,3,7,8-PeCDF	31.02	1.55	10.00	2.64E+05	1.016
2,3,4,7,8-PeCDF	31.85	1.54	10.00	2.84E+05	1.090
1,2,3,4,7,8-HxCDF	33.76	1.18	10.00	2.41E+05	0.985
1,2,3,6,7,8-HxCDF	33.84	1.21	10.00	2.61E+05	1.068
2,3,4,6,7,8-HxCDF	34.19	1.15	10.00	2.44E+05	0.998
1,2,3,7,8,9-HxCDF	34.62	1.18	10.00	2.19E+05	0.895
1,2,3,4,6,7,8-HpCDF	35.39	1.80	10.00	1.63E+05	0.954
1,2,3,4,7,8,9-HpCDF	36.17	1.88	10.00	1.36E+05	0.800
OCDF	37.42	0.89	20.00	2.83E+05	1.642
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.18	0.00	2.00	4.48E+04	1.016
13C12-1,2,3,4,7,8-HxCDD	34.29	1.26	100.00	1.24E+06	0.800
13C12-2,3,4,7,8-PeCDF	31.84	1.60	100.00	2.59E+06	0.995
13C12-1,2,3,4,7,8-HxCDF	33.76	0.52	100.00	2.09E+06	0.855
13C12-1,2,3,4,7,8,9-HpCDF	36.16	0.45	100.00	1.36E+06	0.797
Extraction Standards					
13C12-2,3,7,8-TCDD	27.17	0.776	100	2.21E+06	1.114
13C12-1,2,3,7,8-PeCDD	32.08	1.543	100	1.48E+06	0.748
13C12-1,2,3,6,7,8-HxCDD	34.34	1.248	100	1.55E+06	0.999
13C12-1,2,3,4,6,7,8-HpCDD	35.93	1.079	100	1.29E+06	0.83
13C12-OCDD	37.33	0.91	200	1.72E+06	0.553
13C12-2,3,7,8-TCDF	26.27	0.824	100	3.33E+06	1.682
13C12-1,2,3,7,8-PeCDF	31.01	1.648	100	2.60E+06	1.312
13C12-1,2,3,6,7,8-HxCDF	33.83	0.524	100	2.45E+06	1.573
13C12-1,2,3,4,6,7,8-HpCDF	35.38	0.45	100	1.70E+06	1.096
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.61	0.523	100	2.01E+06	1.289
Injection Standards					
13C12-1234-TCDD IS	26.5	0.776	100	1982061	19820.61
13C12-123789-HxCDD IS	34.47	1.24	100.00	1.56E+06	15557.934

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-21-CCV-611**
 Analysis Method EPA M23
 Analysis Type Calibration

Filename 9-210720B01B Inst # HRMS-? Column COL#-SN# Run Date 20-Jul-2021 17:14

Approved: *Ella Gdyczynski*
 --e-signature--
 13-Jul-2021

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.18	0.82	10.00	2.38E+05	1.090
1,2,3,7,8-PeCDD	32.1	1.59	50.00	7.52E+05	1.009
1,2,3,4,7,8-HxCDD	34.29	1.28	50.00	6.86E+05	0.864
1,2,3,6,7,8-HxCDD	34.34	1.23	50.00	8.56E+05	1.078
1,2,3,7,8,9-HxCDD	34.47	1.20	50.00	7.96E+05	1.002
1,2,3,4,6,7,8-HpCDD	35.93	1.03	50.00	6.97E+05	1.082
OCDD	37.33	0.91	100.00	1.08E+06	1.108
2,3,7,8-TCDF	26.29	0.79	10.00	4.42E+05	1.356
1,2,3,7,8-PeCDF	31.02	1.53	50.00	1.32E+06	1.007
2,3,4,7,8-PeCDF	31.85	1.55	50.00	1.45E+06	1.106
1,2,3,4,7,8-HxCDF	33.76	1.18	50.00	1.23E+06	0.996
1,2,3,6,7,8-HxCDF	33.83	1.16	50.00	1.32E+06	1.068
2,3,4,6,7,8-HxCDF	34.18	1.17	50.00	1.24E+06	0.998
1,2,3,7,8,9-HxCDF	34.62	1.15	50.00	1.08E+06	0.872
1,2,3,4,6,7,8-HpCDF	35.38	1.82	50.00	8.23E+05	0.937
1,2,3,4,7,8,9-HpCDF	36.16	1.87	50.00	6.95E+05	0.792
OCDF	37.41	0.90	100.00	1.41E+06	1.456
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.18	0.00	10.00	2.11E+05	0.964
13C12-1,2,3,4,7,8-HxCDD	34.28	1.28	100.00	1.28E+06	0.803
13C12-2,3,4,7,8-PeCDF	31.84	1.62	100.00	2.61E+06	0.994
13C12-1,2,3,4,7,8-HxCDF	33.75	0.54	100.00	2.15E+06	0.868
13C12-1,2,3,4,7,8,9-HpCDF	36.16	0.45	100.00	1.47E+06	0.834
Extraction Standards					
13C12-2,3,7,8-TCDD	27.17	0.816	100	2.18E+06	1.199
13C12-1,2,3,7,8-PeCDD	32.07	1.595	100	1.49E+06	0.819
13C12-1,2,3,6,7,8-HxCDD	34.33	1.264	100	1.59E+06	1.046
13C12-1,2,3,4,6,7,8-HpCDD	35.92	1.074	100	1.29E+06	0.849
13C12-OCDD	37.33	0.906	200	1.94E+06	0.639
13C12-2,3,7,8-TCDF	26.27	0.79	100	3.26E+06	1.789
13C12-1,2,3,7,8-PeCDF	31	1.672	100	2.62E+06	1.441
13C12-1,2,3,6,7,8-HxCDF	33.83	0.521	100	2.48E+06	1.631
13C12-1,2,3,4,6,7,8-HpCDF	35.38	0.442	100	1.76E+06	1.157
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.6	0.548	100	1.99E+06	1.311
Injection Standards					
13C12-1234-TCDD IS	26.48	0.769	100	1821519.9	18215.199
13C12-123789-HxCDD IS	34.46	1.26	100.00	1.52E+06	15183.951

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-21-CS#4-611**
 Analysis Method EPA M23
 Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:
9-210720B08	HRMS-?	COL#-SN#	20-Jul-2021 22:33	<i>Ella Gdyczynski</i> --e-signature-- 13-Jul-2021

