TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

ANALYTICAL REPORT

PROJECT NO. B0039310.0000.00001

Beazer-Morrisville NC

Lot #: H4K130404

David Bessingpas

ARCADIS U.S. Inc
6602 Excelsior Road
Baxter, MN 56425

TESTAMERICA LABORATORIES, INC.

Ryan Henry

Ryan Henry
Project Manager

December 12, 2014

ANALYTICAL METHODS SUMMARY

H4K130404

PARAMETER	ANALYTICAL METHOD
Dibenzodioxins and Dibenzofurans, HRGC/HRMS	SW846 8290
Percent Moisture	MCAWW 160.3 MOD

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

H4K130404

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
M5HQ1	001	EB-01 (111214)	11/12/14	08:05
M5HQ2	002	SS-109-10'	11/12/14	08:30
M5HQ3	003	SS-108-10'	11/12/14	09:00
M5HQ4	004	SS-107-10'	11/12/14	09:40
M5HQ6	006	SS-110-10'	11/12/14	10:05
M5HQ7	007	SS-105-10'	11/12/14	10:50
M5HQ8	008	SS-106-10'	11/12/14	11:25
M5HQ9	009	SS-103-10'	11/12/14	12:30
M5HRA	010	SS-104-10'	11/12/14	13:00
M5HRC	011	SS-102-10'	11/12/14	13:20
M5HRD	012	SS-101-10'	11/12/14	14:05
M5HRE	013	DUP-01 (111214)	11/12/14	
M5HRG	015	EB-02 (111214)	11/12/14	15:00

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

PROJECT NARRATIVE
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The results reported herein are applicable to the samples submitted for analysis only. If you have any questions about this report, please call (865) 291-3000 to speak with the TestAmerica project manager listed on the cover page.

This report shall not be reproduced except in full, without the written approval of the laboratory.

The original chain of custody documentation is included with this report.

Sample Receipt

There were no problems with the condition of the samples received.

Quality Control and Data Interpretation

Unless otherwise noted, all holding times and QC criteria were met and the test results shown in this report meet all applicable NELAC requirements.

For solid and sediments samples, when percent moisture is included in the report header field, the sample results are reported on a dry weight basis. When percent moisture is not contained in the header field, sample results are reported on an as received or wet weight basis.

Samples SS-108-10', SS-103-10', SS-102-10' and DUP-01 (111214) exhibited internal standard recoveries which were below the lower acceptance criterion (40%). The low recoveries were on internal standards which had native analytes which had saturated the HRMS. The post dilution spiked analyses of these samples were within limits. Please note that the post dilution spikes should not be considered isotope dilution.

The matrix spike and duplicate on sample SS-101-10' exhibited several native recoveries which were outside the established QC limits. The laboratory control sample was within limits indicating a lack of sample homogeneity. Native analytes 1234678-HpCDD and OCDD were reported from post dilution spikes due to levels and are qualified with an "X" to note this.

Method blank, M5H6R-1AA, exhibited 1234678-HpCDD and OCDD above the minimum level. All associated samples were well in excess of twenty times the levels in the method blank.

All positive 2378-TCDF results at or above the minimum level were confirmed on a DB-225 column.

For samples SS-101-10' original, matrix spike and duplicate several results were reported from either a DB-225 column or a post dilution spike. Due to limitation of the data reporting system these values were added to the original work orders and qualified with an "X". The data for these analyses is included in the data package directly following each original analysis.

Samples SS-109-10', SS-107-10', SS-106-10' and SS-104-10' exhibited native OCDD above the upper calibration range. The method does not require further action be taken; therefore, the results were reported as is with an "E" qualifier.

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Samples SS-108-10', SS-110-10', SS-105-10', SS-103-10', SS-102-10', SS-101-10' original, matrix spike and duplicate and DUP-01 (111214) were diluted at various amounts and post spiked with internal standard and recovery standard to bring native analytes within the upper calibration level. Only analytes which were "E" qualified on the original analyses were reported from the post dilution spikes.

The following flags are used to qualify results for chlorinated dioxin and furan results:

J – The reported result is an estimate. The amount reported is below the Minimum Level (ML). The qualitative definition of the ML is "the lowest level at which the analytical system must give a reliable signal and an acceptable calibration point". The ML was introduced in EPA Methods 1624 and 1625 in 1980 and was promulgated in these methods in 1984 at 40 CFR Part 136, Appendix A. For the purposes of this report, the ML is qualitatively defined as described above, and quantitatively defined as follows:

Minimum Level: The concentration or mass of analyte in the sample that corresponds to the lowest calibration level in the initial calibration. It represents a concentration (in the sample extract) equivalent to that of the lowest calibration standard, after corrections for method-specified sample weights, volumes and cleanup procedures has been employed.

Example: The lowest calibration level for TCDD in the initial calibration is 0.5 pg/uL. A mass of 10 pg of 2,3,7,8-TCDD in the sample would result in a concentration of 0.5 pg/uL in the sample extract (at a final volume of 20 uL). Since the concentration in the sample extract corresponds to the concentration in the lowest calibration standard, the 10 pg mass in the sample components is the ML. If the sample extract is further diluted, the ML will increase by the dilution factor.

Example: A 1/10 dilution is performed on the sample extract described above. The ML for 2,3,7,8-TCDD becomes 100 pg rather than the default of 10 pg.

E – The reported result is an estimate. The amount reported is above the Upper Calibration Level (UCL) described below. The quantitative definition of the UCL is listed below:

Upper Calibration Level: The concentration or mass of analyte in the sample that corresponds to the highest calibration level in the initial calibration. It is equivalent to the concentration of the highest calibration standard, assuming that all method-specified sample weights, volumes, and cleanup procedures have been employed.

Example: The maximum calibration level for TCDD in the initial calibration is 200 pg/uL. A mass of 4000 pg of 2,3,7,8-TCDD in the sampling components would result in a concentration of 200 pg/uL in the sample extract (at a final volume of 20 uL). Since the concentration in the sample extract corresponds to the concentration in the highest calibration standard, the 4000 pg mass in the sample components is the UCL. If the sample extract is further diluted, the ML will increase by the dilution factor.

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Example: A 1/10 dilution is performed on the sample extract described above. The UCL for 2,3,7,8-TCDD becomes 40,000 pg rather than the default of 4000 pg. In this example, all positive 2,3,7,8-TCDD results above 40,000 pg are flagged with an E.

B – The analyte is present in the associated method blank at a detectable level. For this analysis, there is no method specified reporting level other than the qualitative criterion that peaks must exhibit a signal-to-noise ratio of ≥2.5 to 1. Therefore, the presence of any reportable amount of the analyte in the blank will result in a B qualifier on all associated samples.

Q – Estimated maximum possible concentration. This qualifier is used when the result is generated from chromatographic data that does not meet all the qualitative criteria for a positive identification given in the method. These criteria include the following:

- Ion abundance ratios must be within specified limits (+/-15% of theoretical ion abundance ratio).
- Retention time criteria (relative to the method-specified isotope labeled retention time standard).
- Co-maximization criterion. The two quantitation ion peaks must reach their maxima within 2 seconds of each other.
- Polychlorinated dibenzofuran purity. No peak can be identified as a polychlorinated dibenzofuran if a polychlorinated diphenyl ether peak maximizes within +/- 2 seconds of the furan candidate.

S – Ion suppression evident. The trace indicating the signal from the lock mass of the calibration compound shows a deflection at the retention time of the analyte. This may indicate a temporary suppression of the instrument sensitivity due to a matrix-borne interference.

C – Coeluting Isomer. The isomer is known to coelute with another member of its homologue group, or the peak shape is shouldered, indicating the likelihood of a coeluting isomer.

X – Other. See explanation in narrative.

Laboratory studies supporting risk assessment and Total Maximum Daily Load (TMDL) evaluations, frequently use qualified data reported as low as the Method Detection Limit (MDL), or the Estimated Detection Limit (EDL). Several of EPA's isotope dilution methods employ the EDL.[1,2,3] The EDL is based on a direct measurement of the signal-to-noise (S/N) ratio acquired during sample analysis. This S/N measurement is used to calculate the concentration in the sample corresponding to the minimum intensity of the smallest quantifiable peak. The EDL reflects the amount of the particular analyte which would be required to cause a positive result for the particular analysis. Because the S/N obtained covaries with recovery, instrument sensitivity and sample-specific cleanup efficacy, the EDL is a more valid measure of the sensitivity of the entire analytical process for the specific sample than is an MDL run periodically on a reference matrix.

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The EDL is typically calculated according to the following equation:

$$\text{Estimated Detection Limit} = \frac{N \times 2.5 \times Qis}{His \times RRF \times W \times S}$$

Where:

N	=	peak to peak noise of quantitation ion signal in the region of the ion chromatogram where the compound of interest is expected to elute
His	=	peak height of quantitation ion for appropriate internal standard
Qis	=	ng of internal standard added to sample
RRF	=	mean relative response factor of compound obtained during initial calibration
W	=	amount of sample extracted (grams or liters)
S	=	percent solids (optional, if results are requested to be reported on dry weight basis)

(The area of the internal standard is sometimes used instead of height, along with an area-to-height conversion factor.)

This method of estimating the detection limit differs from the MDL in that it does not carry the requirement that the sample be statistically distinguished as being from a contaminated population. As results approach the EDL, the risk of false positives and the analytical uncertainty increase significantly. However, a low false positive well below the ML or MDL is often closer to the true value than an assumption that the target analyte is present at the detection or reporting limits. For relatively clean samples, MDL studies may give an elevated estimate of the detection limit. Additionally, on contaminated samples, the MDL may give a falsely low estimate of the detection limit.

$$\text{Analyte Concentration} = \frac{As \times Qis}{Ais \times RRF \times W \times S}$$

Where:

As	=	Sum of areas of the target peaks
Qis	=	ng of internal standard added to sample
Ais	=	Sum of areas of the internal standard peaks
RRF	=	mean relative response factor of compound obtained during initial calibration
W	=	amount of sample extracted (grams or liters)
S	=	percent solids (optional, if results are requested to be reported on dry weight basis)

In sample data, peaks must have an intensity of $\geq$2.5 times the height of the background noise in order to be considered. Careful examination of the two equations above reveals that for the concentration of the smallest peak detectable (per the EDL equation) to exactly equal the smallest peaks that are calculated, requires that the average height to area ratio obtained during the calibration must equal the area to height ratio for every peak obtained near 2.5 times the noise. When the area to height ratio on a peak in a sample is less than the average obtained during calibration, the calculated result will correspond to a peak that would have been less than 2.5 times the noise on the calibration. This is the result of normal variability. Because

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the source methods for the EDL (SW-846 8290 and 8280A) do not provide for censoring of results by any other magnitude standard than being 2.5 times the noise, the laboratory does not censor at the calculated EDL. Hence, detections may be reported below the estimated detection limits.

Footnotes:

1. Code of Federal Regulations, Part 136, Chapter 1, Appendix 1, October 1994: Method 1613 Tetra- Through Octa-Chlorinated Dioxins and Furans by Isotope Dilution High Resolution Gas Chromatography/High Resolution Mass Spectrometry.
2. U.S. EPA. Test Methods for Evaluating Solid Waste, Volume II, SW-846, Update III, December 1996. Method 8280A: The Analysis of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by High Resolution Gas Chromatography/Low Resolution Mass Spectrometry.
3. U.S. EPA. Test Methods for Evaluating Solid Waste, SW-846. Third Edition. March 1995 Method 8290: Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by High Resolution Gas Chromatography/High Resolution Mass Spectrometry.

CERTIFICATION SUMMARY

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Knoxville	L-A-B	DoD ELAP		L2311
TestAmerica Knoxville	Arkansas DEQ	State Program	6	88-0688
TestAmerica Knoxville	California	State Program	9	2423
TestAmerica Knoxville	Colorado	State Program	8	N/A
TestAmerica Knoxville	Connecticut	State Program	1	PH-0223
TestAmerica Knoxville	Florida	NELAC	4	E87177
TestAmerica Knoxville	Georgia	State Program	4	906
TestAmerica Knoxville	Hawaii	State Program	9	N/A
TestAmerica Knoxville	Indiana	State Program	5	C-TN-02
TestAmerica Knoxville	Iowa	State Program	7	375
TestAmerica Knoxville	Kansas	NELAC	7	E-10349
TestAmerica Knoxville	Kentucky	State Program	4	90101
TestAmerica Knoxville	Louisiana DOHH	State Program	6	LA110001
TestAmerica Knoxville	Louisiana DEQ	NELAC	6	83979
TestAmerica Knoxville	Maryland	State Program	3	277
TestAmerica Knoxville	Michigan	State Program	5	9933
TestAmerica Knoxville	Minnesota	NELAC	5	047-999-429
TestAmerica Knoxville	Nevada	State Program	9	TN00009
TestAmerica Knoxville	New Jersey	NELAC	2	TN001
TestAmerica Knoxville	New York	NELAC	2	10781
TestAmerica Knoxville	North Carolina DENR	State Program	4	64
TestAmerica Knoxville	North Carolina DHHS	State Program	4	21705
TestAmerica Knoxville	Ohio	OVAP	5	CL0059
TestAmerica Knoxville	Oklahoma	State Program	6	9415
TestAmerica Knoxville	Pennsylvania	NELAC	3	68-00576
TestAmerica Knoxville	South Carolina	State Program	4	84001
TestAmerica Knoxville	Tennessee	State Program	4	2014
TestAmerica Knoxville	Texas	NELAC	6	T104704380-TX
TestAmerica Knoxville	Federal	USDA		P330-11-00035
TestAmerica Knoxville	Utah	NELAC	8	QUAN3
TestAmerica Knoxville	Virginia	NELAC	3	460176
TestAmerica Knoxville	Virginia	State Program	3	165
TestAmerica Knoxville	Washington	State Program	10	C593
TestAmerica Knoxville	West Virginia DEP	State Program	3	345
TestAmerica Knoxville	West Virginia DHHR	State Program	3	9955C

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

Sample Data Summary

ARCADIS U.S. Inc

Sample ID: EB-01 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 001	**Work Order #....:**	M5HQ11AA	**Matrix....:**	WH
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/20/14	**Analysis Date....:**	12/02/14		
Prep Batch # ....:	4324016				
Initial Wgt/Vol :	1020 mL	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND		0.0098	0.000099	ng/L
1,2,3,7,8-PeCDD	ND		0.049	0.00015	ng/L
1,2,3,4,7,8-HxCDD	ND		0.049	0.00030	ng/L
1,2,3,6,7,8-HxCDD	ND		0.049	0.00029	ng/L
1,2,3,7,8,9-HxCDD	ND		0.049	0.00028	ng/L
1,2,3,4,6,7,8-HpCDD	**0.0016**	**B J**	**0.049**	**0.00042**	**ng/L**
OCDD	**0.0078**	**B J**	**0.098**	**0.00021**	**ng/L**
2,3,7,8-TCDF	ND		0.0098	0.00014	ng/L
1,2,3,7,8-PeCDF	ND		0.049	0.00019	ng/L
2,3,4,7,8-PeCDF	ND		0.049	0.00017	ng/L
1,2,3,4,7,8-HxCDF	ND		0.049	0.00018	ng/L
1,2,3,6,7,8-HxCDF	ND		0.049	0.00016	ng/L
2,3,4,6,7,8-HxCDF	ND		0.049	0.00018	ng/L
1,2,3,7,8,9-HxCDF	ND		0.049	0.00024	ng/L
1,2,3,4,6,7,8-HpCDF	**0.00069**	**J**	**0.049**	**0.00016**	**ng/L**
1,2,3,4,7,8,9-HpCDF	ND		0.049	0.00023	ng/L
OCDF	**0.0019**	**Q B J**	**0.098**	**0.00016**	**ng/L**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	92	40 - 135
13C-1,2,3,7,8-PeCDD	111	40 - 135
13C-1,2,3,4,7,8-HxCDD	95	40 - 135
13C-1,2,3,6,7,8-HxCDD	96	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	101	40 - 135
13C-OCDD	91	40 - 135
13C-2,3,7,8-TCDF	92	40 - 135
13C-1,2,3,7,8-PeCDF	114	40 - 135
13C-2,3,4,7,8-PeCDF	110	40 - 135
13C-1,2,3,4,7,8-HxCDF	94	40 - 135
13C-1,2,3,6,7,8-HxCDF	95	40 - 135
13C-2,3,4,6,7,8-HxCDF	98	40 - 135
13C-1,2,3,7,8,9-HxCDF	96	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	98	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	100	40 - 135
13C-OCDF	86	40 - 135

ARCADIS U.S. Inc

Sample ID: EB-01 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 001	**Work Order #....:**	M5HQ11AA	**Matrix....:**	WH
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/20/14	**Analysis Date....:**	12/02/14		
Prep Batch # ....:	4324016				
Initial Wgt/Vol :	1020 mL	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q . Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-109-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 002	**Work Order #....:**	M5HQ21AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/02/14	**Percent Moisture**	11
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.4 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	2.3	Q J	11	0.37	ng/kg
1,2,3,7,8-PeCDD	48	B J	54	0.40	ng/kg
1,2,3,4,7,8-HxCDD	92		54	0.41	ng/kg
1,2,3,6,7,8-HxCDD	370	B	54	0.37	ng/kg
1,2,3,7,8,9-HxCDD	180	C B	54	0.37	ng/kg
1,2,3,4,6,7,8-HpCDD	10000	B	54	1.3	ng/kg
OCDD	91000	B E	110	1.3	ng/kg
2,3,7,8-TCDF	1.2	Q J	11	0.19	ng/kg
1,2,3,7,8-PeCDF	5.6	J	54	0.35	ng/kg
2,3,4,7,8-PeCDF	6.1	Q B J	54	0.33	ng/kg
1,2,3,4,7,8-HxCDF	74	Q	54	0.26	ng/kg
1,2,3,6,7,8-HxCDF	140	Q	54	0.24	ng/kg
2,3,4,6,7,8-HxCDF	36	B J	54	0.25	ng/kg
1,2,3,7,8,9-HxCDF	1.9	J	54	0.29	ng/kg
1,2,3,4,6,7,8-HpCDF	1700	B	54	0.42	ng/kg
1,2,3,4,7,8,9-HpCDF	120	B	54	0.69	ng/kg
OCDF	7000	B	110	0.49	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	67	40 - 135
13C-1,2,3,7,8-PeCDD	61	40 - 135
13C-1,2,3,4,7,8-HxCDD	62	40 - 135
13C-1,2,3,6,7,8-HxCDD	63	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	71	40 - 135
13C-OCDD	76	40 - 135
13C-2,3,7,8-TCDF	59	40 - 135
13C-1,2,3,7,8-PeCDF	67	40 - 135
13C-2,3,4,7,8-PeCDF	64	40 - 135
13C-1,2,3,4,7,8-HxCDF	60	40 - 135
13C-1,2,3,6,7,8-HxCDF	60	40 - 135
13C-2,3,4,6,7,8-HxCDF	64	40 - 135
13C-1,2,3,7,8,9-HxCDF	67	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	73	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	71	40 - 135
13C-OCDF	65	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-109-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 002	**Work Order #....:**	M5HQ21AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/02/14	**Percent Moisture**	11
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.4 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-108-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 003	**Work Order #....:**	M5HQ31AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	15
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	19		12	0.73	ng/kg
1,2,3,7,8-PeCDD	220	B	59	0.69	ng/kg
1,2,3,4,7,8-HxCDD	530		59	1.9	ng/kg
1,2,3,6,7,8-HxCDD	9500	B	59	2.0	ng/kg
1,2,3,7,8,9-HxCDD	1400	C B	59	1.9	ng/kg
2,3,7,8-TCDF	5.9	J	12	0.61	ng/kg
1,2,3,7,8-PeCDF	28	Q J	59	1.1	ng/kg
2,3,4,7,8-PeCDF	40	B J	59	1.1	ng/kg
1,2,3,4,7,8-HxCDF	1200	Q	59	1.2	ng/kg
1,2,3,6,7,8-HxCDF	1500	Q	59	1.1	ng/kg
2,3,4,6,7,8-HxCDF	300	B	59	1.1	ng/kg
1,2,3,7,8,9-HxCDF	27	J	59	1.4	ng/kg
1,2,3,4,7,8,9-HpCDF	1600	B	59	3.0	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY		RECOVERY LIMITS
13C-2,3,7,8-TCDD	72		40 - 135
13C-1,2,3,7,8-PeCDD	68		40 - 135
13C-1,2,3,4,7,8-HxCDD	61		40 - 135
13C-1,2,3,6,7,8-HxCDD	57		40 - 135
13C-1,2,3,4,6,7,8-HpCDD	78		40 - 135
13C-OCDD	34	*	40 - 135
13C-2,3,7,8-TCDF	68		40 - 135
13C-1,2,3,7,8-PeCDF	68		40 - 135
13C-2,3,4,7,8-PeCDF	68		40 - 135
13C-1,2,3,4,7,8-HxCDF	63		40 - 135
13C-1,2,3,6,7,8-HxCDF	61		40 - 135
13C-2,3,4,6,7,8-HxCDF	68		40 - 135
13C-1,2,3,7,8,9-HxCDF	73		40 - 135
13C-1,2,3,4,6,7,8-HpCDF	68		40 - 135
13C-1,2,3,4,7,8,9-HpCDF	74		40 - 135
13C-OCDF	65		40 - 135

ARCADIS U.S. Inc

Sample ID: SS-108-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 003	**Work Order #....:**	M5HQ31AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	15
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

*	Surrogate recovery is outside stated control limits.
B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
C	Co-eluting isomer.
J	Estimated Result.
Q	Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-108-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 003	**Work Order #....:**	M5HQ32AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/11/14	**Percent Moisture**	15
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	0.067 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,6,7,8-HpCDD	**71000**	**B**	**880**	**49**	**ng/kg**
OCDD	**84000**	**B**	**1800**	**37**	**ng/kg**
1,2,3,4,6,7,8-HpCDF	**11000**	**B**	**880**	**21**	**ng/kg**
OCDF	**29000**	**B**	**1800**	**20**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	97	40 - 135
13C-1,2,3,7,8-PeCDD	72	40 - 135
13C-1,2,3,4,7,8-HxCDD	97	40 - 135
13C-1,2,3,6,7,8-HxCDD	107	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	111	40 - 135
13C-OCDD	91	40 - 135
13C-2,3,7,8-TCDF	96	40 - 135
13C-1,2,3,7,8-PeCDF	86	40 - 135
13C-2,3,4,7,8-PeCDF	83	40 - 135
13C-1,2,3,4,7,8-HxCDF	103	40 - 135
13C-1,2,3,6,7,8-HxCDF	108	40 - 135
13C-2,3,4,6,7,8-HxCDF	105	40 - 135
13C-1,2,3,7,8,9-HxCDF	107	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	107	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	112	40 - 135
13C-OCDF	97	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

ARCADIS U.S. Inc

Sample ID: SS-107-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 004	**Work Order #....:**	M5HQ41AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	12
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	1.2	Q J	11	0.44	ng/kg
1,2,3,7,8-PeCDD	26	B J	56	0.67	ng/kg
1,2,3,4,7,8-HxCDD	76		56	1.3	ng/kg
1,2,3,6,7,8-HxCDD	200	B	56	0.90	ng/kg
1,2,3,7,8,9-HxCDD	130	C B	56	1.0	ng/kg
1,2,3,4,6,7,8-HpCDD	6300	B	56	2.3	ng/kg
OCDD	72000	B E	110	3.3	ng/kg
2,3,7,8-TCDF	1.1	Q J	11	0.47	ng/kg
1,2,3,7,8-PeCDF	3.3	Q J	56	1.2	ng/kg
2,3,4,7,8-PeCDF	160	C B	56	1.2	ng/kg
1,2,3,4,7,8-HxCDF	53	C J	56	0.64	ng/kg
1,2,3,6,7,8-HxCDF	89	Q	56	0.52	ng/kg
2,3,4,6,7,8-HxCDF	28	B J	56	0.55	ng/kg
1,2,3,7,8,9-HxCDF	ND		56	0.74	ng/kg
1,2,3,4,6,7,8-HpCDF	1300	B	56	1.3	ng/kg
1,2,3,4,7,8,9-HpCDF	94	B	56	1.7	ng/kg
OCDF	4900	B	110	1.3	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	76	40 - 135
13C-1,2,3,7,8-PeCDD	65	40 - 135
13C-1,2,3,4,7,8-HxCDD	46	40 - 135
13C-1,2,3,6,7,8-HxCDD	71	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	75	40 - 135
13C-OCDD	91	40 - 135
13C-2,3,7,8-TCDF	63	40 - 135
13C-1,2,3,7,8-PeCDF	64	40 - 135
13C-2,3,4,7,8-PeCDF	62	40 - 135
13C-1,2,3,4,7,8-HxCDF	57	40 - 135
13C-1,2,3,6,7,8-HxCDF	62	40 - 135
13C-2,3,4,6,7,8-HxCDF	66	40 - 135
13C-1,2,3,7,8,9-HxCDF	63	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	64	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	64	40 - 135
13C-OCDF	77	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-107-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 004	**Work Order #....:**	M5HQ41AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	12
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-110-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 006	Work Order #....:	M5HQ61AC	Matrix....:	SO
Date Sampled....:	11/12/14	Date Received....:	11/13/14	Dilution Factor:	10
Prep Date....:	11/17/14	Analysis Date....:	12/03/14	Percent Moisture	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	Instrument ID....:	D2A	Method:	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	19	Q	12	0.84	ng/kg
1,2,3,7,8-PeCDD	240	B	58	1.1	ng/kg
1,2,3,4,7,8-HxCDD	480		58	1.5	ng/kg
1,2,3,6,7,8-HxCDD	2000	B	58	1.4	ng/kg
1,2,3,7,8,9-HxCDD	1100	C B	58	1.3	ng/kg
2,3,7,8-TCDF	6.4	Q J	12	0.64	ng/kg
1,2,3,7,8-PeCDF	25	J	58	0.87	ng/kg
2,3,4,7,8-PeCDF	31	B J	58	0.98	ng/kg
1,2,3,4,7,8-HxCDF	490	Q	58	1.1	ng/kg
1,2,3,6,7,8-HxCDF	1000	Q	58	1.1	ng/kg
2,3,4,6,7,8-HxCDF	180	B	58	0.90	ng/kg
1,2,3,7,8,9-HxCDF	7.2	J	58	1.2	ng/kg
1,2,3,4,6,7,8-HpCDF	11000	B	58	1.9	ng/kg
1,2,3,4,7,8,9-HpCDF	740	B	58	2.4	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	67	40 - 135
13C-1,2,3,7,8-PeCDD	63	40 - 135
13C-1,2,3,4,7,8-HxCDD	59	40 - 135
13C-1,2,3,6,7,8-HxCDD	61	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	76	40 - 135
13C-OCDD	42	40 - 135
13C-2,3,7,8-TCDF	72	40 - 135
13C-1,2,3,7,8-PeCDF	73	40 - 135
13C-2,3,4,7,8-PeCDF	67	40 - 135
13C-1,2,3,4,7,8-HxCDF	53	40 - 135
13C-1,2,3,6,7,8-HxCDF	53	40 - 135
13C-2,3,4,6,7,8-HxCDF	66	40 - 135
13C-1,2,3,7,8,9-HxCDF	67	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	62	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	69	40 - 135
13C-OCDF	68	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-110-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 006	**Work Order #....:**	M5HQ61AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-110-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 006	**Work Order #....:**	M5HQ62AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/11/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	0.2 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,6,7,8-HpCDD	**26000**	**B**	**290**	**15**	**ng/kg**
OCDD	**130000**	**B**	**580**	**19**	**ng/kg**
OCDF	**22000**	**B**	**580**	**7.4**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	96	40 - 135
13C-1,2,3,7,8-PeCDD	79	40 - 135
13C-1,2,3,4,7,8-HxCDD	92	40 - 135
13C-1,2,3,6,7,8-HxCDD	93	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	103	40 - 135
13C-OCDD	96	40 - 135
13C-2,3,7,8-TCDF	95	40 - 135
13C-1,2,3,7,8-PeCDF	89	40 - 135
13C-2,3,4,7,8-PeCDF	89	40 - 135
13C-1,2,3,4,7,8-HxCDF	94	40 - 135
13C-1,2,3,6,7,8-HxCDF	91	40 - 135
13C-2,3,4,6,7,8-HxCDF	97	40 - 135
13C-1,2,3,7,8,9-HxCDF	95	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	103	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	100	40 - 135
13C-OCDF	92	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

ARCADIS U.S. Inc

Sample ID: SS-105-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 007	**Work Order #....:**	M5HQ71AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	20		11	0.87	ng/kg
1,2,3,7,8-PeCDD	380	B	57	0.89	ng/kg
1,2,3,4,7,8-HxCDD	880		57	1.7	ng/kg
1,2,3,6,7,8-HxCDD	4400	B	57	1.6	ng/kg
1,2,3,7,8,9-HxCDD	1900	C B	57	1.5	ng/kg
1,2,3,7,8-PeCDF	56	J	57	0.80	ng/kg
2,3,4,7,8-PeCDF	66	B	57	0.75	ng/kg
1,2,3,4,7,8-HxCDF	920	Q	57	1.1	ng/kg
1,2,3,6,7,8-HxCDF	1300	Q	57	1.0	ng/kg
2,3,4,6,7,8-HxCDF	350	B	57	1.0	ng/kg
1,2,3,7,8,9-HxCDF	20	J	57	1.1	ng/kg
1,2,3,4,7,8,9-HpCDF	1500	B	57	3.2	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	78	40 - 135
13C-1,2,3,7,8-PeCDD	67	40 - 135
13C-1,2,3,4,7,8-HxCDD	61	40 - 135
13C-1,2,3,6,7,8-HxCDD	65	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	76	40 - 135
13C-OCDD	41	40 - 135
13C-1,2,3,7,8-PeCDF	73	40 - 135
13C-2,3,4,7,8-PeCDF	75	40 - 135
13C-1,2,3,4,7,8-HxCDF	60	40 - 135
13C-1,2,3,6,7,8-HxCDF	63	40 - 135
13C-2,3,4,6,7,8-HxCDF	71	40 - 135
13C-1,2,3,7,8,9-HxCDF	71	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	59	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	64	40 - 135
13C-OCDF	62	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

ARCADIS U.S. Inc

Sample ID: SS-105-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 007	**Work Order #....:**	M5HQ71AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-105-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 007	**Work Order #....:**	M5HQ72AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/11/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	0.101 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,6,7,8-HpCDD	**73000**	**B**	**570**	**45**	**ng/kg**
OCDD	**220000**	**B**	**1100**	**59**	**ng/kg**
1,2,3,4,6,7,8-HpCDF	**15000**	**B**	**570**	**16**	**ng/kg**
OCDF	**49000**	**B**	**1100**	**26**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	101	40 - 135
13C-1,2,3,7,8-PeCDD	83	40 - 135
13C-1,2,3,4,7,8-HxCDD	96	40 - 135
13C-1,2,3,6,7,8-HxCDD	101	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	106	40 - 135
13C-OCDD	102	40 - 135
13C-2,3,7,8-TCDF	97	40 - 135
13C-1,2,3,7,8-PeCDF	84	40 - 135
13C-2,3,4,7,8-PeCDF	83	40 - 135
13C-1,2,3,4,7,8-HxCDF	101	40 - 135
13C-1,2,3,6,7,8-HxCDF	98	40 - 135
13C-2,3,4,6,7,8-HxCDF	98	40 - 135
13C-1,2,3,7,8,9-HxCDF	105	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	104	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	98	40 - 135
13C-OCDF	92	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

ARCADIS U.S. Inc

Sample ID: SS-105-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 007	**Work Order #....:**	M5HQ71AD	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/04/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D12C	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Confirmation Run

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDF	12	Q	11	0.81	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDF	85	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-106-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 008	**Work Order #....:**	M5HQ81AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	12
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.4 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	3.3	Q J	11	0.51	ng/kg
1,2,3,7,8-PeCDD	68	B	55	0.69	ng/kg
1,2,3,4,7,8-HxCDD	140		55	1.1	ng/kg
1,2,3,6,7,8-HxCDD	570	B	55	1.1	ng/kg
1,2,3,7,8,9-HxCDD	310	C B	55	1.0	ng/kg
1,2,3,4,6,7,8-HpCDD	16000	B	55	2.4	ng/kg
OCDD	140000	B E	110	1.9	ng/kg
2,3,7,8-TCDF	1.8	J	11	0.40	ng/kg
1,2,3,7,8-PeCDF	7.5	J	55	0.82	ng/kg
2,3,4,7,8-PeCDF	16	Q B J	55	0.85	ng/kg
1,2,3,4,7,8-HxCDF	120	Q	55	0.90	ng/kg
1,2,3,6,7,8-HxCDF	160	Q	55	0.82	ng/kg
2,3,4,6,7,8-HxCDF	61	B	55	0.83	ng/kg
1,2,3,7,8,9-HxCDF	2.1	Q J	55	1.2	ng/kg
1,2,3,4,6,7,8-HpCDF	3300	B	55	1.5	ng/kg
1,2,3,4,7,8,9-HpCDF	180	B	55	2.3	ng/kg
OCDF	13000	B	110	1.7	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	71	40 - 135
13C-1,2,3,7,8-PeCDD	67	40 - 135
13C-1,2,3,4,7,8-HxCDD	69	40 - 135
13C-1,2,3,6,7,8-HxCDD	69	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	85	40 - 135
13C-OCDD	98	40 - 135
13C-2,3,7,8-TCDF	66	40 - 135
13C-1,2,3,7,8-PeCDF	71	40 - 135
13C-2,3,4,7,8-PeCDF	67	40 - 135
13C-1,2,3,4,7,8-HxCDF	62	40 - 135
13C-1,2,3,6,7,8-HxCDF	63	40 - 135
13C-2,3,4,6,7,8-HxCDF	71	40 - 135
13C-1,2,3,7,8,9-HxCDF	66	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	73	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	79	40 - 135
13C-OCDF	79	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-106-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 008	**Work Order #....:**	M5HQ81AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	12
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.4 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-103-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 009	**Work Order #....:**	M5HQ91AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	16
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	640		12	2.8	ng/kg
1,2,3,7,8-PeCDD	8900	B	59	2.6	ng/kg
1,2,3,4,7,8-HxCDD	16000		59	4.9	ng/kg
1,2,3,7,8-PeCDF	1600		59	3.2	ng/kg
2,3,4,7,8-PeCDF	1200	Q B	59	2.7	ng/kg
1,2,3,4,7,8-HxCDF	16000	Q	59	2.8	ng/kg
2,3,4,6,7,8-HxCDF	6700	Q B	59	2.8	ng/kg
1,2,3,7,8,9-HxCDF	170		59	3.2	ng/kg
1,2,3,4,7,8,9-HpCDF	23000	B	59	5.4	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY		RECOVERY LIMITS
13C-2,3,7,8-TCDD	81		40 - 135
13C-1,2,3,7,8-PeCDD	82		40 - 135
13C-1,2,3,4,7,8-HxCDD	63		40 - 135
13C-1,2,3,6,7,8-HxCDD	65		40 - 135
13C-1,2,3,4,6,7,8-HpCDD	55		40 - 135
13C-OCDD	11	*	40 - 135
13C-1,2,3,7,8-PeCDF	79		40 - 135
13C-2,3,4,7,8-PeCDF	85		40 - 135
13C-1,2,3,4,7,8-HxCDF	61		40 - 135
13C-1,2,3,6,7,8-HxCDF	56		40 - 135
13C-2,3,4,6,7,8-HxCDF	67		40 - 135
13C-1,2,3,7,8,9-HxCDF	74		40 - 135
13C-1,2,3,4,6,7,8-HpCDF	60		40 - 135
13C-1,2,3,4,7,8,9-HpCDF	63		40 - 135
13C-OCDF	30	*	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

- * Surrogate recovery is outside stated control limits.
- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-103-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 009	**Work Order #....:**	M5HQ92AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/11/14	**Percent Moisture**	16
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	0.034 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,6,7,8-HxCDD	**34000**	**B**	**1800**	**64**	**ng/kg**
1,2,3,7,8,9-HxCDD	**20000**	**B**	**1800**	**61**	**ng/kg**
1,2,3,4,6,7,8-HpCDD	**560000**	**B**	**1800**	**130**	**ng/kg**
OCDD	**590000**	**B**	**3500**	**100**	**ng/kg**
1,2,3,6,7,8-HxCDF	**22000**		**1800**	**44**	**ng/kg**
1,2,3,4,6,7,8-HpCDF	**170000**	**B**	**1800**	**82**	**ng/kg**
OCDF	**420000**	**B**	**3500**	**97**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	96	40 - 135
13C-1,2,3,7,8-PeCDD	79	40 - 135
13C-1,2,3,4,7,8-HxCDD	92	40 - 135
13C-1,2,3,6,7,8-HxCDD	98	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	111	40 - 135
13C-OCDD	98	40 - 135
13C-2,3,7,8-TCDF	97	40 - 135
13C-1,2,3,7,8-PeCDF	87	40 - 135
13C-2,3,4,7,8-PeCDF	84	40 - 135
13C-1,2,3,4,7,8-HxCDF	96	40 - 135
13C-1,2,3,6,7,8-HxCDF	95	40 - 135
13C-2,3,4,6,7,8-HxCDF	95	40 - 135
13C-1,2,3,7,8,9-HxCDF	96	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	109	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	105	40 - 135
13C-OCDF	99	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

ARCADIS U.S. Inc

Sample ID: SS-103-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 009	**Work Order #....:**	M5HQ91AD	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/04/14	**Percent Moisture**	16
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D12C	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Confirmation Run

PARAMETER	RESULT	MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDF	360	12	6.6	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDF	90	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

ARCADIS U.S. Inc

Sample ID: SS-104-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 010	**Work Order #....:**	M5HRA1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	12
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	7.7	J	11	0.65	ng/kg
1,2,3,7,8-PeCDD	81	B	57	0.75	ng/kg
1,2,3,4,7,8-HxCDD	150		57	1.3	ng/kg
1,2,3,6,7,8-HxCDD	700	B	57	1.6	ng/kg
1,2,3,7,8,9-HxCDD	360	C B	57	1.4	ng/kg
1,2,3,4,6,7,8-HpCDD	16000	B	57	2.9	ng/kg
OCDD	140000	B E	110	2.2	ng/kg
2,3,7,8-TCDF	8.6	Q J	11	0.62	ng/kg
1,2,3,7,8-PeCDF	12	J	57	0.71	ng/kg
2,3,4,7,8-PeCDF	15	B J	57	0.70	ng/kg
1,2,3,4,7,8-HxCDF	150	Q	57	0.87	ng/kg
1,2,3,6,7,8-HxCDF	270	Q	57	0.83	ng/kg
2,3,4,6,7,8-HxCDF	70	B	57	0.92	ng/kg
1,2,3,7,8,9-HxCDF	ND		57	1.1	ng/kg
1,2,3,4,6,7,8-HpCDF	3500	B	57	1.6	ng/kg
1,2,3,4,7,8,9-HpCDF	180	Q B	57	2.4	ng/kg
OCDF	13000	B	110	2.2	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	69	40 - 135
13C-1,2,3,7,8-PeCDD	68	40 - 135
13C-1,2,3,4,7,8-HxCDD	73	40 - 135
13C-1,2,3,6,7,8-HxCDD	66	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	105	40 - 135
13C-OCDD	111	40 - 135
13C-2,3,7,8-TCDF	65	40 - 135
13C-1,2,3,7,8-PeCDF	74	40 - 135
13C-2,3,4,7,8-PeCDF	67	40 - 135
13C-1,2,3,4,7,8-HxCDF	67	40 - 135
13C-1,2,3,6,7,8-HxCDF	74	40 - 135
13C-2,3,4,6,7,8-HxCDF	71	40 - 135
13C-1,2,3,7,8,9-HxCDF	77	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	80	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	107	40 - 135
13C-OCDF	91	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-104-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 010	**Work Order #....:**	M5HRA1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	12
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-102-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 011	**Work Order #....:**	M5HRC1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	16
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	120		12	3.0	ng/kg
1,2,3,7,8-PeCDD	2100	B	59	2.7	ng/kg
1,2,3,4,7,8-HxCDD	4900		59	5.1	ng/kg
1,2,3,6,7,8-HxCDD	18000	B	59	4.9	ng/kg
1,2,3,7,8,9-HxCDD	9400	B	59	4.7	ng/kg
1,2,3,7,8-PeCDF	360		59	3.8	ng/kg
2,3,4,7,8-PeCDF	310	B	59	3.4	ng/kg
1,2,3,4,7,8-HxCDF	3900	Q	59	2.1	ng/kg
1,2,3,6,7,8-HxCDF	7000	Q	59	2.3	ng/kg
2,3,4,6,7,8-HxCDF	2200	B	59	2.2	ng/kg
1,2,3,7,8,9-HxCDF	61		59	2.5	ng/kg
1,2,3,4,7,8,9-HpCDF	7200	B	59	8.3	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY		RECOVERY LIMITS
13C-2,3,7,8-TCDD	78		40 - 135
13C-1,2,3,7,8-PeCDD	78		40 - 135
13C-1,2,3,4,7,8-HxCDD	61		40 - 135
13C-1,2,3,6,7,8-HxCDD	67		40 - 135
13C-1,2,3,4,6,7,8-HpCDD	75		40 - 135
13C-OCDD	14	*	40 - 135
13C-1,2,3,7,8-PeCDF	76		40 - 135
13C-2,3,4,7,8-PeCDF	83		40 - 135
13C-1,2,3,4,7,8-HxCDF	66		40 - 135
13C-1,2,3,6,7,8-HxCDF	59		40 - 135
13C-2,3,4,6,7,8-HxCDF	60		40 - 135
13C-1,2,3,7,8,9-HxCDF	72		40 - 135
13C-1,2,3,4,6,7,8-HpCDF	70		40 - 135
13C-1,2,3,4,7,8,9-HpCDF	63		40 - 135
13C-OCDF	54		40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