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD					
27.18 0.76 40.00 9.21E+05 1.022					
1,2,3,7,8-PeCDD					
32.08 1.59 200.00 3.17E+06 1.032					
1,2,3,4,7,8-HxCDD					
34.29 1.27 200.00 3.36E+06 0.997					
1,2,3,6,7,8-HxCDD					
34.34 1.26 200.00 3.71E+06 1.102					
1,2,3,7,8,9-HxCDD					
34.47 1.26 200.00 3.57E+06 1.059					
1,2,3,4,6,7,8-HpCDD					
35.93 1.05 200.00 3.10E+06 1.068					
OCDD					
37.34 0.90 400.00 4.82E+06 1.166					
2,3,7,8-TCDF					
26.29 0.77 40.00 1.46E+06 1.115					
1,2,3,7,8-PeCDF					
31.01 1.56 200.00 5.70E+06 1.059					
2,3,4,7,8-PeCDF					
31.85 1.56 200.00 6.20E+06 1.151					
1,2,3,4,7,8-HxCDF					
33.76 1.18 200.00 5.53E+06 1.050					
1,2,3,6,7,8-HxCDF					
33.83 1.19 200.00 5.96E+06 1.132					
2,3,4,6,7,8-HxCDF					
34.18 1.17 200.00 5.42E+06 1.029					
1,2,3,7,8,9-HxCDF					
34.62 1.17 200.00 4.82E+06 0.916					
1,2,3,4,6,7,8-HpCDF					
35.38 1.86 200.00 3.62E+06 0.975					
1,2,3,4,7,8,9-HpCDF					
36.16 1.86 200.00 3.04E+06 0.819					
OCDF					
37.42 0.89 400.00 6.59E+06 1.593					
Field Spike Standards					
37Cl4-2,3,7,8-TCDD					
27.18 0.00 40.00 8.91E+05 0.989					
13C12-1,2,3,4,7,8-HxCDD					
34.28 1.34 100.00 1.46E+06 0.870					
13C12-2,3,4,7,8-PeCDF					
31.84 1.61 100.00 2.70E+06 1.003					
13C12-1,2,3,4,7,8-HxCDF					
33.76 0.53 100.00 2.35E+06 0.894					
13C12-1,2,3,4,7,8,9-HpCDF					
36.16 0.44 100.00 1.54E+06 0.831					
Extraction Standards					
13C12-2,3,7,8-TCDD					
27.15 0.773 100 2.25E+06 1.169					
13C12-1,2,3,7,8-PeCDD					
32.07 1.608 100 1.54E+06 0.797					
13C12-1,2,3,6,7,8-HxCDD					
34.34 1.19 100 1.68E+06 0.977					
13C12-1,2,3,4,6,7,8-HpCDD					
35.92 1.053 100 1.45E+06 0.842					
13C12-OCDD					
37.33 0.906 200 2.07E+06 0.6					
13C12-2,3,7,8-TCDF					
26.26 0.82 100 3.27E+06 1.698					
13C12-1,2,3,7,8-PeCDF					
31 1.64 100 2.69E+06 1.396					
13C12-1,2,3,6,7,8-HxCDF					
33.83 0.528 100 2.63E+06 1.527					
13C12-1,2,3,4,6,7,8-HpCDF					
35.38 0.444 100 1.86E+06 1.076					
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF					
34.6 0.542 100 2.13E+06 1.233					
Injection Standards					
13C12-1234-TCDD IS					
26.48 0.774 100 1926472.8 19264.728					
13C12-123789-HxCDD IS					
34.46 1.26 100.00 1.72E+06 17234.996					

ALS Life Sciences

Calibration Report

ALS Sample ID **H9-21-CS#5-611**
 Analysis Method EPA M23
 Analysis Type Calibration

Filename 9-210720B07 Inst # HRMS-? Column COL#-SN# Run Date 20-Jul-2021 21:48

Approved: *Ella Gdyczynski*
 --e-signature--
 13-Jul-2021

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.17	0.77	200.00	4.73E+06	1.034
1,2,3,7,8-PeCDD	32.07	1.56	1000.00	1.93E+07	1.034
1,2,3,4,7,8-HxCDD	34.28	1.27	1000.00	2.00E+07	0.986
1,2,3,6,7,8-HxCDD	34.34	1.27	1000.00	2.26E+07	1.113
1,2,3,7,8,9-HxCDD	34.46	1.27	1000.00	2.16E+07	1.065
1,2,3,4,6,7,8-HpCDD	35.92	1.06	1000.00	1.83E+07	1.038
OCDD	37.34	0.90	2000.00	3.01E+07	1.050
2,3,7,8-TCDF	26.27	0.77	200.00	7.07E+06	1.099
1,2,3,7,8-PeCDF	31	1.56	1000.00	3.35E+07	1.057
2,3,4,7,8-PeCDF	31.84	1.55	1000.00	3.72E+07	1.173
1,2,3,4,7,8-HxCDF	33.76	1.17	1000.00	3.25E+07	1.098
1,2,3,6,7,8-HxCDF	33.83	1.15	1000.00	3.38E+07	1.142
2,3,4,6,7,8-HxCDF	34.18	1.18	1000.00	3.22E+07	1.086
1,2,3,7,8,9-HxCDF	34.61	1.18	1000.00	2.83E+07	0.957
1,2,3,4,6,7,8-HpCDF	35.38	1.85	1000.00	2.13E+07	0.927
1,2,3,4,7,8,9-HpCDF	36.16	1.83	1000.00	1.80E+07	0.783
OCDF	37.42	0.90	2000.00	4.20E+07	1.467
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.17	0.00	200.00	4.71E+06	1.030
13C12-1,2,3,4,7,8-HxCDD	34.27	1.26	100.00	1.78E+06	0.878
13C12-2,3,4,7,8-PeCDF	31.83	1.63	100.00	3.19E+06	1.006
13C12-1,2,3,4,7,8-HxCDF	33.75	0.53	100.00	2.73E+06	0.920
13C12-1,2,3,4,7,8,9-HpCDF	36.15	0.45	100.00	1.92E+06	0.836
Extraction Standards					
13C12-2,3,7,8-TCDD	27.14	0.773	100	2.29E+06	1.315
13C12-1,2,3,7,8-PeCDD	32.06	1.596	100	1.86E+06	1.073
13C12-1,2,3,6,7,8-HxCDD	34.33	1.252	100	2.03E+06	0.989
13C12-1,2,3,4,6,7,8-HpCDD	35.92	1.067	100	1.76E+06	0.859
13C12-OCDD	37.33	0.905	200	2.87E+06	0.698
13C12-2,3,7,8-TCDF	26.26	0.79	100	3.22E+06	1.852
13C12-1,2,3,7,8-PeCDF	30.99	1.621	100	3.17E+06	1.824
13C12-1,2,3,6,7,8-HxCDF	33.82	0.52	100	2.96E+06	1.443
13C12-1,2,3,4,6,7,8-HpCDF	35.37	0.442	100	2.30E+06	1.119
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.6	0.523	100	2.54E+06	1.239
Injection Standards					
13C12-1234-TCDD IS	26.48	0.782	100	1738024.9	17380.249
13C12-123789-HxCDD IS	34.46	1.23	100.00	2.05E+06	20528.631

ALS Life Sciences

Continuing Calibration Report

Sample Name	CCV	Sampling Date	n/a		
ALS Sample ID	H9-21-CCV-582	Extraction Date	n/a		
Analysis Method	EPA M23	Sample Size	1	n/a	
Analysis Type	CCV	Percent Moisture	n/a		
Sample Matrix	QC	Split Ratio	1		

Approved:
Ella Gdyczynski
 --e-signature--
 13-Jul-2021

Run Information		Run 1
Filename	9-210709A15	
Run Date	10-Jul-21 04:39	
Final Volume	10 uL	
Dilution Factor	1	
Analysis Units	%	
Instrument - Column	HRMS-9 DB5ms US1144784H	

Target Analytes	pg/uL	Ret. Time	% Rec	Limits	Flags
2,3,7,8-TCDD	10	27.23	96	75-125	
1,2,3,7,8-PeCDD	50	32.04	98	75-125	
1,2,3,4,7,8-HxCDD	50	34.21	101	75-125	
1,2,3,6,7,8-HxCDD	50	34.26	95	75-125	
1,2,3,7,8,9-HxCDD	50	34.39	96	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.83	94	75-125	
OCDD	100	37.25	93	75-125	
2,3,7,8-TCDF	10	26.32	101	75-125	
1,2,3,7,8-PeCDF	50	30.99	101	75-125	
2,3,4,7,8-PeCDF	50	31.81	102	75-125	
1,2,3,4,7,8-HxCDF	50	33.69	98	75-125	
1,2,3,6,7,8-HxCDF	50	33.76	96	75-125	
2,3,4,6,7,8-HxCDF	50	34.11	100	75-125	
1,2,3,7,8,9-HxCDF	50	34.53	100	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.30	96	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.08	96	75-125	
OCDF	100	37.33	93	70-130	
Field Spike Standards	pg/uL		% Rec	Limits	
37C14-2,3,7,8-TCDD	10	27.23	93	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.20	101	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.80	105	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.68	103	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.06	99	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	27.20	103	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.03	137	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.26	99	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.83	98	70-130	
13C12-OCDD	200	37.24	103	70-130	
13C12-2,3,7,8-TCDF	100	26.30	103	70-130	
13C12-1,2,3,7,8-PeCDF	100	30.97	101	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.75	95	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.29	100	70-130	
Cleanup Standard	pg/uL				
13C12-1,2,3,7,8,9-HxCDF	100	34.52	98	40-130	

ALS Life Sciences

Continuing Calibration Report

Sample Name	CCV	Sampling Date	n/a	
ALS Sample ID	H9-21-CCV-584	Extraction Date	n/a	
Analysis Method	EPA M23	Sample Size	1	n/a
Analysis Type	CCV	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	1	

Approved:
Ella Gdyczynski
 --e-signature--
 13-Jul-2021

Run Information		Run 1
Filename	9-210710A01	
Run Date	10-Jul-21 15:43	
Final Volume	10 uL	
Dilution Factor	1	
Analysis Units	%	
Instrument - Column	HRMS-9 DB5ms US1144784H	

Target Analytes	pg/uL	Ret. Time	% Rec	Limits	Flags
2,3,7,8-TCDD	10	27.23	97	75-125	
1,2,3,7,8-PeCDD	50	32.04	98	75-125	
1,2,3,4,7,8-HxCDD	50	34.21	98	75-125	
1,2,3,6,7,8-HxCDD	50	34.26	99	75-125	
1,2,3,7,8,9-HxCDD	50	34.39	95	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.83	98	75-125	
OCDD	100	37.25	95	75-125	
2,3,7,8-TCDF	10	26.32	105	75-125	
1,2,3,7,8-PeCDF	50	30.99	99	75-125	
2,3,4,7,8-PeCDF	50	31.81	100	75-125	
1,2,3,4,7,8-HxCDF	50	33.69	100	75-125	
1,2,3,6,7,8-HxCDF	50	33.77	101	75-125	
2,3,4,6,7,8-HxCDF	50	34.11	101	75-125	
1,2,3,7,8,9-HxCDF	50	34.53	114	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.30	95	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.08	104	75-125	
OCDF	100	37.33	100	70-130	
Field Spike Standards					
	pg/uL		% Rec	Limits	
37C14-2,3,7,8-TCDD	10	27.23	93	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.21	97	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.80	102	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.68	103	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.06	109	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	27.20	104	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.03	110	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.26	105	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.83	103	70-130	
13C12-OCDD	200	37.24	108	70-130	
13C12-2,3,7,8-TCDF	100	26.30	104	70-130	
13C12-1,2,3,7,8-PeCDF	100	30.97	107	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.75	98	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.29	104	70-130	
Cleanup Standard					
	pg/uL				
13C12-1,2,3,7,8,9-HxCDF	100	34.53	110	40-130	

ALS Life Sciences

Continuing Calibration Report

Sample Name	CCV	Sampling Date	n/a		
ALS Sample ID	H9-21-CCV-585	Extraction Date	n/a		
Analysis Method	EPA M23	Sample Size	1	n/a	
Analysis Type	CCV	Percent Moisture	n/a		
Sample Matrix	QC	Split Ratio	1		

Approved:
Ella Gdyczynski
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 13-Jul-2021

Run Information		Run 1
Filename	9-210710A15	
Run Date	11-Jul-21 01:47	
Final Volume	10 uL	
Dilution Factor	1	
Analysis Units	%	
Instrument - Column	HRMS-9 DB5ms US1144784H	