- * Surrogate recovery is outside stated control limits.
- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-102-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 011	**Work Order #....:**	M5HRC2AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/11/14	**Percent Moisture**	16
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	0.04 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,6,7,8-HpCDD	**110000**	**B**	**1500**	**100**	**ng/kg**
OCDD	**270000**	**B**	**3000**	**95**	**ng/kg**
1,2,3,4,6,7,8-HpCDF	**29000**	**B**	**1500**	**38**	**ng/kg**
OCDF	**83000**	**B**	**3000**	**53**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	100	40 - 135
13C-1,2,3,7,8-PeCDD	81	40 - 135
13C-1,2,3,4,7,8-HxCDD	96	40 - 135
13C-1,2,3,6,7,8-HxCDD	103	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	103	40 - 135
13C-OCDD	94	40 - 135
13C-2,3,7,8-TCDF	100	40 - 135
13C-1,2,3,7,8-PeCDF	92	40 - 135
13C-2,3,4,7,8-PeCDF	90	40 - 135
13C-1,2,3,4,7,8-HxCDF	100	40 - 135
13C-1,2,3,6,7,8-HxCDF	104	40 - 135
13C-2,3,4,6,7,8-HxCDF	99	40 - 135
13C-1,2,3,7,8,9-HxCDF	105	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	110	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	101	40 - 135
13C-OCDF	93	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

ARCADIS U.S. Inc

Sample ID: SS-102-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 011	**Work Order #....:**	M5HRC1AD	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/05/14	**Percent Moisture**	16
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D12C	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Confirmation Run

PARAMETER	RESULT	MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDF	95	1.2	2.5	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDF	77	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

ARCADIS U.S. Inc

Sample ID: SS-101-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 012	Work Order #....:	M5HRD1AC	Matrix....:	SO
Date Sampled....:	11/12/14	Date Received....:	11/13/14	Dilution Factor:	10
Prep Date....:	11/17/14	Analysis Date....:	12/03/14	Percent Moisture	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.3 g	Instrument ID....:	D2A	Method:	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	17		11	0.88	ng/kg
1,2,3,7,8-PeCDD	190	B	57	1.2	ng/kg
1,2,3,4,7,8-HxCDD	420		57	1.9	ng/kg
1,2,3,6,7,8-HxCDD	1100	B	57	1.7	ng/kg
1,2,3,7,8,9-HxCDD	750	B	57	1.7	ng/kg
1,2,3,4,6,7,8-HpCDD	15000	B X	570	17	ng/kg
OCDD	98000	B X	1100	35	ng/kg
2,3,7,8-TCDF	9.9	Q J X	11	1.2	ng/kg
1,2,3,7,8-PeCDF	29	J	57	1.3	ng/kg
2,3,4,7,8-PeCDF	88	Q B	57	1.2	ng/kg
1,2,3,4,7,8-HxCDF	330	Q	57	0.87	ng/kg
1,2,3,6,7,8-HxCDF	450	Q	57	0.90	ng/kg
2,3,4,6,7,8-HxCDF	120	Q B	57	0.85	ng/kg
1,2,3,7,8,9-HxCDF	5.5	Q J	57	1.2	ng/kg
1,2,3,4,6,7,8-HpCDF	6100	B	57	1.6	ng/kg
1,2,3,4,7,8,9-HpCDF	390	B	57	2.8	ng/kg
OCDF	23000	B	110	1.4	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	76	40 - 135
13C-1,2,3,7,8-PeCDD	74	40 - 135
13C-1,2,3,4,7,8-HxCDD	58	40 - 135
13C-1,2,3,6,7,8-HxCDD	72	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	68	40 - 135
13C-OCDD	96	40 - 135
13C-2,3,7,8-TCDF	73	40 - 135
13C-1,2,3,7,8-PeCDF	70	40 - 135
13C-2,3,4,7,8-PeCDF	74	40 - 135
13C-1,2,3,4,7,8-HxCDF	58	40 - 135
13C-1,2,3,6,7,8-HxCDF	61	40 - 135
13C-2,3,4,6,7,8-HxCDF	64	40 - 135
13C-1,2,3,7,8,9-HxCDF	64	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	68	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	68	40 - 135
13C-OCDF	77	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-101-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 012	**Work Order #....:**	M5HRD1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.3 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

X See project narrative.

ARCADIS U.S. Inc

Sample ID: DUP-01 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 013	Work Order #....:	M5HRE1AC	Matrix....:	SO
Date Sampled....:	11/12/14	Date Received....:	11/13/14	Dilution Factor:	10
Prep Date....:	11/17/14	Analysis Date....:	12/03/14	Percent Moisture	15
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	Instrument ID....:	D2A	Method:	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	17		12	0.87	ng/kg
1,2,3,7,8-PeCDD	190	B	59	1.4	ng/kg
1,2,3,4,7,8-HxCDD	460		59	2.4	ng/kg
1,2,3,6,7,8-HxCDD	3800	B	59	2.4	ng/kg
1,2,3,7,8,9-HxCDD	1000	B	59	2.3	ng/kg
2,3,7,8-TCDF	5.4	Q J	12	0.86	ng/kg
1,2,3,7,8-PeCDF	20	Q J	59	1.2	ng/kg
2,3,4,7,8-PeCDF	30	Q B J	59	1.2	ng/kg
1,2,3,4,7,8-HxCDF	660	Q	59	1.4	ng/kg
1,2,3,6,7,8-HxCDF	730	Q	59	1.4	ng/kg
2,3,4,6,7,8-HxCDF	200	Q B	59	1.4	ng/kg
1,2,3,7,8,9-HxCDF	7.8	Q J	59	1.9	ng/kg
1,2,3,4,6,7,8-HpCDF	14000	B	59	2.3	ng/kg
1,2,3,4,7,8,9-HpCDF	980	B	59	3.2	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY		RECOVERY LIMITS
13C-2,3,7,8-TCDD	58		40 - 135
13C-1,2,3,7,8-PeCDD	60		40 - 135
13C-1,2,3,4,7,8-HxCDD	54		40 - 135
13C-1,2,3,6,7,8-HxCDD	62		40 - 135
13C-1,2,3,4,6,7,8-HpCDD	65		40 - 135
13C-OCDD	29	*	40 - 135
13C-2,3,7,8-TCDF	61		40 - 135
13C-1,2,3,7,8-PeCDF	67		40 - 135
13C-2,3,4,7,8-PeCDF	65		40 - 135
13C-1,2,3,4,7,8-HxCDF	55		40 - 135
13C-1,2,3,6,7,8-HxCDF	59		40 - 135
13C-2,3,4,6,7,8-HxCDF	64		40 - 135
13C-1,2,3,7,8,9-HxCDF	61		40 - 135
13C-1,2,3,4,6,7,8-HpCDF	64		40 - 135
13C-1,2,3,4,7,8,9-HpCDF	67		40 - 135
13C-OCDF	62		40 - 135

ARCADIS U.S. Inc

Sample ID: DUP-01 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 013	**Work Order #....:**	M5HRE1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	15
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

*	Surrogate recovery is outside stated control limits.
B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
J	Estimated Result.
Q	Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: DUP-01 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 013	**Work Order #....:**	M5HRE2AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/11/14	**Percent Moisture**	15
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	0.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,6,7,8-HpCDD	**64000**	**B**	**590**	**34**	**ng/kg**
OCDD	**170000**	**B**	**1200**	**38**	**ng/kg**
OCDF	**31000**	**B**	**1200**	**18**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	90	40 - 135
13C-1,2,3,7,8-PeCDD	78	40 - 135
13C-1,2,3,4,7,8-HxCDD	91	40 - 135
13C-1,2,3,6,7,8-HxCDD	94	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	99	40 - 135
13C-OCDD	97	40 - 135
13C-2,3,7,8-TCDF	95	40 - 135
13C-1,2,3,7,8-PeCDF	81	40 - 135
13C-2,3,4,7,8-PeCDF	83	40 - 135
13C-1,2,3,4,7,8-HxCDF	94	40 - 135
13C-1,2,3,6,7,8-HxCDF	96	40 - 135
13C-2,3,4,6,7,8-HxCDF	98	40 - 135
13C-1,2,3,7,8,9-HxCDF	97	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	104	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	92	40 - 135
13C-OCDF	92	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

ARCADIS U.S. Inc

Sample ID: EB-02 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 015	**Work Order #....:**	M5HRG1AA	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/20/14	**Analysis Date....:**	12/02/14		
Prep Batch # ....:	4324016				
Initial Wgt/Vol :	977 mL	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND		0.010	0.00015	ng/L
1,2,3,7,8-PeCDD	**0.0015**	**Q J**	**0.051**	**0.00024**	**ng/L**
1,2,3,4,7,8-HxCDD	**0.0045**	**Q J**	**0.051**	**0.00033**	**ng/L**
1,2,3,6,7,8-HxCDD	**0.014**	**J**	**0.051**	**0.00033**	**ng/L**
1,2,3,7,8,9-HxCDD	**0.0068**	**Q J**	**0.051**	**0.00031**	**ng/L**
1,2,3,4,6,7,8-HpCDD	**0.30**	**B**	**0.051**	**0.00064**	**ng/L**
OCDD	**2.0**	**B**	**0.10**	**0.00089**	**ng/L**
2,3,7,8-TCDF	**0.00014**	**Q J**	**0.010**	**0.00018**	**ng/L**
1,2,3,7,8-PeCDF	ND		0.051	0.00023	ng/L
2,3,4,7,8-PeCDF	ND		0.051	0.00023	ng/L
1,2,3,4,7,8-HxCDF	**0.0043**	**Q B J**	**0.051**	**0.00021**	**ng/L**
1,2,3,6,7,8-HxCDF	**0.013**	**Q J**	**0.051**	**0.00019**	**ng/L**
2,3,4,6,7,8-HxCDF	ND		0.051	0.00020	ng/L
1,2,3,7,8,9-HxCDF	ND		0.051	0.00026	ng/L
1,2,3,4,6,7,8-HpCDF	**0.062**		**0.051**	**0.00027**	**ng/L**
1,2,3,4,7,8,9-HpCDF	**0.0053**	**B J**	**0.051**	**0.00041**	**ng/L**
OCDF	**0.16**	**B**	**0.10**	**0.00027**	**ng/L**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	90	40 - 135
13C-1,2,3,7,8-PeCDD	103	40 - 135
13C-1,2,3,4,7,8-HxCDD	94	40 - 135
13C-1,2,3,6,7,8-HxCDD	95	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	98	40 - 135
13C-OCDD	93	40 - 135
13C-2,3,7,8-TCDF	86	40 - 135
13C-1,2,3,7,8-PeCDF	107	40 - 135
13C-2,3,4,7,8-PeCDF	99	40 - 135
13C-1,2,3,4,7,8-HxCDF	92	40 - 135
13C-1,2,3,6,7,8-HxCDF	92	40 - 135
13C-2,3,4,6,7,8-HxCDF	97	40 - 135
13C-1,2,3,7,8,9-HxCDF	95	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	99	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	100	40 - 135
13C-OCDF	85	40 - 135

ARCADIS U.S. Inc

Sample ID: EB-02 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 015	**Work Order #....:**	M5HRG1AA	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/20/14	**Analysis Date....:**	12/02/14		
Prep Batch # ....:	4324016				
Initial Wgt/Vol :	977 mL	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Method Blank Report

Trace Level Organic Compounds

Lot - Sample #....:	H4K170000 - 012B	**Work Order #....:**	M5H6R1AA	**Matrix....:**	SOLID
Dilution Factor:	1				
Prep Date....:	11/17/14	**Analysis Date....:**	12/02/14	**Percent Moisture:**	0.0
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND		1.0	0.067	ng/kg
1,2,3,7,8-PeCDD	**0.13**	**Q J**	**5.0**	**0.032**	**ng/kg**
1,2,3,4,7,8-HxCDD	ND		5.0	0.036	ng/kg
1,2,3,6,7,8-HxCDD	**0.30**	**Q J**	**5.0**	**0.040**	**ng/kg**
1,2,3,7,8,9-HxCDD	**0.22**	**Q J**	**5.0**	**0.036**	**ng/kg**
1,2,3,4,6,7,8-HpCDD	**5.1**		**5.0**	**0.056**	**ng/kg**
OCDD	**40**		**10**	**0.072**	**ng/kg**
2,3,7,8-TCDF	ND		1.0	0.018	ng/kg
1,2,3,7,8-PeCDF	ND		5.0	0.020	ng/kg
2,3,4,7,8-PeCDF	**0.040**	**Q J**	**5.0**	**0.018**	**ng/kg**
1,2,3,4,7,8-HxCDF	ND		5.0	0.025	ng/kg
1,2,3,6,7,8-HxCDF	ND		5.0	0.025	ng/kg
2,3,4,6,7,8-HxCDF	**0.083**	**Q J**	**5.0**	**0.025**	**ng/kg**
1,2,3,7,8,9-HxCDF	ND		5.0	0.030	ng/kg
1,2,3,4,6,7,8-HpCDF	**0.88**	**J**	**5.0**	**0.026**	**ng/kg**
1,2,3,4,7,8,9-HpCDF	**0.29**	**J**	**5.0**	**0.039**	**ng/kg**
OCDF	**4.2**	**J**	**10**	**0.032**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	74	40 - 135
13C-1,2,3,7,8-PeCDD	69	40 - 135
13C-1,2,3,4,7,8-HxCDD	72	40 - 135
13C-1,2,3,6,7,8-HxCDD	65	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	77	40 - 135
13C-OCDD	66	40 - 135
13C-2,3,7,8-TCDF	72	40 - 135
13C-1,2,3,7,8-PeCDF	74	40 - 135
13C-2,3,4,7,8-PeCDF	71	40 - 135
13C-1,2,3,4,7,8-HxCDF	67	40 - 135
13C-1,2,3,6,7,8-HxCDF	66	40 - 135
13C-2,3,4,6,7,8-HxCDF	73	40 - 135
13C-1,2,3,7,8,9-HxCDF	71	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	71	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	70	40 - 135
13C-OCDF	58	40 - 135

Method Blank Report

Trace Level Organic Compounds

Lot - Sample #....:	H4K170000 - 012B	**Work Order #....:**	M5H6R1AA	**Matrix....:**	SOLID
Dilution Factor:	1				
Prep Date....:	11/17/14	**Analysis Date....:**	12/02/14	**Percent Moisture:**	0.0
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

QUALIFIERS

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Client Lot # ...:	H4K130404	**Work Order # ...:**	M5H6R1AC-LCS	**Matrix .....:**	SOLID
LCS Lot-Sample# :	H4K170000 - 012				
Prep Date .....:	11/17/14	**Analysis Date ..:**	12/02/14		
Prep Batch # ...:	4321012				
Dilution Factor :	1				
Analyst ID.....:	Melissa A. Davidson	**Instrument ID..:**	D2A	**Method.....:**	SW846 8290
Initial Wgt/Vol:	10 g				

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY		RECOVERY LIMITS
2,3,7,8-TCDD	**20.0**	**19.5**	**ng/kg**	**98**		**(79 - 129)**
1,2,3,7,8-PeCDD	**100**	**102**	**ng/kg**	**102**	**B**	**(79 - 129)**
1,2,3,4,7,8-HxCDD	**100**	**107**	**ng/kg**	**107**		**(73 - 123)**
1,2,3,6,7,8-HxCDD	**100**	**95.6**	**ng/kg**	**96**	**B**	**(74 - 124)**
1,2,3,7,8,9-HxCDD	**100**	**115**	**ng/kg**	**115**	**B**	**(70 - 124)**
1,2,3,4,6,7,8-HpCDD	**100**	**99.3**	**ng/kg**	**99**	**B**	**(73 - 123)**
OCDD	**200**	**218**	**ng/kg**	**109**	**B**	**(75 - 125)**
2,3,7,8-TCDF	**20.0**	**19.9**	**ng/kg**	**100**		**(75 - 125)**
1,2,3,7,8-PeCDF	**100**	**94.8**	**ng/kg**	**95**		**(74 - 124)**
2,3,4,7,8-PeCDF	**100**	**101**	**ng/kg**	**101**	**B**	**(75 - 125)**
1,2,3,4,7,8-HxCDF	**100**	**95.1**	**ng/kg**	**95**		**(75 - 125)**
1,2,3,6,7,8-HxCDF	**100**	**98.0**	**ng/kg**	**98**		**(76 - 126)**
2,3,4,6,7,8-HxCDF	**100**	**98.2**	**ng/kg**	**98**	**B**	**(76 - 126)**
1,2,3,7,8,9-HxCDF	**100**	**94.1**	**ng/kg**	**94**		**(77 - 127)**
1,2,3,4,6,7,8-HpCDF	**100**	**93.0**	**ng/kg**	**93**	**B**	**(77 - 127)**
1,2,3,4,7,8,9-HpCDF	**100**	**95.3**	**ng/kg**	**95**	**B**	**(73 - 123)**
OCDF	**200**	**196**	**ng/kg**	**98**	**B**	**(49 - 128)**

INTERNAL STANDARD	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	70	(40 - 135)
13C-1,2,3,7,8-PeCDD	69	(40 - 135)
13C-1,2,3,4,7,8-HxCDD	64	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	66	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	77	(40 - 135)
13C-OCDD	74	(40 - 135)
13C-2,3,7,8-TCDF	67	(40 - 135)
13C-1,2,3,7,8-PeCDF	71	(40 - 135)
13C-2,3,4,7,8-PeCDF	68	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	64	(40 - 135)
13C-1,2,3,6,7,8-HxCDF	61	(40 - 135)
13C-2,3,4,6,7,8-HxCDF	71	(40 - 135)
13C-1,2,3,7,8,9-HxCDF	72	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	68	(40 - 135)
13C-1,2,3,4,7,8,9-HpCDF	74	(40 - 135)
13C-OCDF	63	(40 - 135)

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Notes:

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

MATRIX/MATRIX SPIKE DATA REPORT

Trace Level Organic Compounds

Client Lot # ...:	H4K130404	**Work Order # ...:**	M5HRD1AD-MS	**Matrix .....:**	SOLID
OS Lot-Sample# :	H4K130404 - 012		M5HRD1AE-MSD		
Prep Date .....:	11/17/14	**Analysis Date ..:**	12/03/14		
Prep Batch # ...:	4321012				
Dilution Factor :	10				
Analyst ID.....:	Melissa A. Davidson	**Instrument ID..:**	D2A	**Method.....:**	SW846 8290
Initial Wgt/Vol:	10.3 g				