Target Analytes	pg/uL	Ret. Time	% Rec	Limits	Flags
2,3,7,8-TCDD	10	27.23	99	75-125	
1,2,3,7,8-PeCDD	50	32.05	99	75-125	
1,2,3,4,7,8-HxCDD	50	34.22	97	75-125	
1,2,3,6,7,8-HxCDD	50	34.27	98	75-125	
1,2,3,7,8,9-HxCDD	50	34.40	97	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.85	96	75-125	
OCDD	100	37.26	92	75-125	
2,3,7,8-TCDF	10	26.32	108	75-125	
1,2,3,7,8-PeCDF	50	31.00	101	75-125	
2,3,4,7,8-PeCDF	50	31.81	102	75-125	
1,2,3,4,7,8-HxCDF	50	33.69	96	75-125	
1,2,3,6,7,8-HxCDF	50	33.77	98	75-125	
2,3,4,6,7,8-HxCDF	50	34.11	98	75-125	
1,2,3,7,8,9-HxCDF	50	34.54	105	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.30	93	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.08	100	75-125	
OCDF	100	37.34	98	70-130	
Field Spike Standards	pg/uL		% Rec	Limits	
37C14-2,3,7,8-TCDD	10	27.23	92	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.21	97	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.80	105	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.69	101	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.08	106	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	27.20	101	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.04	109	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.26	104	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.83	101	70-130	
13C12-OCDD	200	37.25	102	70-130	
13C12-2,3,7,8-TCDF	100	26.30	101	70-130	
13C12-1,2,3,7,8-PeCDF	100	30.97	104	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.76	99	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.30	103	70-130	
Cleanup Standard	pg/uL				
13C12-1,2,3,7,8,9-HxCDF	100	34.53	107	40-130	

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Continuing Calibration Report

Sample Name	CCV	Sampling Date	n/a		
ALS Sample ID	H9-21-CCV-586	Extraction Date	n/a		
Analysis Method	EPA M23	Sample Size	1	n/a	
Analysis Type	CCV	Percent Moisture	n/a		
Sample Matrix	QC	Split Ratio	1		

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 13-Jul-2021

Run Information		Run 1
Filename	9-210710A31	
Run Date	11-Jul-21 13:26	
Final Volume	10 uL	
Dilution Factor	1	
Analysis Units	%	
Instrument - Column	HRMS-9 DB5ms US1144784H	

Target Analytes	pg/uL	Ret. Time	% Rec	Limits	Flags
2,3,7,8-TCDD	10	27.23	99	75-125	
1,2,3,7,8-PeCDD	50	32.05	99	75-125	
1,2,3,4,7,8-HxCDD	50	34.22	95	75-125	
1,2,3,6,7,8-HxCDD	50	34.28	91	75-125	
1,2,3,7,8,9-HxCDD	50	34.41	87	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.86	96	75-125	
OCDD	100	37.26	92	75-125	
2,3,7,8-TCDF	10	26.33	105	75-125	
1,2,3,7,8-PeCDF	50	31.00	98	75-125	
2,3,4,7,8-PeCDF	50	31.82	99	75-125	
1,2,3,4,7,8-HxCDF	50	33.70	94	75-125	
1,2,3,6,7,8-HxCDF	50	33.77	100	75-125	
2,3,4,6,7,8-HxCDF	50	34.12	97	75-125	
1,2,3,7,8,9-HxCDF	50	34.55	100	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.31	94	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.09	101	75-125	
OCDF	100	37.34	98	70-130	
Field Spike Standards	pg/uL		% Rec	Limits	
37C14-2,3,7,8-TCDD	10	27.23	93	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.21	92	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.81	102	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.69	97	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.08	107	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	27.20	101	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.04	98	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.27	105	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.85	97	70-130	
13C12-OCDD	200	37.26	94	70-130	
13C12-2,3,7,8-TCDF	100	26.30	101	70-130	
13C12-1,2,3,7,8-PeCDF	100	30.99	98	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.77	100	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.30	97	70-130	
Cleanup Standard	pg/uL				
13C12-1,2,3,7,8,9-HxCDF	100	34.53	104	40-130	

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Continuing Calibration Report

Sample Name	CCV	Sampling Date	n/a		
ALS Sample ID	H9-21-CCV-622	Extraction Date	n/a		
Analysis Method	EPA M23	Sample Size	1	n/a	
Analysis Type	CCV	Percent Moisture	n/a		
Sample Matrix	QC	Split Ratio	1		

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Ella Gdyczynski
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 13-Jul-2021

Run Information		Run 1
Filename	9-210724A01	
Run Date	24-Jul-21 05:03	
Final Volume	10 uL	
Dilution Factor	1	
Analysis Units	%	
Instrument - Column	HRMS-9 DB5ms US1144784H	

Target Analytes	pg/uL	Ret. Time	% Rec	Limits	Flags
2,3,7,8-TCDD	10	27.12	111	75-125	
1,2,3,7,8-PeCDD	50	32.06	102	75-125	
1,2,3,4,7,8-HxCDD	50	34.27	95	75-125	
1,2,3,6,7,8-HxCDD	50	34.32	101	75-125	
1,2,3,7,8,9-HxCDD	50	34.45	96	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.90	106	75-125	
OCDD	100	37.32	87	75-125	
2,3,7,8-TCDF	10	26.23	124	75-125	
1,2,3,7,8-PeCDF	50	30.99	106	75-125	
2,3,4,7,8-PeCDF	50	31.82	105	75-125	
1,2,3,4,7,8-HxCDF	50	33.74	100	75-125	
1,2,3,6,7,8-HxCDF	50	33.81	108	75-125	
2,3,4,6,7,8-HxCDF	50	34.16	102	75-125	
1,2,3,7,8,9-HxCDF	50	34.60	93	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.37	101	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.15	101	75-125	
OCDF	100	37.40	100	70-130	
Field Spike Standards					
	pg/uL		% Rec	Limits	
37C14-2,3,7,8-TCDD	10	27.14	95	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.26	96	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.81	101	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.73	94	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.13	98	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	27.11	104	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.05	99	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.31	109	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.90	108	70-130	
13C12-OCDD	200	37.31	117	70-130	
13C12-2,3,7,8-TCDF	100	26.21	103	70-130	
13C12-1,2,3,7,8-PeCDF	100	30.96	97	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.80	112	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.36	120	70-130	
Cleanup Standard					
	pg/uL				
13C12-1,2,3,7,8,9-HxCDF	100	34.58	104	40-130	

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Continuing Calibration Report

Sample Name	CCV	Sampling Date	n/a		
ALS Sample ID	H9-21-CCV-615	Extraction Date	n/a		
Analysis Method	EPA M23	Sample Size	1	n/a	
Analysis Type	CCV	Percent Moisture	n/a		
Sample Matrix	QC	Split Ratio	1		

Approved:
Ella Gdyczynski
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 13-Jul-2021

Run Information		Run 1
Filename	9-210724A17	
Run Date	24-Jul-21 17:05	
Final Volume	10 uL	
Dilution Factor	1	
Analysis Units	%	
Instrument - Column	HRMS-9 DB5ms US1144784H	

Target Analytes	pg/uL	Ret. Time	% Rec	Limits	Flags
2,3,7,8-TCDD	10	27.12	111	75-125	
1,2,3,7,8-PeCDD	50	32.06	103	75-125	
1,2,3,4,7,8-HxCDD	50	34.26	98	75-125	
1,2,3,6,7,8-HxCDD	50	34.32	96	75-125	
1,2,3,7,8,9-HxCDD	50	34.45	93	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.90	104	75-125	
OCDD	100	37.31	86	75-125	
2,3,7,8-TCDF	10	26.23	123	75-125	
1,2,3,7,8-PeCDF	50	30.97	105	75-125	
2,3,4,7,8-PeCDF	50	31.82	107	75-125	
1,2,3,4,7,8-HxCDF	50	33.74	99	75-125	
1,2,3,6,7,8-HxCDF	50	33.81	105	75-125	
2,3,4,6,7,8-HxCDF	50	34.16	101	75-125	
1,2,3,7,8,9-HxCDF	50	34.59	97	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.36	103	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.13	97	75-125	
OCDF	100	37.39	100	70-130	
Field Spike Standards					
	pg/uL		% Rec	Limits	
37C14-2,3,7,8-TCDD	10	27.12	95	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.25	100	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.81	104	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.72	92	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.13	99	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	27.09	101	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.04	97	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.31	107	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.89	104	70-130	
13C12-OCDD	200	37.31	107	70-130	
13C12-2,3,7,8-TCDF	100	26.21	98	70-130	
13C12-1,2,3,7,8-PeCDF	100	30.96	93	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.80	110	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.36	115	70-130	
Cleanup Standard					
	pg/uL				
13C12-1,2,3,7,8,9-HxCDF	100	34.58	103	40-130	

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	Media Blank	Sampling Date	n/a		
ALS Sample ID	WG3559668-1	Extraction Date	23-Jun-21		
Analysis Method	EPA M23	Sample Size	1	sample	
Analysis Type	Blank	Percent Moisture	n/a		
Sample Matrix	QC	Split Ratio	4		

Approved:
Ella Gdyczynski
--e-signature--
13-Jul-2021

Run Information	Run 1
Filename	9-210710A06
Run Date	10-Jul-21 19:17
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-9 DB5ms US1144784H

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	EMPC pg	LQL
2,3,7,8-TCDD	1	NotFnd	<1.3	1.3	U	4.0
1,2,3,7,8-PeCDD	1	NotFnd	<0.79	0.79	U	20
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.75	0.75	U	20
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.67	0.67	U	20
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.70	0.70	U	20
1,2,3,4,6,7,8-HpCDD	0.01	35.83	<2.3	0.66	M,J,R	2.3
OCDD	0.0003	37.25	9.38	1.2	M,J	40
2,3,7,8-TCDF	0.1	NotFnd	<0.83	0.83	U	4.0
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.98	0.98	U	20
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.91	0.91	U	20
1,2,3,4,7,8-HxCDF	0.1	33.69	0.780	0.61	M,J	20
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.59	0.59	U	20
2,3,4,6,7,8-HxCDF	0.1	34.11	<0.79	0.65	M,J,R	0.79
1,2,3,7,8,9-HxCDF	0.1	34.53	<1.1	0.84	M,J,R	1.1
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<0.95	0.95	U	20
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.3	1.3	U	20
OCDF	0.0003	37.33	<2.5	1.2	J,R	2.5

Field Spike Standards	pg	% Rec	Limits
37C14-2,3,7,8-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	pg	Conc.	EDL
13C12-2,3,7,8-TCDD	4000	27.20	56 40-130
13C12-1,2,3,7,8-PeCDD	4000	32.03	63 40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.26	63 40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.83	68 25-130
13C12-OCDD	8000	37.24	73 25-130
13C12-2,3,7,8-TCDF	4000	26.30	63 40-130
13C12-1,2,3,7,8-PeCDF	4000	30.97	59 40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.75	59 40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.29	71 25-130

Cleanup Standard	pg	Conc.	EDL
13C12-1,2,3,7,8,9-HxCDF	4000	34.52	69 40-130

Homologue Group Totals	# peaks	Conc. pg	EDL pg
Total-TCDD	0	<1.3	1.3 U
Total-PeCDD	0	<0.79	0.79 U
Total-HxCDD	0	<0.75	0.75 U
Total-HpCDD	0	<0.66	0.66 U
Total-TCDF	0	<0.83	0.83 U
Total-PeCDF	0	<0.98	0.98 U
Total-HxCDF	0	<0.84	0.84 U
Total-HpCDF	0	<1.3	1.3 U

Toxic Equivalency - (WHO 2005)	pg
Lower Bound PCDD/F TEQ (WHO 2005)	0.0808
Mid Point PCDD/F TEQ (WHO 2005)	1.68
Upper Bound PCDD/F TEQ (WHO 2005)	3.06

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
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.
NS	Indicates that this compound was not spiked.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a	
ALS Sample ID	WG3559668-4	Extraction Date	23-Jun-21	
Analysis Method	EPA M23	Sample Size	1	sample
Analysis Type	Blank	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	4	
				Approved: Ella Gdyczynski --e-signature-- 13-Jul-2021

Run Information		Run 1
Filename	9-210710A07	
Run Date	10-Jul-21 20:01	
Final Volume	10 uL	
Dilution Factor	1	
Analysis Units	pg	
Instrument - Column	HRMS-9 DB5ms US1144784H	

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
2,3,7,8-TCDD	1	NotFnd	<1.1	1.1	U		4.0
1,2,3,7,8-PeCDD	1	NotFnd	<0.79	0.79	U		20
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.70	0.70	U		20
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.62	0.62	U		20
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.65	0.65	U		20
1,2,3,4,6,7,8-HpCDD	0.01	35.85	1.96	1.1	M,J		20
OCDD	0.0003	37.25	<4.4	1.2	M,J,R	4.4	40
2,3,7,8-TCDF	0.1	NotFnd	<1.0	1.0	U		4.0
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.76	0.76	U		20
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.71	0.71	U		20
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.71	0.71	U		20
1,2,3,6,7,8-HxCDF	0.1	33.78	0.780	0.69	M,J		20
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.75	0.75	U		20
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.98	0.98	U		20
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<0.77	0.77	U		20
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.1	1.1	U		20
OCDF	0.0003	37.33	<1.6	0.74	M,J,R	1.6	40

Field Spike Standards	pg	% Rec	Limits
37C14-2,3,7,8-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	
13C12-1,2,3,4,6,7,8,9-HpCDF		NS	

Extraction Standards	pg	Conc. pg	EDL pg
13C12-2,3,7,8-TCDD	4000	27.21	54 40-130
13C12-1,2,3,7,8-PeCDD	4000	32.04	63 40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.27	63 40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.85	68 25-130
13C12-OCDD	8000	37.25	67 25-130
13C12-2,3,7,8-TCDF	4000	26.32	59 40-130
13C12-1,2,3,7,8-PeCDF	4000	30.99	58 40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.77	57 40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.30	68 25-130