PARAMETER	SAMPLE AMOUNT	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS
2,3,7,8-TCDD	17	22.4	42.5	ng/kg	113	(79 - 129)		
	17	22.4	34.7	ng/kg	78 a p	(79 - 129)	20	(0 - 15)
1,2,3,7,8-PeCDD	190	112	312	ng/kg	108 B	(79 - 129)		
	190	112	363	ng/kg	154 a B	(79 - 129)	15	(0 - 15)
1,2,3,4,7,8-HxCDD	420	112	577	ng/kg	143 a	(73 - 123)		
	420	112	510	ng/kg	84	(73 - 123)	12	(0 - 15)
1,2,3,6,7,8-HxCDD	1100	112	1380	ng/kg	225 a B	(73 - 127)		
	1100	112	1520	ng/kg	353 a B	(73 - 127)	9.9	(0 - 15)
1,2,3,7,8,9-HxCDD	750	112	961	ng/kg	192 a B	(65 - 141)		
	750	112	941	ng/kg	173 a B	(65 - 141)	2.2	(0 - 15)
1,2,3,4,6,7,8-HpCDD	15000	112	28900	ng/kg	1200a B X	(54 - 138)		
	15000	112	36200	ng/kg	1850a p B X	(54 - 138)	22	(0 - 15)
OCDD	98000	224	14000	ng/kg	1890a B X	(31 - 154)		
	98000	224	17500	ng/kg	3460a p B X	(31 - 154)	22	(0 - 15)
2,3,7,8-TCDF	9.9	22.4	30.6	ng/kg	92 X	(75 - 125)		
	9.9	22.4	29.0	ng/kg	85 X	(75 - 125)	5.6	(0 - 15)
1,2,3,7,8-PeCDF	29	112	132	ng/kg	92	(74 - 124)		
	29	112	121	ng/kg	82	(74 - 124)	9.2	(0 - 15)
2,3,4,7,8-PeCDF	88	112	172	ng/kg	75 B	(75 - 125)		
	88	112	133	ng/kg	40 a p B	(75 - 125)	25	(0 - 15)
1,2,3,4,7,8-HxCDF	330	112	462	ng/kg	118	(75 - 125)		
	330	112	463	ng/kg	119	(75 - 125)	0.20	(0 - 15)
1,2,3,6,7,8-HxCDF	450	112	505	ng/kg	45 a	(73 - 131)		
	450	112	644	ng/kg	169 a p	(73 - 131)	24	(0 - 15)
2,3,4,6,7,8-HxCDF	120	112	235	ng/kg	105 B	(76 - 129)		
	120	112	236	ng/kg	105 B	(76 - 129)	0.090	(0 - 15)
1,2,3,7,8,9-HxCDF	5.5	112	118	ng/kg	101	(77 - 127)		
	5.5	112	105	ng/kg	89	(77 - 127)	12	(0 - 15)
1,2,3,4,6,7,8-HpCDF	6100	112	5590	ng/kg	0.0 a B	(72 - 134)		
	6100	112	4810	ng/kg	0.0 a B	(72 - 134)	0.0	(0 - 15)
1,2,3,4,7,8,9-HpCDF	390	112	457	ng/kg	58 a B	(73 - 124)		
	390	112	490	ng/kg	87 B	(73 - 124)	6.9	(0 - 15)
OCDF	23000	224	19300	ng/kg	0.0 a B	(45 - 135)		
	23000	224	16300	ng/kg	0.0 a B	(45 - 135)	0.0	(0 - 15)

MATRIX/MATRIX SPIKE DATA REPORT

Trace Level Organic Compounds

Client Lot # ...:	H4K130404	**Work Order # ...:**	M5HRD1AD-MS	**Matrix .....:**	SOLID
OS Lot-Sample# :	H4K130404 - 012		M5HRD1AE-MSD		
Prep Date .....:	11/17/14	**Analysis Date ..:**	12/03/14		
Prep Batch # ...:	4321012				
Dilution Factor :	10				
Analyst ID.....:	Melissa A. Davidson	**Instrument ID..:**	D2A	**Method.....:**	SW846 8290
Initial Wgt/Vol:	10.3 g				

INTERNAL STANDARD	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	63	(40 - 135)
	70	(40 - 135)
13C-1,2,3,7,8-PeCDD	61	(40 - 135)
	54	(40 - 135)
13C-1,2,3,4,7,8-HxCDD	50	(40 - 135)
	58	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	63	(40 - 135)
	66	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	77	(40 - 135)
	74	(40 - 135)
13C-OCDD	89	(40 - 135)
	82	(40 - 135)
13C-2,3,7,8-TCDF	89	(40 - 135)
	87	(40 - 135)
13C-1,2,3,7,8-PeCDF	66	(40 - 135)
	69	(40 - 135)
13C-2,3,4,7,8-PeCDF	63	(40 - 135)
	67	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	56	(40 - 135)
	57	(40 - 135)
13C-1,2,3,6,7,8-HxCDF	64	(40 - 135)
	61	(40 - 135)
13C-2,3,4,6,7,8-HxCDF	63	(40 - 135)
	65	(40 - 135)
13C-1,2,3,7,8,9-HxCDF	60	(40 - 135)
	64	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	68	(40 - 135)
	77	(40 - 135)
13C-1,2,3,4,7,8,9-HpCDF	70	(40 - 135)
	65	(40 - 135)
13C-OCDF	79	(40 - 135)
	72	(40 - 135)

MATRIX/MATRIX SPIKE DATA REPORT

Trace Level Organic Compounds

Client Lot # ...:	H4K130404	**Work Order # ...:**	M5HRD1AD-MS	**Matrix .....:**	SOLID
OS Lot-Sample# :	H4K130404 - 012		M5HRD1AE-MSD		
Prep Date .....:	11/17/14	**Analysis Date ..:**	12/03/14		
Prep Batch # ...:	4321012				
Dilution Factor :	10				
Analyst ID.....:	Melissa A. Davidson	**Instrument ID..:**	D2A	**Method.....:**	SW846 8290
Initial Wgt/Vol:	10.3 g				

Notes:

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

p Relative percent difference (RPD) is outside stated control limits.

X See project narrative.

Method Blank Report

Trace Level Organic Compounds

Lot - Sample #....:	H4K200000 - 016B	**Work Order #....:**	M5KEP1AA	**Matrix....:**	WATER
Dilution Factor:	1				
Prep Date....:	11/20/14	**Analysis Date....:**	12/02/14		
Prep Batch # ....:	4324016				
Initial Wgt/Vol :	1000 mL	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND		0.010	0.00033	ng/L
1,2,3,7,8-PeCDD	ND		0.050	0.00035	ng/L
1,2,3,4,7,8-HxCDD	ND		0.050	0.00053	ng/L
1,2,3,6,7,8-HxCDD	ND		0.050	0.00053	ng/L
1,2,3,7,8,9-HxCDD	ND		0.050	0.00050	ng/L
1,2,3,4,6,7,8-HpCDD	**0.0031**	**Q J**	**0.050**	**0.00077**	**ng/L**
OCDD	**0.017**	**J**	**0.10**	**0.00054**	**ng/L**
2,3,7,8-TCDF	ND		0.010	0.00030	ng/L
1,2,3,7,8-PeCDF	ND		0.050	0.00035	ng/L
2,3,4,7,8-PeCDF	**0.00091**	**Q J**	**0.050**	**0.00034**	**ng/L**
1,2,3,4,7,8-HxCDF	**0.00090**	**Q J**	**0.050**	**0.00036**	**ng/L**
1,2,3,6,7,8-HxCDF	ND		0.050	0.00034	ng/L
2,3,4,6,7,8-HxCDF	ND		0.050	0.00034	ng/L
1,2,3,7,8,9-HxCDF	ND		0.050	0.00046	ng/L
1,2,3,4,6,7,8-HpCDF	ND		0.050	0.00033	ng/L
1,2,3,4,7,8,9-HpCDF	**0.0018**	**J**	**0.050**	**0.00052**	**ng/L**
OCDF	**0.0018**	**Q J**	**0.10**	**0.00027**	**ng/L**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	93	40 - 135
13C-1,2,3,7,8-PeCDD	94	40 - 135
13C-1,2,3,4,7,8-HxCDD	89	40 - 135
13C-1,2,3,6,7,8-HxCDD	91	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	98	40 - 135
13C-OCDD	96	40 - 135
13C-2,3,7,8-TCDF	88	40 - 135
13C-1,2,3,7,8-PeCDF	100	40 - 135
13C-2,3,4,7,8-PeCDF	96	40 - 135
13C-1,2,3,4,7,8-HxCDF	90	40 - 135
13C-1,2,3,6,7,8-HxCDF	89	40 - 135
13C-2,3,4,6,7,8-HxCDF	97	40 - 135
13C-1,2,3,7,8,9-HxCDF	94	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	95	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	96	40 - 135
13C-OCDF	86	40 - 135

Method Blank Report

Trace Level Organic Compounds

Lot - Sample #....:	H4K200000 - 016B	**Work Order #....:**	M5KEP1AA	**Matrix....:**	WATER
Dilution Factor:	1				
Prep Date....:	11/20/14	**Analysis Date....:**	12/02/14		
Prep Batch # ....:	4324016				
Initial Wgt/Vol :	1000 mL	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

QUALIFIERS

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Client Lot # ...:	H4K130404	**Work Order # ...:**	M5KEP1AC-LCS	**Matrix .....:**	WATER
LCS Lot-Sample# :	H4K200000 - 016				
Prep Date .....:	11/20/14	**Analysis Date ..:**	12/02/14		
Prep Batch # ...:	4324016				
Dilution Factor :	1				
Analyst ID.....:	Melissa A. Davidson	**Instrument ID..:**	D2A	**Method.....:**	SW846 8290
Initial Wgt/Vol:	1000 mL				

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY		RECOVERY LIMITS
2,3,7,8-TCDD	**0.200**	**0.199**	**ng/L**	**100**		**(77 - 127)**
1,2,3,7,8-PeCDD	**1.00**	**1.06**	**ng/L**	**106**		**(78 - 128)**
1,2,3,4,7,8-HxCDD	**1.00**	**1.03**	**ng/L**	**103**		**(73 - 123)**
1,2,3,6,7,8-HxCDD	**1.00**	**0.964**	**ng/L**	**96**		**(72 - 127)**
1,2,3,7,8,9-HxCDD	**1.00**	**1.08**	**ng/L**	**108**		**(76 - 126)**
1,2,3,4,6,7,8-HpCDD	**1.00**	**0.976**	**ng/L**	**98**	**B**	**(73 - 123)**
OCDD	**2.00**	**1.90**	**ng/L**	**95**	**B**	**(75 - 125)**
2,3,7,8-TCDF	**0.200**	**0.199**	**ng/L**	**100**		**(74 - 124)**
1,2,3,7,8-PeCDF	**1.00**	**0.975**	**ng/L**	**97**		**(74 - 124)**
2,3,4,7,8-PeCDF	**1.00**	**0.986**	**ng/L**	**99**	**B**	**(74 - 124)**
1,2,3,4,7,8-HxCDF	**1.00**	**0.964**	**ng/L**	**96**	**B**	**(75 - 125)**
1,2,3,6,7,8-HxCDF	**1.00**	**0.972**	**ng/L**	**97**		**(75 - 125)**
2,3,4,6,7,8-HxCDF	**1.00**	**0.962**	**ng/L**	**96**		**(76 - 126)**
1,2,3,7,8,9-HxCDF	**1.00**	**0.955**	**ng/L**	**95**		**(76 - 126)**
1,2,3,4,6,7,8-HpCDF	**1.00**	**0.944**	**ng/L**	**94**		**(71 - 121)**
1,2,3,4,7,8,9-HpCDF	**1.00**	**1.00**	**ng/L**	**100**	**B**	**(73 - 123)**
OCDF	**2.00**	**1.95**	**ng/L**	**98**	**B**	**(68 - 132)**

INTERNAL STANDARD	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	94	(40 - 135)
13C-1,2,3,7,8-PeCDD	93	(40 - 135)
13C-1,2,3,4,7,8-HxCDD	87	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	89	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	97	(40 - 135)
13C-OCDD	96	(40 - 135)
13C-2,3,7,8-TCDF	91	(40 - 135)
13C-1,2,3,7,8-PeCDF	99	(40 - 135)
13C-2,3,4,7,8-PeCDF	95	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	90	(40 - 135)
13C-1,2,3,6,7,8-HxCDF	86	(40 - 135)
13C-2,3,4,6,7,8-HxCDF	92	(40 - 135)
13C-1,2,3,7,8,9-HxCDF	98	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	92	(40 - 135)
13C-1,2,3,4,7,8,9-HpCDF	96	(40 - 135)
13C-OCDF	89	(40 - 135)

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Notes:

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Sample Receipt Documentation

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

H4K130404

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessingpas	Site Contact:	COC Record 1 of 4
Company Name ARCADIS	Tel/Mobile: 218 829 4607	Lab Contact: / Carrier:	COC No: 04746
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter, MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? (Y) N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: 2 coolers
Project Name/Number: B0039310.0000.0000	☒ 2 weeks		Temperature: RT 0.2, 0.1 / CT 0.1, 0.0 deg C
Site: Beazer-Morrisville NC	☐ 1 week		Shipper: ✓ FedEx __UPS __Other:
P O #	☐ 2 days		Tracking Number: 605780793691 m
Sampled by: D. Rhodes / R. Sams	☐ 1 day		Recorded by: BKD Date: 11-13-14

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans-8290	Sample Specific Notes:
EB-01 (111214)	11-12-14	0805	G	WS	2		X	Equipment blank - DI water
SS-109-10'	11-12-14	0830	G	S	1		X	
SS-109-25'	11-12-14	0840	G	S	1		X	
SS-109-50'	11-12-14	0850	G	S	1		X	
SS-108-10'	11-12-14	0900	G	S	1		X	
SS-108-25'	11-12-14	0910	G	S	1		X	
SS-108-50'	11-12-14	0920	G	S	1		X	
SS-107-10'	11-12-14	0940	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:
Hold all 25' and 50' Samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1510	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0206)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

HMK130404

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessinger	Site Contact:	COC Record 2 of 4
Company Name ARCADIS	Tel/Mobile: 218-829-4607	Lab Contact: / Carrier:	COC No: 04747
Address 6602 Excelsior Rd.	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer-Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
P O #	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes/R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans - 8290	Sample Specific Notes:
SS-107-25'	11-12-14	0950	G	S	3		X	MS/MSD
SS-107-38'	11-12-14	1000	G	S	1		X	
SS-110-10'	11-12-14	1005	G	S	1		X	
SS-110-25'	11-12-14	1010	G	S	1		X	
SS-110-50'	11-12-14	1020	G	S	1		X	
SS-105-10'	11-12-14	1050	G	S	1		X	
SS-105-25'	11-12-14	1100	G	S	1		X	
SS-105-50'	11-12-14	1115	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:

Hold all 25' & 50' samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0208)

57 of 60

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

1-141K130404

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessinger pcs	Site Contact:	COC Record 3 of 4
Company Name ARCADIS	Tel/Mobile: 218-829 4607	Lab Contact: / Carrier:	COC No: 04749
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer - Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
PO #	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes/R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dixxms/Furans - 8290										Sample Specific Notes:
SS-106-10'	11-12-14	1125	G	S	1		X										
SS-106-25'	11-12-14	1130	G	S	1		X										
SS-103-10'	11-12-14	1230	G	S	1		X										
SS-103-25'	11-12-14	1240	G	S	1		X										
SS-103-50'	11-12-14	1245	G	S	1		X										
SS-104-25'	11-12-14	1255	G	S	1		X										
SS-104-10'	11-12-14	1300	G	S	1		X										
SS-102-10'	11-12-14	1320	G	S	1		X										

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold all 25' + 50' samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0208)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

1-44K1304D4

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessingpas	Site Contact:	COC Record 4 of 4
Company Name ARCADIS	Tel/Mobile: 218 829 4607	Lab Contact: / Carrier:	COC No: 04748
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer - Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
PO #	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes/R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Diesel/Pesticides-8270											Sample Specific Notes:
SS-102-25'	11-12-14	1330	G	S	1		X											
SS-102-50'	11-12-14	1340	G	S	1		X											
SS-101-50'	11-12-14	1350	G	S	1		X											
SS-101-25'	11-12-14	1400	G	S	1		X											
SS-101-10'	11-12-14	1405	G	S	3		X											MS/MSD
Dup-01 (111214)	11-12-14	0000	G	S	1		X											
Dup-02 (111214)	11-12-14	0001	G	S	1		X											
EB-02 (111214)	11-12-14	1500	G	W	2		X											

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold all 25' & 50' Samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0208)

TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Lot Number: H4K130404

Review Items	Yes	No	NA	If No, what was the problem?
1. Do sample container labels match COC? (IDs, Dates, Times)	✓			☐ **1a** Do not match COC ☐ **1b** Incomplete information ☐ **1c** Marking smeared ☐ **1d** Label torn ☐ **1e** No label ☐ **1f** COC not received ☐ **1g** Other:
2. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID : SCS7 Correction factor: -0.1	✓			☐ **2a** Temp Blank = _____ ☐ **2b** Cooler Temp = _____ ☐ **2c** Cooling initiated for recently collected samples, ice present.
3. Were samples received with correct chemical preservative (excluding Encore)?			✓	☐ **3a** See box 3A for pH Preservation ☐ **3b** Other:
4. Were custody seals present/intact on cooler and/or containers?	✓			☐ **4a** Not present ☐ **4b** Not intact ☐ **4c** Other:
5. Were all of the samples listed on the COC received?	✓			☐ **5a** Samples received-not on COC ☐ **5b** Samples not received-on COC
6. Were all of the sample containers received intact?	✓			☐ **6a** Leaking ☐ **6b** Broken
7. Were VOA samples received without headspace?			✓	☐ **7a** Headspace (VOA only)
8. Were samples received in appropriate containers?	✓			☐ **8a** Improper container
9. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number: _____			✓	☐ **9a** Could not be determined due to matrix interference
10. Were samples received within holding time?	✓			☐ **10a** Holding time expired
11. For rad samples, was sample activity info. provided?			✓	☐ Incomplete information
12. For 1613B water samples is pH<9?			✓	If no, was pH adjusted to pH 7 - 9 with sulfuric acid? _____
13. Are the shipping containers intact?	✓			☐ **13a** Leaking ☐ **13b** Other:
14. Was COC relinquished? (Signed/Dated/Timed)	✓			☐ **14a** Not relinquished
15. Are tests/parameters listed for each sample?	✓			☐ **15a** Incomplete information
16. Is the matrix of the samples noted?	✓			☐ **15a** Incomplete information
17. Is the date/time of sample collection noted?	✓			☐ **15a** Incomplete information
18. Is the client and project name/# identified?	✓			☐ **15a** Incomplete information
19. Was the sampler identified on the COC?	✓			☐ **19a** Other

Comments/Actions Taken

pH test strip lot number: _____

	Box 3A: pH Preservation	Box 9A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Quote #: 91874 PM Instructions: NA

Sample Receiving Associate: _____ Date: _____

QA026R28.doc, 042414

Imagine the result

Beazer East, Inc.

Koppers Company Inc. Superfund Site

Data Review

MORRISVILLE, NORTH CAROLINA

DIOXIN ANALYSES

SDG #H4K130404

Analyses Performed By:
TestAmerica Laboratories
Knoxville, Tennessee

Report #23239R
Review Level: Tier III
Project: B0039310.0000.00003

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #H4K130404 for samples collected in association with the Koppers Company Inc. Superfund Site Investigation. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis	
					Dioxins/ Furans	MISC
EB-01 (111214)	H4K130404001	Water	11/12/2014		X	
SS-109-10'	H4K130404002	Soil	11/12/2014		X	
SS-108-10'	H4K130404003	Soil	11/12/2014		X	
SS-107-10'	H4K130404004	Soil	11/12/2014		X	
SS-110-10'	H4K130404006	Soil	11/12/2014		X	
SS-105-10'	H4K130404007	Soil	11/12/2014		X	
SS-106-10'	H4K130404008	Soil	11/12/2014		X	
SS-103-10'	H4K130404009	Soil	11/12/2014		X	
SS-104-10'	H4K130404010	Soil	11/12/2014		X	
SS-102-10'	H4K130404011	Soil	11/12/2014		X	
SS-101-10'	H4K130404012	Soil	11/12/2014		X	
DUP-01 (111214)	H4K130404013	Soil	11/12/2014	SS-108-10'	X	
EB-02 (111214)	H4K130404015	Water	11/12/2014		X	

Notes:

1. The matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location SS-101-10'.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8290. Data were reviewed in accordance with USEPA's *Guidance on Environmental Data Verification and Data Validation* (USEPA, 2002), the *USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review* (USEPA, 2011), and the USEPA Region 4 Data Validation Standard Operating Procedures for Chlorinated Dioxin/Furan Analysis by High Resolution Gas Chromatography/High Resolution Mass Spectrometry (USEPA, 2014b).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

R The sample results are rejected as unusable. The analyte may or may not be present in the sample.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

POLYCHLORINATED DIBENZODIOXINS AND POLYCHLORINATED DIBENZOFURANS (PCDD/PCDF) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8290	Water	None for collection to extraction and 45 days from extraction to analysis	Cool to <6 °C
	Soil	None and 45 days from extraction to analysis	Cool to <6 °C

Note: In accordance with USEPA Region 4 guidelines, if samples are stored properly, the holding times for extraction/preparation are up to one year. Aqueous, solid, and semi-solid samples should be stored in the dark at 6 °C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks (RBs) measure contamination of samples during field operations. Note per the USEPA Region 4 guidelines, the RBs will not be used for data qualification.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were detected in the associated QA blanks; however, the associated sample results were greater than the BAL and/or were non-detect. Therefore, sample results greater than the BAL resulted in the removal of the laboratory qualifier (B). No other qualification of the sample results was required.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the daily instrument performance is satisfactory.

4.1 Initial Calibration

A maximum relative standard deviation (RSD) of 20% is allowed for all non-labeled compounds (target) and 30% is allowed for all labeled compounds (internal standards and recovery standards).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit percent difference (%D) less than the control limit (20%).

All calibration criteria were within the control limits.

5. Internal Standard Performance

Internal standard performance criteria ensure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require that the internal standard compounds exhibit recoveries within the control limits of 40% to 135%.

The internal standards exhibited responses within control limits.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compounds' concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	Compound	MS Recovery	MSD Recovery
SS-101-10'	2,3,7,8-TCDD	AC	<LL but >10%
	1,2,3,7,8-PeCDD	AC	>UL
	1,2,3,4,7,8-HxCDD	>UL	>UL
	2,3,4,7,8-PeCDF	AC	<LL but >10%

AC = Acceptable
LL = Lower control limit
UL = Upper control limit

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	No Action
	Detect	J

Control Limit	Sample Result	Qualification
< LL but > 10%	Non-detect	J
	Detect	J
< 10%	Non-detect	R
	Detect	J

Sample locations associated with MS/MSD recoveries exhibiting an RPD greater than the control limit are presented in the following table.

Sample Locations	Compound
SS-101-10'	2,3,7,8-TCDD
	2,3,4,7,8-PeCDF

The criteria used to evaluate the RPD between the MS/MSD recoveries are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	J
	Detect	J

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices and 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the Reporting Limit (RL), a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
SS-108-10'/ DUP-01 (111214)	1,2,3,4,6,7,8-HpCDD	71000	64000	10.3%
	1,2,3,4,6,7,8-HpCDF	11000	14000	24.0%
	1,2,3,4,7,8,9-HpCDF	1600	980	48.0%
	1,2,3,4,7,8-HxCDD	530	460	14.1%

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
	1,2,3,4,7,8-HxCDF	1200 UX	660 UX	AC
	1,2,3,6,7,8-HxCDD	9500	3800	85.7%
	1,2,3,6,7,8-HxCDF	1500 UX	730 UX	AC
	1,2,3,7,8,9-HxCDD	1400	1000	33.3%
	1,2,3,7,8,9-HxCDF	27 J	7.8 UX	AC
	1,2,3,7,8-PeCDD	220	190	14.6%
	1,2,3,7,8-PeCDF	28 UX	20 UX	AC
	2,3,4,6,7,8-HxCDF	300	200 UX	AC
	2,3,4,7,8-PeCDF	40	30 UX	AC
	2,3,7,8-TCDD	19	17	11.1%
	2,3,7,8-TCDF	5.9 J	5.4 UX	AC
	OCDD	84000	170000	67.7%
	OCDF	29000	31000	6.6%

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

9. Compound Identification

Note: The laboratory flagged compounds in sample locations SS-109-10', SS-107-10', SS-110-10', SS-105-10', SS-106-10', and SS-104-10' as “C” for compounds which exhibited co-eluting isomers. The associated compounds were flagged as estimated.

PCDD/PCDF compounds are identified by using the compound’s ion abundance ratios, signal-to-noise ratios, and retention times relative to the internal standards.

An estimated maximum possible concentration (EMPC) designation is given to compounds which have signals eluting within the established retention time window which would, if positively identified, be greater than the detection limit. The signals do not, however, meet the ion abundance ratio criteria and cannot be identified as the compound of interest. The EMPC value is the estimated concentration of the interferant quantitated "as the compound of interest.” This value should be considered an elevated detection limit based on potential compound identification and quantitation interference. The laboratory qualified EMPC values with a “Q”. The qualifier UX has been added to the sample results to indicate the elevated detection limit as EMPC.

Sample ID	Compound	Laboratory Result	Reported Result
EB-01 (111214)	OCDF	0.0019 Q B J	0.0019 UX
SS-109-10'	2,3,7,8-TCDD	2.3 Q J	2.3 UX
	2,3,7,8-TCDF	1.2 Q J	1.2 UX
	2,3,4,7,8-PeCDF	6.1 Q B J	6.1 UX

Sample ID	Compound	Laboratory Result	Reported Result
	1,2,3,4,7,8-HxCDF	74 Q	74 UX
	1,2,3,6,7,8-HxCDF	140 Q	140 UX
SS-108-10'	1,2,3,7,8-PeCDF	28 Q J	28 UX
	1,2,3,4,7,8-HxCDF	1200 Q	1200 UX
	1,2,3,6,7,8-HxCDF	1500 Q	1500 UX
SS-107-10'	2,3,7,8-TCDD	1.2 Q J	1.2 UX
	2,3,7,8-TCDF	1.1 Q J	1.1 UX
	1,2,3,7,8-PeCDF	3.3 Q J	3.3 UX
	1,2,3,6,7,8-HxCDF	89 Q	89 UX
SS-110-10'	2,3,7,8-TCDD	19 Q	19 UX
	2,3,7,8-TCDF	6.4 Q J	6.4 UX
	1,2,3,4,7,8-HxCDF	490 Q	490 UX
	1,2,3,6,7,8-HxCDF	1000 Q	1000 UX
SS-105-10'	2,3,7,8-TCDF	12 Q	12 UX
	1,2,3,4,7,8-HxCDF	920 Q	920 UX
	1,2,3,6,7,8-HxCDF	1300 Q	1300 UX
SS-103-10'	2,3,4,7,8-PeCDF	1200 Q B	1200 UX
	1,2,3,4,7,8-HxCDF	16000 Q	16000 UX
	2,3,4,6,7,8-HxCDF	6700 Q B	6700 UX
SS-106-10'	2,3,7,8-TCDD	3.3 Q J	3.3 UX
	2,3,4,7,8-PeCDF	16 Q B J	16 UX
	1,2,3,4,7,8-HxCDF	120 Q	120 UX
	1,2,3,6,7,8-HxCDF	160 Q	160 UX
	1,2,3,7,8,9-HxCDF	2.1 Q J	2.1 UX
SS-104-10'	2,3,7,8-TCDF	8.6 Q J	8.6 UX
	1,2,3,4,7,8-HxCDF	150 Q	150 UX
	1,2,3,6,7,8-HxCDF	270 Q	270 UX
	1,2,3,7,8,9-HxCDF	180 Q B	180 UX
SS-102-10'	1,2,3,4,7,8-HxCDF	3900 Q	3900 UX
	1,2,3,6,7,8-HxCDF	7000 Q	7000 UX
SS-101-10'	2,3,7,8-TCDF	9.9 Q J X	9.9 UX
	2,3,4,7,8-PeCDF	88 Q B	88 UX
	1,2,3,4,7,8-HxCDF	330 Q	330 UX
	1,2,3,6,7,8-HxCDF	450 Q	450 UX
	2,3,4,6,7,8-HxCDF	120 Q B	120 UX
	1,2,3,7,8,9-HxCDF	5.5 Q J	5.5 UX
DUP-01 (111214)	2,3,7,8-TCDF	5.4 Q J	5.4 UX
	1,2,3,7,8-PeCDF	20 Q J	20 UX
	2,3,4,7,8-PeCDF	30 Q B J	30 UX
	1,2,3,4,7,8-HxCDF	660 Q	660 UX

Sample ID	Compound	Laboratory Result	Reported Result
	1,2,3,6,7,8-HxCDF	730 Q	730 UX
	2,3,4,6,7,8-HxCDF	200 Q B	200 UX
	1,2,3,7,8,9-HxCDF	7.8 Q J	7.8 UX
EB-02 (111214)	1,2,3,7,8-PeCDD	0.0015 Q J	0.0015 UX
	1,2,3,4,7,8-HxCDD	0.0045 Q J	0.0045 UX
	1,2,3,7,8,9-HxCDD	0.0068 Q J	0.0068 UX
	2,3,4,7,8-PeCDF	0.00014 Q J	0.00014 UX
	1,2,3,4,7,8-HxCDF	0.0043 Q B J	0.0043 UX
	1,2,3,6,7,8-HxCDF	0.013 Q J	0.013 UX

Sample results associated with compound that exhibited a concentration greater than the linear range of the instrument calibration are summarized in the following table.

Sample ID	Compound	Original Analysis	Diluted Analysis	Reported Analysis
SS-109-10'	OCDD	91000 E	--	91000 EJ
SS-107-10'	OCDD	72000 E	--	72000 EJ
SS-106-10'	OCDD	140000 E	--	140000 EJ
SS-104-10'	OCDD	140000 E	--	140000 EJ
SS-108-10'	1,2,3,4,6,7,8-HpCDD	--	71000 D	71000 D
	OCDD	--	84000 D	84000 D
	1,2,3,4,6,7,8-HpCDF	--	11000 D	11000 D
	OCDF	--	29000 D	29000 D
SS-110-10'	1,2,3,4,6,7,8-HpCDD	--	26000 D	26000 D
	OCDD	--	130000 D	130000 D
	OCDF	--	22000 D	22000 D
SS-105-10'	1,2,3,4,6,7,8-HpCDD	--	73000 D	73000 D
	OCDD	--	220000 D	220000 D
	1,2,3,4,6,7,8-HpCDF	--	15000 D	15000 D
	OCDF	--	49000 D	49000 D
SS-103-10'	1,2,3,6,7,8-HxCDD	--	34000 D	34000 D
	1,2,3,7,8,9-HxCDD	--	20000 D	20000 D
	2,3,7,8-TCDF	--	360 D	360 D
	1,2,3,4,6,7,8-HpCDD	--	560000 D	560000 D
	OCDD	--	590000 D	590000 D

Sample ID	Compound	Original Analysis	Diluted Analysis	Reported Analysis
	1,2,3,6,7,8-HxCDF	--	22000 D	22000 D
	1,2,3,4,6,7,8-HpCDF	--	170000 D	170000 D
	OCDF	--	420000 D	420000 D
SS-102-10'	1,2,3,4,6,7,8-HpCDD	--	110000 D	110000 D
	OCDD	--	270000 D	270000 D
	2,3,7,8-TCDF	--	95 D	95 D
	1,2,3,4,6,7,8-HpCDF	--	29000 D	29000 D
	OCDF	--	83000 D	83000 D
DUP-01 (111214)	1,2,3,4,6,7,8-HpCDD	--	64000 D	64000 D
	OCDD	--	170000 D	170000 D
	OCDF	--	31000 D	31000 D

Note: In the instance where both the original analysis and the diluted analysis sample results exhibited a concentration greater than or less than the calibration linear range of the instrument, the sample result exhibiting the greatest concentration will be reported as the final result.

Sample results associated with compounds exhibiting concentration greater than the linear range qualified as documented in the table below when reported as the final reported sample result.

Reported Sample Results	Qualification
Diluted sample result within calibration range	D
Diluted sample result less than the calibration range	DJ
Diluted sample result greater than the calibration range	EDJ
Original sample result greater than the calibration range	EJ

10. System Performance and Overall Assessment

For sample location SS-101-10' original, matrix spike and duplicate, several results were reported from either from the DB-225 column or a post-dilution spike. Due to limitations of the data reporting system, these values were added to the original work orders and qualified with an "X". The data for these analyses are included in the data package directly following each original analysis. Since this has no impact on the data, the "X" qualifier was removed.

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR PCDD/PCDF

PCDDs/PCDFs; SW-846 8290	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
HIGH-RESOLUTION GAS CHROMATOGRAPHY/HIGH-RESOLUTION MASS SPECTROMETRY (HRGC/HRMS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks		X	X		
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X	X		
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Signal-to-noise ratio $\geq$ 10:1		X		X	
Internal standard performance		X		X	
Recovery standard performance		X		X	
Resolution mix $\leq$ 25%		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	

PCDDs/PCDFs; SW-846 8290	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
HIGH-RESOLUTION GAS CHROMATOGRAPHY/HIGH-RESOLUTION MASS SPECTROMETRY (HRGC/HRMS)					
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference, %D – difference

VALIDATION PERFORMED BY: Todd Church

SIGNATURE:

DATE: March 6, 2015

PEER REVIEW: Dennis Capria

DATE: March 10, 2015

CHAIN OF CUSTODY/
CORRECTED SAMPLE ANALYSIS DATA SHEETS

ARCADIS U.S. Inc

Sample ID: EB-01 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 001	**Work Order #....:**	M5HQ11AA	**Matrix....:**	WH
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/20/14	**Analysis Date....:**	12/02/14		
Prep Batch # ....:	4324016				
Initial Wgt/Vol :	1020 mL	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND		0.0098	0.000099	ng/L
1,2,3,7,8-PeCDD	ND		0.049	0.00015	ng/L
1,2,3,4,7,8-HxCDD	ND		0.049	0.00030	ng/L
1,2,3,6,7,8-HxCDD	ND		0.049	0.00029	ng/L
1,2,3,7,8,9-HxCDD	ND		0.049	0.00028	ng/L
1,2,3,4,6,7,8-HpCDD	**0.0016**	**B J**	**0.049**	**0.00042**	**ng/L**
OCDD	**0.0078**	**B J**	**0.098**	**0.00021**	**ng/L**
2,3,7,8-TCDF	ND		0.0098	0.00014	ng/L
1,2,3,7,8-PeCDF	ND		0.049	0.00019	ng/L
2,3,4,7,8-PeCDF	ND		0.049	0.00017	ng/L
1,2,3,4,7,8-HxCDF	ND		0.049	0.00018	ng/L
1,2,3,6,7,8-HxCDF	ND		0.049	0.00016	ng/L
2,3,4,6,7,8-HxCDF	ND		0.049	0.00018	ng/L
1,2,3,7,8,9-HxCDF	ND		0.049	0.00024	ng/L
1,2,3,4,6,7,8-HpCDF	**0.00069**	**J**	**0.049**	**0.00016**	**ng/L**
1,2,3,4,7,8,9-HpCDF	ND		0.049	0.00023	ng/L
OCDF	**0.0019**	~~Q B J~~ UX	**0.098**	**0.00016**	**ng/L**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	92	40 - 135
13C-1,2,3,7,8-PeCDD	111	40 - 135
13C-1,2,3,4,7,8-HxCDD	95	40 - 135
13C-1,2,3,6,7,8-HxCDD	96	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	101	40 - 135
13C-OCDD	91	40 - 135
13C-2,3,7,8-TCDF	92	40 - 135
13C-1,2,3,7,8-PeCDF	114	40 - 135
13C-2,3,4,7,8-PeCDF	110	40 - 135
13C-1,2,3,4,7,8-HxCDF	94	40 - 135
13C-1,2,3,6,7,8-HxCDF	95	40 - 135
13C-2,3,4,6,7,8-HxCDF	98	40 - 135
13C-1,2,3,7,8,9-HxCDF	96	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	98	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	100	40 - 135
13C-OCDF	86	40 - 135

ARCADIS U.S. Inc

Sample ID: EB-01 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 001	**Work Order #....:**	M5HQ11AA	**Matrix....:**	WH
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/20/14	**Analysis Date....:**	12/02/14		
Prep Batch # ....:	4324016				
Initial Wgt/Vol :	1020 mL	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q . Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers

UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-109-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 002	**Work Order #....:**	M5HQ21AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/02/14	**Percent Moisture**	11
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.4 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	2.3	~~Q J~~ UX	11	0.37	ng/kg
1,2,3,7,8-PeCDD	48	~~B~~ J	54	0.40	ng/kg
1,2,3,4,7,8-HxCDD	92		54	0.41	ng/kg
1,2,3,6,7,8-HxCDD	370	~~B~~	54	0.37	ng/kg
1,2,3,7,8,9-HxCDD	180	~~C B~~ J	54	0.37	ng/kg
1,2,3,4,6,7,8-HpCDD	10000	~~B~~	54	1.3	ng/kg
OCDD	91000	~~B E~~ EJ	110	1.3	ng/kg
2,3,7,8-TCDF	1.2	~~Q J~~ UX	11	0.19	ng/kg
1,2,3,7,8-PeCDF	5.6	J	54	0.35	ng/kg
2,3,4,7,8-PeCDF	6.1	~~Q B J~~ UX	54	0.33	ng/kg
1,2,3,4,7,8-HxCDF	74	~~Q~~ UX	54	0.26	ng/kg
1,2,3,6,7,8-HxCDF	140	~~Q~~ UX	54	0.24	ng/kg
2,3,4,6,7,8-HxCDF	36	~~B~~ J	54	0.25	ng/kg
1,2,3,7,8,9-HxCDF	1.9	J	54	0.29	ng/kg
1,2,3,4,6,7,8-HpCDF	1700	~~B~~	54	0.42	ng/kg
1,2,3,4,7,8,9-HpCDF	120	~~B~~	54	0.69	ng/kg
OCDF	7000	~~B~~	110	0.49	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	67	40 - 135
13C-1,2,3,7,8-PeCDD	61	40 - 135
13C-1,2,3,4,7,8-HxCDD	62	40 - 135
13C-1,2,3,6,7,8-HxCDD	63	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	71	40 - 135
13C-OCDD	76	40 - 135
13C-2,3,7,8-TCDF	59	40 - 135
13C-1,2,3,7,8-PeCDF	67	40 - 135
13C-2,3,4,7,8-PeCDF	64	40 - 135
13C-1,2,3,4,7,8-HxCDF	60	40 - 135
13C-1,2,3,6,7,8-HxCDF	60	40 - 135
13C-2,3,4,6,7,8-HxCDF	64	40 - 135
13C-1,2,3,7,8,9-HxCDF	67	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	73	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	71	40 - 135
13C-OCDF	65	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-109-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 002	**Work Order #....:**	M5HQ21AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/02/14	**Percent Moisture**	11
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.4 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers

EJ = The compound was quantified above the calibration range; estimated value

J = Estimated value

UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-108-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 003	**Work Order #....:**	M5HQ31AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	15
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	19			12	0.73	ng/kg
1,2,3,7,8-PeCDD	220	~~B~~		59	0.69	ng/kg
1,2,3,4,7,8-HxCDD	530			59	1.9	ng/kg
1,2,3,6,7,8-HxCDD	9500	~~B~~		59	2.0	ng/kg
1,2,3,7,8,9-HxCDD	1400	~~C B~~	J	59	1.9	ng/kg
2,3,7,8-TCDF	5.9	J		12	0.61	ng/kg
1,2,3,7,8-PeCDF	28	~~Q J~~	UX	59	1.1	ng/kg
2,3,4,7,8-PeCDF	40	~~B~~ J		59	1.1	ng/kg
1,2,3,4,7,8-HxCDF	1200	~~Q~~	UX	59	1.2	ng/kg
1,2,3,6,7,8-HxCDF	1500	~~Q~~	UX	59	1.1	ng/kg
2,3,4,6,7,8-HxCDF	300	~~B~~		59	1.1	ng/kg
1,2,3,7,8,9-HxCDF	27	J		59	1.4	ng/kg
1,2,3,4,7,8,9-HpCDF	1600	~~B~~		59	3.0	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY		RECOVERY LIMITS
13C-2,3,7,8-TCDD	72		40 - 135
13C-1,2,3,7,8-PeCDD	68		40 - 135
13C-1,2,3,4,7,8-HxCDD	61		40 - 135
13C-1,2,3,6,7,8-HxCDD	57		40 - 135
13C-1,2,3,4,6,7,8-HpCDD	78		40 - 135
13C-OCDD	34	*	40 - 135
13C-2,3,7,8-TCDF	68		40 - 135
13C-1,2,3,7,8-PeCDF	68		40 - 135
13C-2,3,4,7,8-PeCDF	68		40 - 135
13C-1,2,3,4,7,8-HxCDF	63		40 - 135
13C-1,2,3,6,7,8-HxCDF	61		40 - 135
13C-2,3,4,6,7,8-HxCDF	68		40 - 135
13C-1,2,3,7,8,9-HxCDF	73		40 - 135
13C-1,2,3,4,6,7,8-HpCDF	68		40 - 135
13C-1,2,3,4,7,8,9-HpCDF	74		40 - 135
13C-OCDF	65		40 - 135

ARCADIS U.S. Inc

Sample ID: SS-108-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 003	**Work Order #....:**	M5HQ31AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	15
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

*	Surrogate recovery is outside stated control limits.
B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
C	Co-eluting isomer.
J	Estimated Result.
Q	Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
J = Estimated value
UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-108-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 003	**Work Order #....:**	M5HQ32AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/11/14	**Percent Moisture**	15
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	0.067 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,6,7,8-HpCDD	71000	~~B~~	D	880	49	ng/kg
OCDD	84000	~~B~~		1800	37	ng/kg
1,2,3,4,6,7,8-HpCDF	11000	~~B~~		880	21	ng/kg
OCDF	29000	~~B~~		1800	20	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	97	40 - 135
13C-1,2,3,7,8-PeCDD	72	40 - 135
13C-1,2,3,4,7,8-HxCDD	97	40 - 135
13C-1,2,3,6,7,8-HxCDD	107	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	111	40 - 135
13C-OCDD	91	40 - 135
13C-2,3,7,8-TCDF	96	40 - 135
13C-1,2,3,7,8-PeCDF	86	40 - 135
13C-2,3,4,7,8-PeCDF	83	40 - 135
13C-1,2,3,4,7,8-HxCDF	103	40 - 135
13C-1,2,3,6,7,8-HxCDF	108	40 - 135
13C-2,3,4,6,7,8-HxCDF	105	40 - 135
13C-1,2,3,7,8,9-HxCDF	107	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	107	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	112	40 - 135
13C-OCDF	97	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Data Validation Qualifiers