Cleanup Standard	pg	Conc. pg	EDL pg
13C12-1,2,3,7,8,9-HxCDF	4000	34.54	67 40-130

Homologue Group Totals	# peaks	Conc. pg	EDL pg
Total-TCDD	0	<1.1	1.1 U 4.0
Total-PeCDD	0	<0.79	0.79 U 20
Total-HxCDD	0	<0.70	0.70 U 20
Total-HpCDD	1	1.96	1.1 20
Total-TCDF	0	<1.0	1.0 U 4.0
Total-PeCDF	0	<0.76	0.76 U 20
Total-HxCDF	0	<0.98	0.98 U 20
Total-HpCDF	0	<1.1	1.1 U 20

Toxic Equivalency - (WHO 2005)	pg
Lower Bound PCDD/F TEQ (WHO 2005)	0.0976
Mid Point PCDD/F TEQ (WHO 2005)	1.44
Upper Bound PCDD/F TEQ (WHO 2005)	2.78

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
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.
NS	Indicates that this compound was not spiked.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	Laboratory Control Sample	Sampling Date	n/a		
ALS Sample ID	WG3559668-2	Extraction Date	23-Jun-21		
Analysis Method	EPA M23	Sample Size	1	n/a	
Analysis Type	LCS	Percent Moisture	n/a		
Sample Matrix	QC	Split Ratio	4		

Approved:
Ella Gdyczynski
 --e-signature--
 13-Jul-2021

Run Information		Run 1
Filename	9-210709A13	
Run Date	10-Jul-21 03:12	
Final Volume	10 uL	
Dilution Factor	1	
Analysis Units	pg	
Instrument - Column	HRMS-9 DB5ms US1144784H	

Target Analytes	pg	Ret. Time	% Rec	Limits	Flags
2,3,7,8-TCDD	400	27.23	88	70-130	
1,2,3,7,8-PeCDD	2000	32.04	105	70-130	
1,2,3,4,7,8-HxCDD	2000	34.21	107	70-130	
1,2,3,6,7,8-HxCDD	2000	34.26	99	70-130	
1,2,3,7,8,9-HxCDD	2000	34.39	104	70-130	
1,2,3,4,6,7,8-HpCDD	2000	35.85	94	70-130	
OCDD	4000	37.25	90	70-130	
2,3,7,8-TCDF	400	26.33	94	70-130	
1,2,3,7,8-PeCDF	2000	30.99	106	70-130	
2,3,4,7,8-PeCDF	2000	31.81	99	70-130	
1,2,3,4,7,8-HxCDF	2000	33.69	99	70-130	
1,2,3,6,7,8-HxCDF	2000	33.77	103	70-130	
2,3,4,6,7,8-HxCDF	2000	34.11	109	70-130	
1,2,3,7,8,9-HxCDF	2000	34.53	114	70-130	
1,2,3,4,6,7,8-HpCDF	2000	35.30	96	70-130	
1,2,3,4,7,8,9-HpCDF	2000	36.08	107	70-130	
OCDF	4000	37.33	90	70-130	
Field Spike Standards	pg		% Rec	Limits	
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	27.21	65	40-130	
13C12-1,2,3,7,8-PeCDD	4000	32.03	72	40-130	
13C12-1,2,3,6,7,8-HxCDD	4000	34.26	73	40-130	
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.83	76	25-130	
13C12-OCDD	8000	37.25	89	25-130	
13C12-2,3,7,8-TCDF	4000	26.30	68	40-130	
13C12-1,2,3,7,8-PeCDF	4000	30.97	69	40-130	
13C12-1,2,3,6,7,8-HxCDF	4000	33.76	71	40-130	
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.29	77	25-130	
Cleanup Standard	pg				
13C12-1,2,3,7,8,9-HxCDF	4000	34.53	79	40-130	

R Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
 NS Indicates that this compound was not spiked.



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SECTION 6: INTERNAL RECORDS

Including:

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

Batch ID: WG3559668

DX Extraction Standard:

(Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3559668-1	40	✓
WG3559668-2	40	✓
WG3559668-3	40	✓
WG3559668-4	40	✓
L2602390-1	40	✓
L2602390-2	40	✓
L2602390-3	40	✓
L2602390-4	40	✓
L2602390-5	40	✓
	40	
	40	
	40	

Syringe ID:

320

Standard:

M23-ES#2- 0434

Spike Date:

23 June 2021

Spike Witnessing

Chemist's Initials

Chemist: AR

Witness's Initials

Witness: AB

Witness's Initials

Correct Syringe Obtained: AB

Witness's Initials

Correct Standard Obtained: AB

Witness's Initials

Correct Technique Followed: AB

PCB Extraction Standard:

(Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3559668-1	40	✓
WG3559668-2	40	✓
WG3559668-3	40	✓
WG3559668-4	40	✓
L2602390-1	40	✓
L2602390-2	40	✓
L2602390-3	40	✓
L2602390-4	40	✓
L2602390-5	40	✓
	40	
	40	

Syringe ID:

382

Standard:

1668A-ES#2- 0724

Spike Date:

23 June 2021

Spike Witnessing

Chemist's Initials

Chemist: AR

Witness's Initials

Witness: AB

Witness's Initials

Correct Syringe Obtained: AB

Witness's Initials

Correct Standard Obtained: AB

Witness's Initials

Correct Technique Followed: AB

Batch ID: WG3559668

Batch ID: WG3559668

Syringe ID: 322
Standard: 1613B-NS#3-033C
Date & Initials: 23-June-2021 AR

DX Native Standard:		(Checkmark)
Sample I.D.	Volume (ul)	Spiked
WG3559668-2	40	✓
WG3559668-3	40	✓

Syringe ID: 394
Standard: 1668A-NS#1-041C
Date & Initials: 23-June-2021 AR

PCB Native Standard:		(Checkmark)
Sample I.D.	Volume (ul)	Spiked
WG3559668-2	40	✓
WG3559668-3	40	✓

DX Cleanup Standard:		(Checkmark)
Sample I.D.	Volume (ul)	Spiked
WG3559668-1	20	✓
WG3559668-2	20	✓
WG3559668-3	N/A	N/A
WG3559668-4	20	✓
L2602390-1	20	✓
L2602390-2	20	✓
L2602390-3	20	✓
L2602390-4	20	✓
L2602390-5	20	✓
	20	
	20	