D = Concentration is based on a diluted sample analysis

ARCADIS U.S. Inc

Sample ID: SS-107-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 004	**Work Order #....:**	M5HQ41AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	12
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	1.2	~~Q J~~ UX	11	0.44	ng/kg
1,2,3,7,8-PeCDD	26	~~B~~ J	56	0.67	ng/kg
1,2,3,4,7,8-HxCDD	76		56	1.3	ng/kg
1,2,3,6,7,8-HxCDD	200	~~B~~	56	0.90	ng/kg
1,2,3,7,8,9-HxCDD	130	~~C B~~ J	56	1.0	ng/kg
1,2,3,4,6,7,8-HpCDD	6300	~~B~~	56	2.3	ng/kg
OCDD	72000	~~B~~ E J	110	3.3	ng/kg
2,3,7,8-TCDF	1.1	~~Q J~~ UX	11	0.47	ng/kg
1,2,3,7,8-PeCDF	3.3	~~Q J~~ UX	56	1.2	ng/kg
2,3,4,7,8-PeCDF	160	~~C B~~ J	56	1.2	ng/kg
1,2,3,4,7,8-HxCDF	53	~~C~~ J	56	0.64	ng/kg
1,2,3,6,7,8-HxCDF	89	~~Q~~ UX	56	0.52	ng/kg
2,3,4,6,7,8-HxCDF	28	~~B~~ J	56	0.55	ng/kg
1,2,3,7,8,9-HxCDF	ND		56	0.74	ng/kg
1,2,3,4,6,7,8-HpCDF	1300	~~B~~	56	1.3	ng/kg
1,2,3,4,7,8,9-HpCDF	94	~~B~~	56	1.7	ng/kg
OCDF	4900	~~B~~	110	1.3	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	76	40 - 135
13C-1,2,3,7,8-PeCDD	65	40 - 135
13C-1,2,3,4,7,8-HxCDD	46	40 - 135
13C-1,2,3,6,7,8-HxCDD	71	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	75	40 - 135
13C-OCDD	91	40 - 135
13C-2,3,7,8-TCDF	63	40 - 135
13C-1,2,3,7,8-PeCDF	64	40 - 135
13C-2,3,4,7,8-PeCDF	62	40 - 135
13C-1,2,3,4,7,8-HxCDF	57	40 - 135
13C-1,2,3,6,7,8-HxCDF	62	40 - 135
13C-2,3,4,6,7,8-HxCDF	66	40 - 135
13C-1,2,3,7,8,9-HxCDF	63	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	64	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	64	40 - 135
13C-OCDF	77	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-107-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 004	**Work Order #....:**	M5HQ41AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	12
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
J = Estimated value
UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-110-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 006	**Work Order #....:**	M5HQ61AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	19	~~Q~~	UX	12	0.84	ng/kg
1,2,3,7,8-PeCDD	240	~~B~~		58	1.1	ng/kg
1,2,3,4,7,8-HxCDD	480			58	1.5	ng/kg
1,2,3,6,7,8-HxCDD	2000	~~B~~		58	1.4	ng/kg
1,2,3,7,8,9-HxCDD	1100	~~C B~~	J	58	1.3	ng/kg
2,3,7,8-TCDF	6.4	~~Q J~~	UX	12	0.64	ng/kg
1,2,3,7,8-PeCDF	25	J		58	0.87	ng/kg
2,3,4,7,8-PeCDF	31	~~B~~ J		58	0.98	ng/kg
1,2,3,4,7,8-HxCDF	490	~~Q~~	UX	58	1.1	ng/kg
1,2,3,6,7,8-HxCDF	1000	~~Q~~	UX	58	1.1	ng/kg
2,3,4,6,7,8-HxCDF	180	~~B~~		58	0.90	ng/kg
1,2,3,7,8,9-HxCDF	7.2	J		58	1.2	ng/kg
1,2,3,4,6,7,8-HpCDF	11000	~~B~~		58	1.9	ng/kg
1,2,3,4,7,8,9-HpCDF	740	~~B~~		58	2.4	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	67	40 - 135
13C-1,2,3,7,8-PeCDD	63	40 - 135
13C-1,2,3,4,7,8-HxCDD	59	40 - 135
13C-1,2,3,6,7,8-HxCDD	61	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	76	40 - 135
13C-OCDD	42	40 - 135
13C-2,3,7,8-TCDF	72	40 - 135
13C-1,2,3,7,8-PeCDF	73	40 - 135
13C-2,3,4,7,8-PeCDF	67	40 - 135
13C-1,2,3,4,7,8-HxCDF	53	40 - 135
13C-1,2,3,6,7,8-HxCDF	53	40 - 135
13C-2,3,4,6,7,8-HxCDF	66	40 - 135
13C-1,2,3,7,8,9-HxCDF	67	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	62	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	69	40 - 135
13C-OCDF	68	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-110-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 006	**Work Order #....:**	M5HQ61AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
J = Estimated value
UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-110-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 006	**Work Order #....:**	M5HQ62AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/11/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	0.2 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,6,7,8-HpCDD	26000	~~B~~	D	290	15	ng/kg
OCDD	130000	~~B~~		580	19	ng/kg
OCDF	22000	~~B~~		580	7.4	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	96	40 - 135
13C-1,2,3,7,8-PeCDD	79	40 - 135
13C-1,2,3,4,7,8-HxCDD	92	40 - 135
13C-1,2,3,6,7,8-HxCDD	93	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	103	40 - 135
13C-OCDD	96	40 - 135
13C-2,3,7,8-TCDF	95	40 - 135
13C-1,2,3,7,8-PeCDF	89	40 - 135
13C-2,3,4,7,8-PeCDF	89	40 - 135
13C-1,2,3,4,7,8-HxCDF	94	40 - 135
13C-1,2,3,6,7,8-HxCDF	91	40 - 135
13C-2,3,4,6,7,8-HxCDF	97	40 - 135
13C-1,2,3,7,8,9-HxCDF	95	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	103	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	100	40 - 135
13C-OCDF	92	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Data Validation Qualifiers

D = Concentration is based on a diluted sample analysis

ARCADIS U.S. Inc

Sample ID: SS-105-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 007	**Work Order #....:**	M5HQ71AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	20		11	0.87	ng/kg
1,2,3,7,8-PeCDD	380	~~B~~	57	0.89	ng/kg
1,2,3,4,7,8-HxCDD	880		57	1.7	ng/kg
1,2,3,6,7,8-HxCDD	4400	~~B~~	57	1.6	ng/kg
1,2,3,7,8,9-HxCDD	1900	~~C B~~ J	57	1.5	ng/kg
1,2,3,7,8-PeCDF	56	J	57	0.80	ng/kg
2,3,4,7,8-PeCDF	66	~~B~~	57	0.75	ng/kg
1,2,3,4,7,8-HxCDF	920	~~Q~~ UX	57	1.1	ng/kg
1,2,3,6,7,8-HxCDF	1300	~~Q~~ UX	57	1.0	ng/kg
2,3,4,6,7,8-HxCDF	350	~~B~~	57	1.0	ng/kg
1,2,3,7,8,9-HxCDF	20	J	57	1.1	ng/kg
1,2,3,4,7,8,9-HpCDF	1500	~~B~~	57	3.2	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	78	40 - 135
13C-1,2,3,7,8-PeCDD	67	40 - 135
13C-1,2,3,4,7,8-HxCDD	61	40 - 135
13C-1,2,3,6,7,8-HxCDD	65	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	76	40 - 135
13C-OCDD	41	40 - 135
13C-1,2,3,7,8-PeCDF	73	40 - 135
13C-2,3,4,7,8-PeCDF	75	40 - 135
13C-1,2,3,4,7,8-HxCDF	60	40 - 135
13C-1,2,3,6,7,8-HxCDF	63	40 - 135
13C-2,3,4,6,7,8-HxCDF	71	40 - 135
13C-1,2,3,7,8,9-HxCDF	71	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	59	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	64	40 - 135
13C-OCDF	62	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

ARCADIS U.S. Inc

Sample ID: SS-105-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 007	**Work Order #....:**	M5HQ71AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
J = Estimated value
UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-105-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 007	**Work Order #....:**	M5HQ72AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/11/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	0.101 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,6,7,8-HpCDD	73000	~~B~~	D	570	45	ng/kg
OCDD	220000	~~B~~		1100	59	ng/kg
1,2,3,4,6,7,8-HpCDF	15000	~~B~~		570	16	ng/kg
OCDF	49000	~~B~~		1100	26	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	101	40 - 135
13C-1,2,3,7,8-PeCDD	83	40 - 135
13C-1,2,3,4,7,8-HxCDD	96	40 - 135
13C-1,2,3,6,7,8-HxCDD	101	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	106	40 - 135
13C-OCDD	102	40 - 135
13C-2,3,7,8-TCDF	97	40 - 135
13C-1,2,3,7,8-PeCDF	84	40 - 135
13C-2,3,4,7,8-PeCDF	83	40 - 135
13C-1,2,3,4,7,8-HxCDF	101	40 - 135
13C-1,2,3,6,7,8-HxCDF	98	40 - 135
13C-2,3,4,6,7,8-HxCDF	98	40 - 135
13C-1,2,3,7,8,9-HxCDF	105	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	104	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	98	40 - 135
13C-OCDF	92	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Data Validation Qualifiers

D = Concentration is based on a diluted sample analysis

ARCADIS U.S. Inc

Sample ID: SS-105-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 007	**Work Order #....:**	M5HQ71AD	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/04/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D12C	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Confirmation Run

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDF	12	~~Q~~ UX	11	0.81	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDF	85	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-106-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 008	**Work Order #....:**	M5HQ81AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	12
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.4 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	3.3	~~Q J~~ UX	11	0.51	ng/kg
1,2,3,7,8-PeCDD	68	~~B~~	55	0.69	ng/kg
1,2,3,4,7,8-HxCDD	140		55	1.1	ng/kg
1,2,3,6,7,8-HxCDD	570	~~B~~	55	1.1	ng/kg
1,2,3,7,8,9-HxCDD	310	~~C B~~ J	55	1.0	ng/kg
1,2,3,4,6,7,8-HpCDD	16000	~~B~~	55	2.4	ng/kg
OCDD	140000	~~B~~ E J	110	1.9	ng/kg
2,3,7,8-TCDF	1.8	J	11	0.40	ng/kg
1,2,3,7,8-PeCDF	7.5	J	55	0.82	ng/kg
2,3,4,7,8-PeCDF	16	~~Q B J~~ UX	55	0.85	ng/kg
1,2,3,4,7,8-HxCDF	120	~~Q~~ UX	55	0.90	ng/kg
1,2,3,6,7,8-HxCDF	160	~~Q~~ UX	55	0.82	ng/kg
2,3,4,6,7,8-HxCDF	61	~~B~~	55	0.83	ng/kg
1,2,3,7,8,9-HxCDF	2.1	~~Q J~~ UX	55	1.2	ng/kg
1,2,3,4,6,7,8-HpCDF	3300	~~B~~	55	1.5	ng/kg
1,2,3,4,7,8,9-HpCDF	180	~~B~~	55	2.3	ng/kg
OCDF	13000	~~B~~	110	1.7	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	71	40 - 135
13C-1,2,3,7,8-PeCDD	67	40 - 135
13C-1,2,3,4,7,8-HxCDD	69	40 - 135
13C-1,2,3,6,7,8-HxCDD	69	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	85	40 - 135
13C-OCDD	98	40 - 135
13C-2,3,7,8-TCDF	66	40 - 135
13C-1,2,3,7,8-PeCDF	71	40 - 135
13C-2,3,4,7,8-PeCDF	67	40 - 135
13C-1,2,3,4,7,8-HxCDF	62	40 - 135
13C-1,2,3,6,7,8-HxCDF	63	40 - 135
13C-2,3,4,6,7,8-HxCDF	71	40 - 135
13C-1,2,3,7,8,9-HxCDF	66	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	73	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	79	40 - 135
13C-OCDF	79	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-106-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 008	**Work Order #....:**	M5HQ81AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	12
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.4 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
J = Estimated value
UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-103-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 009	**Work Order #....:**	M5HQ91AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	16
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	640			12	2.8	ng/kg
1,2,3,7,8-PeCDD	8900	B		59	2.6	ng/kg
1,2,3,4,7,8-HxCDD	16000			59	4.9	ng/kg
1,2,3,7,8-PeCDF	1600			59	3.2	ng/kg
2,3,4,7,8-PeCDF	1200	~~Q B~~	UX	59	2.7	ng/kg
1,2,3,4,7,8-HxCDF	16000	~~Q~~	UX	59	2.8	ng/kg
2,3,4,6,7,8-HxCDF	6700	~~Q B~~	UX	59	2.8	ng/kg
1,2,3,7,8,9-HxCDF	170			59	3.2	ng/kg
1,2,3,4,7,8,9-HpCDF	23000	B		59	5.4	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY		RECOVERY LIMITS
13C-2,3,7,8-TCDD	81		40 - 135
13C-1,2,3,7,8-PeCDD	82		40 - 135
13C-1,2,3,4,7,8-HxCDD	63		40 - 135
13C-1,2,3,6,7,8-HxCDD	65		40 - 135
13C-1,2,3,4,6,7,8-HpCDD	55		40 - 135
13C-OCDD	11	*	40 - 135
13C-1,2,3,7,8-PeCDF	79		40 - 135
13C-2,3,4,7,8-PeCDF	85		40 - 135
13C-1,2,3,4,7,8-HxCDF	61		40 - 135
13C-1,2,3,6,7,8-HxCDF	56		40 - 135
13C-2,3,4,6,7,8-HxCDF	67		40 - 135
13C-1,2,3,7,8,9-HxCDF	74		40 - 135
13C-1,2,3,4,6,7,8-HpCDF	60		40 - 135
13C-1,2,3,4,7,8,9-HpCDF	63		40 - 135
13C-OCDF	30	*	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

- * Surrogate recovery is outside stated control limits.
- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers

UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-103-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 009	**Work Order #....:**	M5HQ92AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/11/14	**Percent Moisture**	16
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	0.034 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,6,7,8-HxCDD	34000	~~B~~ D	1800	64	ng/kg
1,2,3,7,8,9-HxCDD	20000	~~B~~	1800	61	ng/kg
1,2,3,4,6,7,8-HpCDD	560000	~~B~~	1800	130	ng/kg
OCDD	590000	~~B~~	3500	100	ng/kg
1,2,3,6,7,8-HxCDF	22000		1800	44	ng/kg
1,2,3,4,6,7,8-HpCDF	170000	~~B~~	1800	82	ng/kg
OCDF	420000	~~B~~	3500	97	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	96	40 - 135
13C-1,2,3,7,8-PeCDD	79	40 - 135
13C-1,2,3,4,7,8-HxCDD	92	40 - 135
13C-1,2,3,6,7,8-HxCDD	98	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	111	40 - 135
13C-OCDD	98	40 - 135
13C-2,3,7,8-TCDF	97	40 - 135
13C-1,2,3,7,8-PeCDF	87	40 - 135
13C-2,3,4,7,8-PeCDF	84	40 - 135
13C-1,2,3,4,7,8-HxCDF	96	40 - 135
13C-1,2,3,6,7,8-HxCDF	95	40 - 135
13C-2,3,4,6,7,8-HxCDF	95	40 - 135
13C-1,2,3,7,8,9-HxCDF	96	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	109	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	105	40 - 135
13C-OCDF	99	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Data Validation Qualifiers

D = Concentration is based on a diluted sample analysis

ARCADIS U.S. Inc

Sample ID: SS-103-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 009	**Work Order #....:**	M5HQ91AD	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/04/14	**Percent Moisture**	16
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D12C	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Confirmation Run

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDF	360	D	12	6.6	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDF	90	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

Data Validation Qualifiers

D = Concentration is based on a diluted sample analysis

ARCADIS U.S. Inc

Sample ID: SS-104-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 010	**Work Order #....:**	M5HRA1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	12
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	7.7	J	11	0.65	ng/kg
1,2,3,7,8-PeCDD	81	~~B~~	57	0.75	ng/kg
1,2,3,4,7,8-HxCDD	150		57	1.3	ng/kg
1,2,3,6,7,8-HxCDD	700	~~B~~	57	1.6	ng/kg
1,2,3,7,8,9-HxCDD	360	~~C B~~ J	57	1.4	ng/kg
1,2,3,4,6,7,8-HpCDD	16000	~~B~~	57	2.9	ng/kg
OCDD	140000	~~B~~ E J	110	2.2	ng/kg
2,3,7,8-TCDF	8.6	~~Q J~~ UX	11	0.62	ng/kg
1,2,3,7,8-PeCDF	12	J	57	0.71	ng/kg
2,3,4,7,8-PeCDF	15	~~B~~ J	57	0.70	ng/kg
1,2,3,4,7,8-HxCDF	150	~~Q~~ UX	57	0.87	ng/kg
1,2,3,6,7,8-HxCDF	270	~~Q~~ UX	57	0.83	ng/kg
2,3,4,6,7,8-HxCDF	70	~~B~~	57	0.92	ng/kg
1,2,3,7,8,9-HxCDF	ND		57	1.1	ng/kg
1,2,3,4,6,7,8-HpCDF	3500	~~B~~	57	1.6	ng/kg
1,2,3,4,7,8,9-HpCDF	180	~~Q B~~ UX	57	2.4	ng/kg
OCDF	13000	~~B~~	110	2.2	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	69	40 - 135
13C-1,2,3,7,8-PeCDD	68	40 - 135
13C-1,2,3,4,7,8-HxCDD	73	40 - 135
13C-1,2,3,6,7,8-HxCDD	66	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	105	40 - 135
13C-OCDD	111	40 - 135
13C-2,3,7,8-TCDF	65	40 - 135
13C-1,2,3,7,8-PeCDF	74	40 - 135
13C-2,3,4,7,8-PeCDF	67	40 - 135
13C-1,2,3,4,7,8-HxCDF	67	40 - 135
13C-1,2,3,6,7,8-HxCDF	74	40 - 135
13C-2,3,4,6,7,8-HxCDF	71	40 - 135
13C-1,2,3,7,8,9-HxCDF	77	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	80	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	107	40 - 135
13C-OCDF	91	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-104-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 010	**Work Order #....:**	M5HRA1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	12
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
J = Estimated value
UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-102-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 011	**Work Order #....:**	M5HRC1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	16
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	120			12	3.0	ng/kg
1,2,3,7,8-PeCDD	2100	~~B~~		59	2.7	ng/kg
1,2,3,4,7,8-HxCDD	4900			59	5.1	ng/kg
1,2,3,6,7,8-HxCDD	18000	~~B~~		59	4.9	ng/kg
1,2,3,7,8,9-HxCDD	9400	~~B~~		59	4.7	ng/kg
1,2,3,7,8-PeCDF	360			59	3.8	ng/kg
2,3,4,7,8-PeCDF	310	~~B~~		59	3.4	ng/kg
1,2,3,4,7,8-HxCDF	3900	~~Q~~	UX	59	2.1	ng/kg
1,2,3,6,7,8-HxCDF	7000	~~Q~~	UX	59	2.3	ng/kg
2,3,4,6,7,8-HxCDF	2200	~~B~~		59	2.2	ng/kg
1,2,3,7,8,9-HxCDF	61			59	2.5	ng/kg
1,2,3,4,7,8,9-HpCDF	7200	~~B~~		59	8.3	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY		RECOVERY LIMITS
13C-2,3,7,8-TCDD	78		40 - 135
13C-1,2,3,7,8-PeCDD	78		40 - 135
13C-1,2,3,4,7,8-HxCDD	61		40 - 135
13C-1,2,3,6,7,8-HxCDD	67		40 - 135
13C-1,2,3,4,6,7,8-HpCDD	75		40 - 135
13C-OCDD	14	*	40 - 135
13C-1,2,3,7,8-PeCDF	76		40 - 135
13C-2,3,4,7,8-PeCDF	83		40 - 135
13C-1,2,3,4,7,8-HxCDF	66		40 - 135
13C-1,2,3,6,7,8-HxCDF	59		40 - 135
13C-2,3,4,6,7,8-HxCDF	60		40 - 135
13C-1,2,3,7,8,9-HxCDF	72		40 - 135
13C-1,2,3,4,6,7,8-HpCDF	70		40 - 135
13C-1,2,3,4,7,8,9-HpCDF	63		40 - 135
13C-OCDF	54		40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

- * Surrogate recovery is outside stated control limits.
- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers

UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-102-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 011	**Work Order #....:**	M5HRC2AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/11/14	**Percent Moisture**	16
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	0.04 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,6,7,8-HpCDD	**110000**	~~B~~ D	**1500**	**100**	**ng/kg**
OCDD	**270000**	~~B~~	**3000**	**95**	**ng/kg**
1,2,3,4,6,7,8-HpCDF	**29000**	~~B~~	**1500**	**38**	**ng/kg**
OCDF	**83000**	~~B~~	**3000**	**53**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	100	40 - 135
13C-1,2,3,7,8-PeCDD	81	40 - 135
13C-1,2,3,4,7,8-HxCDD	96	40 - 135
13C-1,2,3,6,7,8-HxCDD	103	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	103	40 - 135
13C-OCDD	94	40 - 135
13C-2,3,7,8-TCDF	100	40 - 135
13C-1,2,3,7,8-PeCDF	92	40 - 135
13C-2,3,4,7,8-PeCDF	90	40 - 135
13C-1,2,3,4,7,8-HxCDF	100	40 - 135
13C-1,2,3,6,7,8-HxCDF	104	40 - 135
13C-2,3,4,6,7,8-HxCDF	99	40 - 135
13C-1,2,3,7,8,9-HxCDF	105	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	110	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	101	40 - 135
13C-OCDF	93	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Data Validation Qualifiers

D = Concentration is based on a diluted sample analysis

ARCADIS U.S. Inc

Sample ID: SS-102-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 011	**Work Order #....:**	M5HRC1AD	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/05/14	**Percent Moisture**	16
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D12C	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Confirmation Run

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDF	95	D	1.2	2.5	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDF	77	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

Data Validation Qualifiers
D = Concentration is based on a diluted sample analysis

ARCADIS U.S. Inc

Sample ID: SS-101-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 012	Work Order #....:	M5HRD1AC	Matrix....:	SO
Date Sampled....:	11/12/14	Date Received....:	11/13/14	Dilution Factor:	10
Prep Date....:	11/17/14	Analysis Date....:	12/03/14	Percent Moisture	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.3 g	Instrument ID....:	D2A	Method:	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	17	J		11	0.88	ng/kg
1,2,3,7,8-PeCDD	190	J	~~B~~	57	1.2	ng/kg
1,2,3,4,7,8-HxCDD	420	J		57	1.9	ng/kg
1,2,3,6,7,8-HxCDD	1100		~~B~~	57	1.7	ng/kg
1,2,3,7,8,9-HxCDD	750		~~B~~	57	1.7	ng/kg
1,2,3,4,6,7,8-HpCDD	15000		~~B X~~	570	17	ng/kg
OCDD	98000		~~B X~~	1100	35	ng/kg
2,3,7,8-TCDF	9.9		~~Q J X~~	UXJ 11	1.2	ng/kg
1,2,3,7,8-PeCDF	29		J	57	1.3	ng/kg
2,3,4,7,8-PeCDF	88		~~Q B~~	UXJ 57	1.2	ng/kg
1,2,3,4,7,8-HxCDF	330		~~Q~~	UX 57	0.87	ng/kg
1,2,3,6,7,8-HxCDF	450		~~Q~~	UX 57	0.90	ng/kg
2,3,4,6,7,8-HxCDF	120		~~Q B~~	UX 57	0.85	ng/kg
1,2,3,7,8,9-HxCDF	5.5		~~Q J~~	UX 57	1.2	ng/kg
1,2,3,4,6,7,8-HpCDF	6100		~~B~~	57	1.6	ng/kg
1,2,3,4,7,8,9-HpCDF	390		~~B~~	57	2.8	ng/kg
OCDF	23000		~~B~~	110	1.4	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	76	40 - 135
13C-1,2,3,7,8-PeCDD	74	40 - 135
13C-1,2,3,4,7,8-HxCDD	58	40 - 135
13C-1,2,3,6,7,8-HxCDD	72	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	68	40 - 135
13C-OCDD	96	40 - 135
13C-2,3,7,8-TCDF	73	40 - 135
13C-1,2,3,7,8-PeCDF	70	40 - 135
13C-2,3,4,7,8-PeCDF	74	40 - 135
13C-1,2,3,4,7,8-HxCDF	58	40 - 135
13C-1,2,3,6,7,8-HxCDF	61	40 - 135
13C-2,3,4,6,7,8-HxCDF	64	40 - 135
13C-1,2,3,7,8,9-HxCDF	64	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	68	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	68	40 - 135
13C-OCDF	77	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-101-10'

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 012	**Work Order #....:**	M5HRD1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	14
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10.3 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

X See project narrative.

Data Validation Qualifiers

J = Estimated value

UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: DUP-01 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 013	Work Order #....:	M5HRE1AC	Matrix....:	SO
Date Sampled....:	11/12/14	Date Received....:	11/13/14	Dilution Factor:	10
Prep Date....:	11/17/14	Analysis Date....:	12/03/14	Percent Moisture	15
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	Instrument ID....:	D2A	Method:	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	17			12	0.87	ng/kg
1,2,3,7,8-PeCDD	190	~~B~~		59	1.4	ng/kg
1,2,3,4,7,8-HxCDD	460			59	2.4	ng/kg
1,2,3,6,7,8-HxCDD	3800	~~B~~		59	2.4	ng/kg
1,2,3,7,8,9-HxCDD	1000	~~B~~		59	2.3	ng/kg
2,3,7,8-TCDF	5.4	~~Q J~~	UX	12	0.86	ng/kg
1,2,3,7,8-PeCDF	20	~~Q J~~		59	1.2	ng/kg
2,3,4,7,8-PeCDF	30	~~Q B J~~		59	1.2	ng/kg
1,2,3,4,7,8-HxCDF	660	~~Q~~		59	1.4	ng/kg
1,2,3,6,7,8-HxCDF	730	~~Q~~		59	1.4	ng/kg
2,3,4,6,7,8-HxCDF	200	~~Q B~~		59	1.4	ng/kg
1,2,3,7,8,9-HxCDF	7.8	~~Q J~~	UX	59	1.9	ng/kg
1,2,3,4,6,7,8-HpCDF	14000	~~B~~		59	2.3	ng/kg
1,2,3,4,7,8,9-HpCDF	980	~~B~~		59	3.2	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY		RECOVERY LIMITS
13C-2,3,7,8-TCDD	58		40 - 135
13C-1,2,3,7,8-PeCDD	60		40 - 135
13C-1,2,3,4,7,8-HxCDD	54		40 - 135
13C-1,2,3,6,7,8-HxCDD	62		40 - 135
13C-1,2,3,4,6,7,8-HpCDD	65		40 - 135
13C-OCDD	29	*	40 - 135
13C-2,3,7,8-TCDF	61		40 - 135
13C-1,2,3,7,8-PeCDF	67		40 - 135
13C-2,3,4,7,8-PeCDF	65		40 - 135
13C-1,2,3,4,7,8-HxCDF	55		40 - 135
13C-1,2,3,6,7,8-HxCDF	59		40 - 135
13C-2,3,4,6,7,8-HxCDF	64		40 - 135
13C-1,2,3,7,8,9-HxCDF	61		40 - 135
13C-1,2,3,4,6,7,8-HpCDF	64		40 - 135
13C-1,2,3,4,7,8,9-HpCDF	67		40 - 135
13C-OCDF	62		40 - 135

ARCADIS U.S. Inc

Sample ID: DUP-01 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 013	**Work Order #....:**	M5HRE1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	11/17/14	**Analysis Date....:**	12/03/14	**Percent Moisture**	15
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

*	Surrogate recovery is outside stated control limits.
B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
J	Estimated Result.
Q	Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers

UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: DUP-01 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 013	**Work Order #....:**	M5HRE2AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/17/14	**Analysis Date....:**	12/11/14	**Percent Moisture**	15
Prep Batch # ....:	4321012				
Initial Wgt/Vol :	0.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,6,7,8-HpCDD	64000	~~B~~	D	590	34	ng/kg
OCDD	170000	~~B~~		1200	38	ng/kg
OCDF	31000	~~B~~		1200	18	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	90	40 - 135
13C-1,2,3,7,8-PeCDD	78	40 - 135
13C-1,2,3,4,7,8-HxCDD	91	40 - 135
13C-1,2,3,6,7,8-HxCDD	94	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	99	40 - 135
13C-OCDD	97	40 - 135
13C-2,3,7,8-TCDF	95	40 - 135
13C-1,2,3,7,8-PeCDF	81	40 - 135
13C-2,3,4,7,8-PeCDF	83	40 - 135
13C-1,2,3,4,7,8-HxCDF	94	40 - 135
13C-1,2,3,6,7,8-HxCDF	96	40 - 135
13C-2,3,4,6,7,8-HxCDF	98	40 - 135
13C-1,2,3,7,8,9-HxCDF	97	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	104	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	92	40 - 135
13C-OCDF	92	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Data Validation Qualifiers

D = Concentration is based on a diluted sample analysis

ARCADIS U.S. Inc

Sample ID: EB-02 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 015	**Work Order #....:**	M5HRG1AA	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/20/14	**Analysis Date....:**	12/02/14		
Prep Batch # ....:	4324016				
Initial Wgt/Vol :	977 mL	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND			0.010	0.00015	ng/L
1,2,3,7,8-PeCDD	**0.0015**	~~Q J~~	UX	**0.051**	**0.00024**	**ng/L**
1,2,3,4,7,8-HxCDD	**0.0045**	~~Q J~~	UX	**0.051**	**0.00033**	**ng/L**
1,2,3,6,7,8-HxCDD	**0.014**	**J**		**0.051**	**0.00033**	**ng/L**
1,2,3,7,8,9-HxCDD	**0.0068**	~~Q J~~	UX	**0.051**	**0.00031**	**ng/L**
1,2,3,4,6,7,8-HpCDD	**0.30**	**B**		**0.051**	**0.00064**	**ng/L**
OCDD	**2.0**	**B**		**0.10**	**0.00089**	**ng/L**
2,3,7,8-TCDF	**0.00014**	~~Q J~~	UX	**0.010**	**0.00018**	**ng/L**
1,2,3,7,8-PeCDF	ND			0.051	0.00023	ng/L
2,3,4,7,8-PeCDF	ND			0.051	0.00023	ng/L
1,2,3,4,7,8-HxCDF	**0.0043**	~~Q B J~~	UX	**0.051**	**0.00021**	**ng/L**
1,2,3,6,7,8-HxCDF	**0.013**	~~Q J~~	UX	**0.051**	**0.00019**	**ng/L**
2,3,4,6,7,8-HxCDF	ND			0.051	0.00020	ng/L
1,2,3,7,8,9-HxCDF	ND			0.051	0.00026	ng/L
1,2,3,4,6,7,8-HpCDF	**0.062**			**0.051**	**0.00027**	**ng/L**
1,2,3,4,7,8,9-HpCDF	**0.0053**	**B J**		**0.051**	**0.00041**	**ng/L**
OCDF	**0.16**	**B**		**0.10**	**0.00027**	**ng/L**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	90	40 - 135
13C-1,2,3,7,8-PeCDD	103	40 - 135
13C-1,2,3,4,7,8-HxCDD	94	40 - 135
13C-1,2,3,6,7,8-HxCDD	95	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	98	40 - 135
13C-OCDD	93	40 - 135
13C-2,3,7,8-TCDF	86	40 - 135
13C-1,2,3,7,8-PeCDF	107	40 - 135
13C-2,3,4,7,8-PeCDF	99	40 - 135
13C-1,2,3,4,7,8-HxCDF	92	40 - 135
13C-1,2,3,6,7,8-HxCDF	92	40 - 135
13C-2,3,4,6,7,8-HxCDF	97	40 - 135
13C-1,2,3,7,8,9-HxCDF	95	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	99	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	100	40 - 135
13C-OCDF	85	40 - 135

ARCADIS U.S. Inc

Sample ID: EB-02 (111214)

Trace Level Organic Compounds

Lot - Sample #....:	H4K130404 - 015	**Work Order #....:**	M5HRG1AA	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	11/20/14	**Analysis Date....:**	12/02/14		
Prep Batch # ....:	4324016				
Initial Wgt/Vol :	977 mL	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers

UX = Estimated Maximum Possible Concentration (EMPC); see Page 8 of the Data Review Report for additional details

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

H4K130404

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessingpas	Site Contact:	COC Record 1 of 4
Company Name ARCADIS	Tel/Mobile: 218 829 4607	Lab Contact: / Carrier:	COC No: 04746
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter, MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? (Y) N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: 2 coolers
Project Name/Number: B0039310.0000.0000	☒ 2 weeks		Temperature: RT 0.2, 0.1 / CT 0.1, 0.0 deg C
Site: Beazer-Morrisville NC	☐ 1 week		Shipper: ✓ FedEx __UPS __Other:
P O #	☐ 2 days		Tracking Number: 605780793691 m
Sampled by: D. Rhodes / R. Sams	☐ 1 day		Recorded by: BKD Date: 11-13-14

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans-8290	Sample Specific Notes:
EB-01 (111214)	11-12-14	0805	G	WS	2		X	Equipment blank - DI water
SS-109-10'	11-12-14	0830	G	S	1		X	
SS-109-25'	11-12-14	0840	G	S	1		X	
SS-109-50'	11-12-14	0850	G	S	1		X	
SS-108-10'	11-12-14	0900	G	S	1		X	
SS-108-25'	11-12-14	0910	G	S	1		X	
SS-108-50'	11-12-14	0920	G	S	1		X	
SS-107-10'	11-12-14	0940	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:
Hold all 25' and 50' Samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1510	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0206)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

HMK130404

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessinger	Site Contact:	COC Record 2 of 4
Company Name ARCADIS	Tel/Mobile: 218-829-4607	Lab Contact: / Carrier:	COC No: 04747
Address 6602 Excelsior Rd.	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer-Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
P O #	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes/R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans - 8290	Sample Specific Notes:
SS-107-25'	11-12-14	0950	G	S	3		X	MS/MSD
SS-107-38'	11-12-14	1000	G	S	1		X	
SS-110-10'	11-12-14	1005	G	S	1		X	
SS-110-25'	11-12-14	1010	G	S	1		X	
SS-110-50'	11-12-14	1020	G	S	1		X	
SS-105-10'	11-12-14	1050	G	S	1		X	
SS-105-25'	11-12-14	1100	G	S	1		X	
SS-105-50'	11-12-14	1115	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:

Hold all 25' & 50' samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

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TAL-0046-140 (0208)

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TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

1-141K130404

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessinger pcs	Site Contact:	COC Record 3 of 4
Company Name ARCADIS	Tel/Mobile: 218-829 4607	Lab Contact: / Carrier:	COC No: 04749
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer - Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
PO #	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes/R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dixxms/Furans - 8290										Sample Specific Notes:
SS-106-10'	11-12-14	1125	G	S	1		X										
SS-106-25'	11-12-14	1130	G	S	1		X										
SS-103-10'	11-12-14	1230	G	S	1		X										
SS-103-25'	11-12-14	1240	G	S	1		X										
SS-103-50'	11-12-14	1245	G	S	1		X										
SS-104-25'	11-12-14	1255	G	S	1		X										
SS-104-10'	11-12-14	1300	G	S	1		X										
SS-102-10'	11-12-14	1320	G	S	1		X										

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold all 25' + 50' samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

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TAL-0046-140 (0208)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

1-44K1304D4

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessingpas	Site Contact:	COC Record 4 of 4
Company Name ARCADIS	Tel/Mobile: 218 829 4607	Lab Contact: / Carrier:	COC No: 04748
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer - Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
PO #	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes/R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Diesel/Pesticides-8270											Sample Specific Notes:
SS-102-25'	11-12-14	1330	G	S	1		X											
SS-102-50'	11-12-14	1340	G	S	1		X											
SS-101-50'	11-12-14	1350	G	S	1		X											
SS-101-25'	11-12-14	1400	G	S	1		X											
SS-101-10'	11-12-14	1405	G	S	3		X											MS/MSD
Dup-01 (111214)	11-12-14	0000	G	S	1		X											
Dup-02 (111214)	11-12-14	0001	G	S	1		X											
EB-02 (111214)	11-12-14	1500	G	W	2		X											

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold all 25' & 50' Samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

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TAL-0046-140 (0208)

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

ANALYTICAL REPORT

PROJECT NO. B0039310.0000.00001

Beazer-Morrisville NC

Lot #: H4L260401

David Bessingpas

ARCADIS U.S. Inc
6602 Excelsior Road
Baxter, MN 56425

TESTAMERICA LABORATORIES, INC.

Ryan Henry

Ryan Henry
Project Manager

January 16, 2015

ANALYTICAL METHODS SUMMARY

H4L260401

PARAMETER	ANALYTICAL METHOD
Dibenzodioxins and Dibenzofurans, HRGC/HRMS	SW846 8290
Percent Moisture	MCAWW 160.3 MOD

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

H4L260401

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
M5T23	001	SS-108-25'	11/12/14	09:10
M5T24	002	SS-110-25'	11/12/14	10:10
M5T25	003	SS-105-25'	11/12/14	11:00
M5T26	004	SS-103-25'	11/12/14	12:40
M5T27	005	SS-102-25'	11/12/14	13:30
M5T28	006	SS-101-25'	11/12/14	14:00

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All ealculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

PROJECT NARRATIVE
H4L260401

The results reported herein are applicable to the samples submitted for analysis only. If you have any questions about this report, please call (865) 291-3000 to speak with the TestAmerica project manager listed on the cover page.

This report shall not be reproduced except in full, without the written approval of the laboratory.

The original chain of custody documentation is included with this report.

Sample Receipt

There were no problems with the condition of the samples received.

Quality Control and Data Interpretation

Unless otherwise noted, all holding times and QC criteria were met and the test results shown in this report meet all applicable NELAC requirements.

For solid and sediments samples, when percent moisture is included in the report header field, the sample results are reported on a dry weight basis. When percent moisture is not contained in the header field, sample results are reported on an as received or wet weight basis.

All samples were extracted outside the method holding time as requested by the client.

Samples SS-108-25', SS-105-25', SS-103-25', SS-102-25' and SS-101-25' were post dilution spiked. The samples were extracted at 10g and based on screening results an appropriate amount of sample was removed and spiked with internal standards and processed. The post dilution spike amount is accounted for in the sample weight, e.g. 10g sample 30X dilution, 0.333g used as an initial weight.

Sample SS-110-25' is reported from two runs to bring all native analytes within the upper calibration range.

All samples exhibited native OCDD above the upper calibration range. The method does not require further action be taken; therefore, the results were reported as is with an "E" qualifier.

The following flags are used to qualify results for chlorinated dioxin and furan results:

J – The reported result is an estimate. The amount reported is below the Minimum Level (ML). The qualitative definition of the ML is "the lowest level at which the analytical system must give a reliable signal and an acceptable calibration point". The ML was introduced in EPA Methods 1624 and 1625 in 1980 and was promulgated in these methods in 1984 at 40 CFR Part 136, Appendix A. For the purposes of this report, the ML is qualitatively defined as described above, and quantitatively defined as follows:

Minimum Level: The concentration or mass of analyte in the sample that corresponds to the lowest calibration level in the initial calibration. It represents a concentration (in the

PROJECT NARRATIVE
H4L260401

sample extract) equivalent to that of the lowest calibration standard, after corrections for method-specified sample weights, volumes and cleanup procedures has been employed.

Example: The lowest calibration level for TCDD in the initial calibration is 0.5 pg/uL. A mass of 10 pg of 2,3,7,8-TCDD in the sample would result in a concentration of 0.5 pg/uL in the sample extract (at a final volume of 20 uL). Since the concentration in the sample extract corresponds to the concentration in the lowest calibration standard, the 10 pg mass in the sample components is the ML. If the sample extract is further diluted, the ML will increase by the dilution factor.

Example: A 1/10 dilution is performed on the sample extract described above. The ML for 2,3,7,8-TCDD becomes 100 pg rather than the default of 10 pg.

E – The reported result is an estimate. The amount reported is above the Upper Calibration Level (UCL) described below. The quantitative definition of the UCL is listed below:

Upper Calibration Level: The concentration or mass of analyte in the sample that corresponds to the highest calibration level in the initial calibration. It is equivalent to the concentration of the highest calibration standard, assuming that all method-specified sample weights, volumes, and cleanup procedures have been employed.

Example: The maximum calibration level for TCDD in the initial calibration is 200 pg/uL. A mass of 4000 pg of 2,3,7,8-TCDD in the sampling components would result in a concentration of 200 pg/uL in the sample extract (at a final volume of 20 uL). Since the concentration in the sample extract corresponds to the concentration in the highest calibration standard, the 4000 pg mass in the sample components is the UCL. If the sample extract is further diluted, the ML will increase by the dilution factor.