Syringe ID: 357
Standard: M23-CL#1-038B

Date & Initials: 24-Jun-21 ACR

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

PCB Cleanup Standard:		(Checkmark)
Sample I.D.	Volume (ul)	Spiked
WG3559668-1	20	✓
WG3559668-2	20	✓
WG3559668-3	N/A	N/A
WG3559668-4	20	✓
L2602390-1	20	✓
L2602390-2	20	✓
L2602390-3	20	✓
L2602390-4	20	✓
L2602390-5	20	✓
	20	
	20	
WG3559668 PREP		
3-OCT-18 / MSM RS		
Page 3 of 6		

Syringe ID: 378
Standard: 1668A-CL#2-040H

Date & Initials: 24-Jun-21 ACR

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

Batch ID: WG3559668

DX Injection Standard: (Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3559668-1	10	✓
WG3559668-2	10	✓
WG3559668-3	10	✓
WG3559668-4	10	✓
L2602390-1	10	✓
L2602390-2	10	✓
L2602390-3	10	✓
L2602390-4	10	✓
L2602390-5	10	✓
	10	
	10	
	10	
	10	
	10	
	10	
	10	
	10	

Syringe ID: 408

Standard: 1613B-IS#1-092K

Date & Initials: 05-Jul-2021 AP

Correct Syringe Obtained: Chemist's Initials

Correct Standard Obtained: Chemist's Initials

Correct Technique Followed: Chemist's Initials

PCB Injection Standard: (Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3559668-1	5	✓
WG3559668-2	5	✓
WG3559668-3	5	✓
WG3559668-4	5	✓
L2602390-1	5	✓
L2602390-2	5	✓
L2602390-3	5	✓
L2602390-4	5	✓
L2602390-5	5	✓
	5	
	5	
	5	
	5	
	5	
	5	
	5	
	5	
	5	

Syringe ID: 407

Standard: 1668A-IS#2-015A

Date & Initials: 25-Jun-2021 AP

Correct Syringe Obtained: Chemist's Initials

Correct Standard Obtained: Chemist's Initials

Correct Technique Followed: Chemist's Initials

Batch ID: WG3559668

Reagent Lot Numbers:

Reagent	Lot#	Manufacturer
Acetone	105971	
Hexane	105964	
DCM	106160	
Toluene	106112	
Nonane	ORG-WAKONON-059	
1:1 DCM:HEX	ORG-DH2-659	
Sodium Sulphate	ORG-SSU-2648, 2632, 2649	
Acid Silica	ORG-ASI-10066	
Neutral Silica	ORG-NSI-2605	
Alumina	ORG-ALU-409	
1% Decafluorobenzene	ORG-2%DAS-	
3-Chloro-4-methyl-5-nitrobenzene	ORG-CC-302	

Batch ID: WG3559668

Procedure:

This batchsheet is a guideline only. Please see test procedure for complete set of instructions.

Extraction:

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

Rotovap:

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

Batch ID: WG3559668

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: WG3559668

Comments:

NOTE: Label and Save All Columns including Acid Silica Columns

* Each sample contains 3 vials, each with different L#s on inside and out side. Table summarizes L#s.

Approval of Deviation from Standard Method

(Batch Writer): _____

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

WG3559668		Prep Analyst:		
PUF - M23/1668A (HR)		Date:		
	Very Good	Meets Method Req.	Some Outliers	Very Poor
MB				
LCS				
DUP				
ES rec				

Sample L#	Outside L#	inside L#
L2602390-1	L2602387-1 L2577435-1 L2588195-1	L2576584-1 L2550525-5 L2566478-2
L2602390-2	L2577435-2 L2602387-2 L2588195-2	L2550525-4 L2576584-2 L2566478-1
AR L2602390-3	L2602387-3 L2577435-3 L2588195-3	L2576584-3 L2550525-3 L2566478-4
L2602390-4	L2577435-4 L2602387-4 L2588195-4	L2550525-2 L2576584-4 L2566478-5
L2602390-5 WG3559668 PREP 3-Oct-18 / MSM RS	L2588195-5 L2577435-5 L2602387-5	L2566478-3 L2550525-1 L2576584-5

ALS Life Sciences

Sample Calculation Report

CS3 RRF Check

Approved:	Ella Gdyczynski
	--e-signature--
	13-Jul-2021

RRF	=	$\frac{\text{Response of 2,3,7,8-TCDD}}{\text{Response of 13C12-2,3,7,8-TCDD}}$	x	$\frac{\text{Concentration of 13C12-2,3,7,8-TCDD}}{\text{Concentration of TCDD}}$			
		100243.40		100	=	0.94	0.94
		1069911.30		10			

Calculated Value Value from TargetLyn
 x

Calculation of OCDD amount in L2602390-1

pg	=	$\frac{\text{Response of OCDD}}{\text{Response of 13C12-OCDD}}$	x	$\frac{\text{pg of 13C12-OCDD spiked}}{\text{Mean RRF} * \text{Sample Size}}$		
		9611.7		8000	=	197.581
		307211.3		1.27 * 1.00		197.600

Calculation of 13C12-2,3,7,8-TCDD Recovery in L2602390-1

% Recovery	=	$\frac{\text{Response of 13C12-2,3,7,8-TCDD}}{\text{Response of 13C12-1,2,3,4-TCDD}}$	x	$\frac{\text{pg of 13C12-1,2,3,4-TCDD spiked} * 100}{\text{Mean RRF} * \text{Amount Spiked}}$		
		806466.7		2000 * 100	=	55
		1231212.3		1.19 * 2000		55 %



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SECTION 7: SHIPPING/RECEIVING DOCUMENTS

Including:

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



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: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																																																																																																															
Contact: Molly Alar				Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days)			EMERGENCY																																																																																																																																												
Phone: 425-677-0211				Compare Results to Criteria on Report - provide details below if box checked <input type="checkbox"/>			4 day [P4-20%] <input type="checkbox"/>			1 Business day [E - 100%] <input type="checkbox"/>																																																																																																																																												
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Street: 975 5th Ave NW				Email 1 or Fax: malar@farallonconsulting.com			Date and Time Required for all E&P TATs:			dd-mmm-yy hh:mm																																																																																																																																												
City/Province: Issaquah				Email 2: AP@farallonconsulting.com			For tests that can not be performed according to the service level selected, you will be contacted.																																																																																																																																															
Postal Code: 98027				Email 3: spatterson@farallonconsulting.com			Analysis Request Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																																																																																																															
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				Invoice Distribution																																																																																																																																																		
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Sample Identification and/or Coordinates (This description will appear on the report)				Date (dd-mmm-yy)																																																									Time (hh:mm)			Sample Type																																																																																						
1 L2550525 - 5 - 1				15-Apr-21			1056			Air																																																																																																																																												
2 L2550525 - 4 - 2				1			1206			1																																																																																																																																												
3 L2550525 - 3 - 3				1			1222			1																																																																																																																																												
4 L2550525 - 2 - 4				1			1229			1																																																																																																																																												
5 L2550525 - 1 - 5				1			1238			1																																																																																																																																												
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Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO				Hold samples for composite.			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>																																																																																																																																															
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO							Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>																																																																																																																																															
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SHIPMENT RELEASE (client use)				INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)																																																																																																																																															
Released by: <i>Molly Alar</i>				Received by: <i>BARA BURTA</i>			Received by: _____																																																																																																																																															
Date: 4/15/21				Date: 16-Apr-2021			Date: _____																																																																																																																																															
Time: 1500				Time: 12:00			Time: _____																																																																																																																																															

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

Canada Toll Free: 1 800 668 9878

www.alsglobal.com



L2588195-COFC

Composite WO: L2602390

COC Number: 17-792155

Page 1 of 1

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: <u>Farallon Consulting</u>		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																
Contact: <u>Molly Alar</u>		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PROXIMITY (Business Days)		EMERGENCY																																														
Phone: <u>206-482-9806 425-677-0211</u>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			4 day [P4-20%] <input type="checkbox"/>		1 Business day [E - 100%] <input type="checkbox"/>																																														
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Street: <u>975 Stn Ave NW</u>		Email 1 or Fax: <u>Malar@farallonconsulting.com</u>			2 day [P2-50%] <input type="checkbox"/>		Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																														
City/Province: <u>Issaquah, WA</u>		Email 2: <u>spatterson@farallonconsulting.com</u>			For tests that can not be performed according to the service level selected, you will be contacted.																																																
Postal Code: <u>98027</u>		Email 3:			Analysis Request																																																
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Invoice Distribution			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			<table border="1"> <tr><td colspan="7">NUMBER OF CONTAINERS</td></tr> <tr><td colspan="7">EPA Method</td></tr> <tr><td colspan="7">PCBs</td></tr> <tr><td colspan="7">Dioxins</td></tr> <tr><td colspan="7">EPA Method</td></tr> <tr><td colspan="7">8240A</td></tr> </table>							NUMBER OF CONTAINERS							EPA Method							PCBs							Dioxins							EPA Method							8240A						
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Company:		Email 1 or Fax: <u>AP@farallonconsulting.com</u>			<table border="1"> <tr><td colspan="7" rowspan="4">SAMPLES ON HOLD</td></tr> <tr><td colspan="7" rowspan="4">SUSPECTED HAZARD (see Special Instructions)</td></tr> <tr><td colspan="7"></td></tr> <tr><td colspan="7"></td></tr> </table>							SAMPLES ON HOLD							SUSPECTED HAZARD (see Special Instructions)																																		
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Contact:		Email 2: <u>Malar@farallonconsulting.com</u>																																																			
Project Information		Oil and Gas Required Fields (client use)																																																			
ALS Account # / Quote #:		AFE/Cost Center: PO#:																																																			
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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																																																	
1	L2566478-2-1	13-May-21	0955	Air	1	X	X																																														
2	L2566478-1-2		1012		1	X	X																																														
3	L2566478-4-3		1025		1	X	X																																														
4	L2566478-5-4		1032		1	X	X																																														
5	L2566478-3-5		1038		1	X	X																																														
Drinking Water (DW) Samples¹ (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)																																																
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		<u>Hold samples for composite.</u>			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>																																																
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>																																																
					Cooling Initiated <input checked="" type="checkbox"/>																																																
					INITIAL COOLER TEMPERATURES °C: 6.0°C																																																
					FINAL COOLER TEMPERATURES °C:																																																
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)																																																
Released by: <u>Molly Alar</u>	Date: <u>5/13/21</u>	Time: <u>1400</u>	Received by: <u>ARRAN PATON</u>	Date: <u>14-MAY-2021</u>	Time: <u>15:20</u>	Received by: _____ Date: _____ Time: _____																																															

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION
ALS Canada Ltd.

WHITE - LABORATORY COPY YELLOW - CLIENT COPY
L2602390 DX DPKG 210728

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



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: <u>Farallon Consulting</u>		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL EDD (DIGITAL)		Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																				
Contact: <u>Molly Alar</u>		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		PRIORITY (Business Days)	4 day [P4-20%] <input type="checkbox"/>		EMERGENCY	1 Business day [E - 100%] <input type="checkbox"/>																
Phone: <u>425-077-0211</u>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%] <input type="checkbox"/>			Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>																
Company address below will appear on the final report		Select Distribution: <input type="checkbox"/> EMAIL MAIL <input type="checkbox"/> FAX		Date and Time Required for all E&P TATs:		dd-mmm-yy hh:mm																		
Street: <u>975 5th Ave NW</u>		Email 1 or Fax: <u>Malar@farallonconsulting.com</u>		or tests that can not be performed according to the service level selected, you will be contacted.																				
City/Province: <u>Issaquah, WA</u>		Email 2: <u>Spatterson@farallonconsulting.com</u>		Analysis Request Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																				
Postal Code: <u>98027</u>		Email 3:																						
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Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																						
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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																
1		L2576584-1-1		15-Jun-21		1023		Air																
2		L2576584-2-2				1048																		
3		L2576584-3-3				1114																		
4		L2576584-4-4				1127																		
5		L2576584-5-5				1141																		
Drinking Water (DW) Samples' (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)		SAMPLE CONDITION AS RECEIVED (lab use only)																				
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		Composite with 4/15/21 and 5/13/21 samples and test.		Frozen <input type="checkbox"/>		SIF Observations Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>																		
Are samples for human consumption/ use? YES NO				Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/>		Custody seal intact Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>																		
				Cooling Initiated <input checked="" type="checkbox"/>		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: <u>Molly Alar</u> Date: <u>6/15/2021</u> Time: <u>11:00</u>		Received by: <u>BARAN BULTAN</u> Date: <u>16-JUNE-2021</u> Time: <u>13:20</u>		Received by:		Date:		Time:																

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
18-Apr-2024 12:00	FARALLON	5 x PUFs	7.3°C	Good FedEx 7731 8909 2080	MB	18-Apr-2024 14:30	L2577435	-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
14-May-2024 15:20	FARAWAY	5 x PUFs	6.0°C	Good Fedex 9719 9696 3041	Mg	14-May-2024 17:30	L2S88195	-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
16-June-2024 13:20	FARALLON	5 x PUFs	15.8°C	Good FESER 7739 4013 4088	Mg	17-June-2024 10:20	L2602387 L2602390	-1-5 -1-5

*Temperatures were recorded using : VWR Traceable dedicated I.R. gun (model 36934-178 SN 192108143)

Other (specify): _____