Example: A 1/10 dilution is performed on the sample extract described above. The UCL for 2,3,7,8-TCDD becomes 40,000 pg rather than the default of 4000 pg. In this example, all positive 2,3,7,8-TCDD results above 40,000 pg are flagged with an E.

B – The analyte is present in the associated method blank at a detectable level. For this analysis, there is no method specified reporting level other than the qualitative criterion that peaks must exhibit a signal-to-noise ratio of $\geq$2.5 to 1. Therefore, the presence of any reportable amount of the analyte in the blank will result in a B qualifier on all associated samples.

Q – Estimated maximum possible concentration. This qualifier is used when the result is generated from chromatographic data that does not meet all the qualitative criteria for a positive identification given in the method. These criteria include the following:

- Ion abundance ratios must be within specified limits (+/-15% of theoretical ion abundance ratio).
- Retention time criteria (relative to the method-specified isotope labeled retention time standard).
- Co-maximization criterion. The two quantitation ion peaks must reach their maxima within 2 seconds of each other.

PROJECT NARRATIVE
H4L260401

- Polychlorinated dibenzofuran purity. No peak can be identified as a polychlorinated dibenzofuran if a polychlorinated diphenyl ether peak maximizes within +/- 2 seconds of the furan candidate.

S – Ion suppression evident. The trace indicating the signal from the lock mass of the calibration compound shows a deflection at the retention time of the analyte. This may indicate a temporary suppression of the instrument sensitivity due to a matrix-borne interference.

C – Coeluting Isomer. The isomer is known to coelute with another member of its homologue group, or the peak shape is shouldered, indicating the likelihood of a coeluting isomer.

X – Other. See explanation in narrative.

Laboratory studies supporting risk assessment and Total Maximum Daily Load (TMDL) evaluations, frequently use qualified data reported as low as the Method Detection Limit (MDL), or the Estimated Detection Limit (EDL). Several of EPA's isotope dilution methods employ the EDL.[1,2,3] The EDL is based on a direct measurement of the signal-to-noise (S/N) ratio acquired during sample analysis. This S/N measurement is used to calculate the concentration in the sample corresponding to the minimum intensity of the smallest quantifiable peak. The EDL reflects the amount of the particular analyte which would be required to cause a positive result for the particular analysis. Because the S/N obtained covaries with recovery, instrument sensitivity and sample-specific cleanup efficacy, the EDL is a more valid measure of the sensitivity of the entire analytical process for the specific sample than is an MDL run periodically on a reference matrix.

The EDL is typically calculated according to the following equation:

$$\text{Estimated Detection Limit} = \frac{N \times 2.5 \times Qis}{His \times RRF \times W \times S}$$

Where:

N	=	peak to peak noise of quantitation ion signal in the region of the ion chromatogram where the compound of interest is expected to elute
His	=	peak height of quantitation ion for appropriate internal standard
Qis	=	ng of internal standard added to sample
RRF	=	mean relative response factor of compound obtained during initial calibration
W	=	amount of sample extracted (grams or liters)
S	=	percent solids (optional, if results are requested to be reported on dry weight basis)

(The area of the internal standard is sometimes used instead of height, along with an area-to-height conversion factor.)

This method of estimating the detection limit differs from the MDL in that it does not carry the requirement that the sample be statistically distinguished as being from a contaminated

PROJECT NARRATIVE
H4L260401

population. As results approach the EDL, the risk of false positives and the analytical uncertainty increase significantly. However, a low false positive well below the ML or MDL is often closer to the true value than an assumption that the target analyte is present at the detection or reporting limits. For relatively clean samples, MDL studies may give an elevated estimate of the detection limit. Additionally, on contaminated samples, the MDL may give a falsely low estimate of the detection limit.

$$\text{Analyte Concentration} = \frac{As \times Qis}{Ais \times RRF \times W \times S}$$

Where:

As	=	Sum of areas of the target peaks
Qis	=	ng of internal standard added to sample
Ais	=	Sum of areas of the internal standard peaks
RRF	=	mean relative response factor of compound obtained during initial calibration
W	=	amount of sample extracted (grams or liters)
S	=	percent solids (optional, if results are requested to be reported on dry weight basis)

In sample data, peaks must have an intensity of $\geq$2.5 times the height of the background noise in order to be considered. Careful examination of the two equations above reveals that for the concentration of the smallest peak detectable (per the EDL equation) to exactly equal the smallest peaks that are calculated, requires that the average height to area ratio obtained during the calibration must equal the area to height ratio for every peak obtained near 2.5 times the noise. When the area to height ratio on a peak in a sample is less than the average obtained during calibration, the calculated result will correspond to a peak that would have been less than 2.5 times the noise on the calibration. This is the result of normal variability. Because the source methods for the EDL (SW-846 8290 and 8280A) do not provide for censoring of results by any other magnitude standard than being 2.5 times the noise, the laboratory does not censor at the calculated EDL. Hence, detections may be reported below the estimated detection limits.

Footnotes:

1. Code of Federal Regulations, Part 136, Chapter 1, Appendix 1, October 1994: Method 1613 Tetra- Through Octa-Chlorinated Dioxins and Furans by Isotope Dilution High Resolution Gas Chromatography/High Resolution Mass Spectrometry.
2. U.S. EPA. Test Methods for Evaluating Solid Waste, Volume II, SW-846, Update III, December 1996. Method 8280A: The Analysis of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by High Resolution Gas Chromatography/Low Resolution Mass Spectrometry.
3. U.S. EPA. Test Methods for Evaluating Solid Waste, SW-846. Third Edition. March 1995 Method 8290: Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by High Resolution Gas Chromatography/High Resolution Mass Spectrometry.

CERTIFICATION SUMMARY

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Knoxville	L-A-B	DoD ELAP		L2311
TestAmerica Knoxville	Arkansas DEQ	State Program	6	88-0688
TestAmerica Knoxville	California	State Program	9	2423
TestAmerica Knoxville	Colorado	State Program	8	N/A
TestAmerica Knoxville	Connecticut	State Program	1	PH-0223
TestAmerica Knoxville	Florida	NELAC	4	E87177
TestAmerica Knoxville	Georgia	State Program	4	906
TestAmerica Knoxville	Hawaii	State Program	9	N/A
TestAmerica Knoxville	Indiana	State Program	5	C-TN-02
TestAmerica Knoxville	Iowa	State Program	7	375
TestAmerica Knoxville	Kansas	NELAC	7	E-10349
TestAmerica Knoxville	Kentucky	State Program	4	90101
TestAmerica Knoxville	Louisiana DOHH	State Program	6	LA110001
TestAmerica Knoxville	Louisiana DEQ	NELAC	6	83979
TestAmerica Knoxville	Maryland	State Program	3	277
TestAmerica Knoxville	Michigan	State Program	5	9933
TestAmerica Knoxville	Minnesota	NELAC	5	047-999-429
TestAmerica Knoxville	Nevada	State Program	9	TN00009
TestAmerica Knoxville	New Jersey	NELAC	2	TN001
TestAmerica Knoxville	New York	NELAC	2	10781
TestAmerica Knoxville	North Carolina DENR	State Program	4	64
TestAmerica Knoxville	North Carolina DHHS	State Program	4	21705
TestAmerica Knoxville	Ohio	OVAP	5	CL0059
TestAmerica Knoxville	Oklahoma	State Program	6	9415
TestAmerica Knoxville	Pennsylvania	NELAC	3	68-00576
TestAmerica Knoxville	South Carolina	State Program	4	84001
TestAmerica Knoxville	Tennessee	State Program	4	2014
TestAmerica Knoxville	Texas	NELAC	6	T104704380-TX
TestAmerica Knoxville	Federal	USDA		P330-11-00035
TestAmerica Knoxville	Utah	NELAC	8	QUAN3
TestAmerica Knoxville	Virginia	NELAC	3	460176
TestAmerica Knoxville	Virginia	State Program	3	165
TestAmerica Knoxville	Washington	State Program	10	C593
TestAmerica Knoxville	West Virginia DEP	State Program	3	345
TestAmerica Knoxville	West Virginia DHHR	State Program	3	9955C

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

Sample Data Summary

ARCADIS U.S. Inc

Sample ID: SS-108-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 001	**Work Order #....:**	M5T231AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	12
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.3367 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	89	Q J	340	6.2	ng/kg
1,2,3,7,8-PeCDD	780	J	1700	16	ng/kg
1,2,3,4,7,8-HxCDD	1500	Q J	1700	17	ng/kg
1,2,3,6,7,8-HxCDD	11000		1700	18	ng/kg
1,2,3,7,8,9-HxCDD	3300	C B	1700	17	ng/kg
1,2,3,4,6,7,8-HpCDD	300000	B	1700	45	ng/kg
OCDD	2600000	B E	3400	53	ng/kg
2,3,7,8-TCDF	28	Q J	340	12	ng/kg
1,2,3,7,8-PeCDF	93	Q J	1700	19	ng/kg
2,3,4,7,8-PeCDF	190	Q J	1700	19	ng/kg
1,2,3,4,7,8-HxCDF	2500	Q B	1700	16	ng/kg
1,2,3,6,7,8-HxCDF	5900	Q B	1700	15	ng/kg
2,3,4,6,7,8-HxCDF	ND		1700	16	ng/kg
1,2,3,7,8,9-HxCDF	110	Q J	1700	21	ng/kg
1,2,3,4,6,7,8-HpCDF	47000	B	1700	28	ng/kg
1,2,3,4,7,8,9-HpCDF	3100	Q B	1700	39	ng/kg
OCDF	180000	B	3400	30	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	86	40 - 135
13C-1,2,3,7,8-PeCDD	75	40 - 135
13C-1,2,3,4,7,8-HxCDD	86	40 - 135
13C-1,2,3,6,7,8-HxCDD	96	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	109	40 - 135
13C-OCDD	106	40 - 135
13C-2,3,7,8-TCDF	77	40 - 135
13C-1,2,3,7,8-PeCDF	86	40 - 135
13C-2,3,4,7,8-PeCDF	78	40 - 135
13C-1,2,3,4,7,8-HxCDF	93	40 - 135
13C-1,2,3,6,7,8-HxCDF	93	40 - 135
13C-2,3,4,6,7,8-HxCDF	91	40 - 135
13C-1,2,3,7,8,9-HxCDF	96	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	97	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	100	40 - 135
13C-OCDF	100	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-108-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 001	**Work Order #....:**	M5T231AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	12
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.3367 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-110-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 002	**Work Order #....:**	M5T241AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	13
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	12		11	0.50	ng/kg
1,2,3,7,8-PeCDD	150		57	0.90	ng/kg
1,2,3,4,7,8-HxCDD	300		57	0.66	ng/kg
1,2,3,6,7,8-HxCDD	1200		57	0.64	ng/kg
1,2,3,7,8,9-HxCDD	540	C B	57	0.61	ng/kg
OCDD	190000	B E	110	1.3	ng/kg
2,3,7,8-TCDF	1.8	Q J	11	0.36	ng/kg
1,2,3,7,8-PeCDF	21	Q J	57	0.82	ng/kg
2,3,4,7,8-PeCDF	26	Q J	57	0.76	ng/kg
1,2,3,4,7,8-HxCDF	280	Q B	57	0.41	ng/kg
1,2,3,6,7,8-HxCDF	850	Q B	57	0.42	ng/kg
2,3,4,6,7,8-HxCDF	160	Q	57	0.42	ng/kg
1,2,3,7,8,9-HxCDF	5.2	Q J	57	0.55	ng/kg
1,2,3,4,6,7,8-HpCDF	5500	B	57	0.71	ng/kg
1,2,3,4,7,8,9-HpCDF	410	B	57	1.2	ng/kg
OCDF	24000	Q B	110	1.0	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	78	40 - 135
13C-1,2,3,7,8-PeCDD	77	40 - 135
13C-1,2,3,4,7,8-HxCDD	85	40 - 135
13C-1,2,3,6,7,8-HxCDD	89	40 - 135
13C-OCDD	68	40 - 135
13C-2,3,7,8-TCDF	85	40 - 135
13C-1,2,3,7,8-PeCDF	84	40 - 135
13C-2,3,4,7,8-PeCDF	75	40 - 135
13C-1,2,3,4,7,8-HxCDF	89	40 - 135
13C-1,2,3,6,7,8-HxCDF	86	40 - 135
13C-2,3,4,6,7,8-HxCDF	89	40 - 135
13C-1,2,3,7,8,9-HxCDF	91	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	101	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	90	40 - 135
13C-OCDF	85	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-110-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 002	**Work Order #....:**	M5T241AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	13
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-110-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 002	**Work Order #....:**	M5T242AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	20
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	13
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,6,7,8-HpCDD	32000	B	110	2.9	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-1,2,3,4,6,7,8-HpCDD	95	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

ARCADIS U.S. Inc

Sample ID: SS-105-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 003	**Work Order #....:**	M5T251AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	23
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.3333 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	10	Q J	39	1.5	ng/kg
1,2,3,7,8-PeCDD	220		200	3.1	ng/kg
1,2,3,4,7,8-HxCDD	540		200	2.5	ng/kg
1,2,3,6,7,8-HxCDD	2000		200	2.5	ng/kg
1,2,3,7,8,9-HxCDD	1000	B	200	2.4	ng/kg
1,2,3,4,6,7,8-HpCDD	53000	B	200	10	ng/kg
OCDD	520000	B E	390	16	ng/kg
2,3,7,8-TCDF	8.0	Q J	39	1.6	ng/kg
1,2,3,7,8-PeCDF	35	J	200	4.3	ng/kg
2,3,4,7,8-PeCDF	41	Q J	200	4.1	ng/kg
1,2,3,4,7,8-HxCDF	510	Q B	200	2.7	ng/kg
1,2,3,6,7,8-HxCDF	1600	Q B	200	2.6	ng/kg
2,3,4,6,7,8-HxCDF	300		200	2.6	ng/kg
1,2,3,7,8,9-HxCDF	ND		200	3.1	ng/kg
1,2,3,4,6,7,8-HpCDF	11000	B	200	4.7	ng/kg
1,2,3,4,7,8,9-HpCDF	710	B	200	7.0	ng/kg
OCDF	40000	B	390	5.2	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	75	40 - 135
13C-1,2,3,7,8-PeCDD	74	40 - 135
13C-1,2,3,4,7,8-HxCDD	79	40 - 135
13C-1,2,3,6,7,8-HxCDD	81	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	85	40 - 135
13C-OCDD	69	40 - 135
13C-2,3,7,8-TCDF	76	40 - 135
13C-1,2,3,7,8-PeCDF	79	40 - 135
13C-2,3,4,7,8-PeCDF	76	40 - 135
13C-1,2,3,4,7,8-HxCDF	82	40 - 135
13C-1,2,3,6,7,8-HxCDF	76	40 - 135
13C-2,3,4,6,7,8-HxCDF	81	40 - 135
13C-1,2,3,7,8,9-HxCDF	86	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	82	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	85	40 - 135
13C-OCDF	75	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-105-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 003	**Work Order #....:**	M5T251AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	23
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.3333 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-103-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 004	Work Order #....:	M5T261AC	Matrix....:	SO
Date Sampled....:	11/12/14	Date Received....:	11/13/14	Dilution Factor:	5
Prep Date....:	01/07/15	Analysis Date....:	01/14/15	Percent Moisture	8.7
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.0286 g	Instrument ID....:	D2A	Method:	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	440	J	1900	48	ng/kg
1,2,3,7,8-PeCDD	9500	J	9600	110	ng/kg
1,2,3,4,7,8-HxCDD	23000		9600	190	ng/kg
1,2,3,6,7,8-HxCDD	64000		9600	160	ng/kg
1,2,3,7,8,9-HxCDD	43000	C B	9600	160	ng/kg
1,2,3,4,6,7,8-HpCDD	1700000	B	9600	310	ng/kg
OCDD	26000000	B E	19000	360	ng/kg
2,3,7,8-TCDF	270	Q J	1900	110	ng/kg
1,2,3,7,8-PeCDF	1800	Q J	9600	190	ng/kg
2,3,4,7,8-PeCDF	1600	Q J	9600	170	ng/kg
1,2,3,4,7,8-HxCDF	22000	Q B	9600	150	ng/kg
1,2,3,6,7,8-HxCDF	36000	Q B	9600	130	ng/kg
2,3,4,6,7,8-HxCDF	12000	Q	9600	140	ng/kg
1,2,3,7,8,9-HxCDF	ND		9600	180	ng/kg
1,2,3,4,6,7,8-HpCDF	290000	B	9600	210	ng/kg
1,2,3,4,7,8,9-HpCDF	22000	B	9600	350	ng/kg
OCDF	750000	B	19000	200	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	82	40 - 135
13C-1,2,3,7,8-PeCDD	67	40 - 135
13C-1,2,3,4,7,8-HxCDD	74	40 - 135
13C-1,2,3,6,7,8-HxCDD	93	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	99	40 - 135
13C-OCDD	102	40 - 135
13C-2,3,7,8-TCDF	79	40 - 135
13C-1,2,3,7,8-PeCDF	76	40 - 135
13C-2,3,4,7,8-PeCDF	74	40 - 135
13C-1,2,3,4,7,8-HxCDF	78	40 - 135
13C-1,2,3,6,7,8-HxCDF	86	40 - 135
13C-2,3,4,6,7,8-HxCDF	83	40 - 135
13C-1,2,3,7,8,9-HxCDF	89	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	90	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	92	40 - 135
13C-OCDF	94	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-103-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 004	**Work Order #....:**	M5T261AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	5
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	8.7
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.0286 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-102-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 005	Work Order #....:	M5T271AC	Matrix....:	SO
Date Sampled....:	11/12/14	Date Received....:	11/13/14	Dilution Factor:	10
Prep Date....:	01/07/15	Analysis Date....:	01/14/15	Percent Moisture	17
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.404 g	Instrument ID....:	D2A	Method:	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	210	J	300	23	ng/kg
1,2,3,7,8-PeCDD	3000		1500	26	ng/kg
1,2,3,4,7,8-HxCDD	7000		1500	23	ng/kg
1,2,3,6,7,8-HxCDD	16000		1500	26	ng/kg
1,2,3,7,8,9-HxCDD	13000	C B	1500	23	ng/kg
1,2,3,4,6,7,8-HpCDD	310000	B	1500	53	ng/kg
OCDD	2200000	B E	3000	56	ng/kg
2,3,7,8-TCDF	79	Q J	300	19	ng/kg
1,2,3,7,8-PeCDF	520	J	1500	31	ng/kg
2,3,4,7,8-PeCDF	600	J	1500	29	ng/kg
1,2,3,4,7,8-HxCDF	5400	Q B	1500	21	ng/kg
1,2,3,6,7,8-HxCDF	11000	Q B	1500	19	ng/kg
2,3,4,6,7,8-HxCDF	3800	Q	1500	22	ng/kg
1,2,3,7,8,9-HxCDF	ND		1500	26	ng/kg
1,2,3,4,6,7,8-HpCDF	77000	Q B	1500	29	ng/kg
1,2,3,4,7,8,9-HpCDF	3800	B	1500	44	ng/kg
OCDF	120000	Q B	3000	17	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	76	40 - 135
13C-1,2,3,7,8-PeCDD	67	40 - 135
13C-1,2,3,4,7,8-HxCDD	75	40 - 135
13C-1,2,3,6,7,8-HxCDD	78	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	104	40 - 135
13C-OCDD	104	40 - 135
13C-2,3,7,8-TCDF	68	40 - 135
13C-1,2,3,7,8-PeCDF	69	40 - 135
13C-2,3,4,7,8-PeCDF	69	40 - 135
13C-1,2,3,4,7,8-HxCDF	81	40 - 135
13C-1,2,3,6,7,8-HxCDF	78	40 - 135
13C-2,3,4,6,7,8-HxCDF	78	40 - 135
13C-1,2,3,7,8,9-HxCDF	85	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	88	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	85	40 - 135
13C-OCDF	93	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-102-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 005	**Work Order #....:**	M5T271AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	17
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.404 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-101-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 006	**Work Order #....:**	M5T281AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	20
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.6667 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	110	Q J	190	11	ng/kg
1,2,3,7,8-PeCDD	1800		940	13	ng/kg
1,2,3,4,7,8-HxCDD	3500		940	18	ng/kg
1,2,3,6,7,8-HxCDD	10000		940	19	ng/kg
1,2,3,7,8,9-HxCDD	5600	B	940	18	ng/kg
1,2,3,4,6,7,8-HpCDD	210000	B	940	28	ng/kg
OCDD	1600000	B E	1900	42	ng/kg
2,3,7,8-TCDF	88	J	190	10	ng/kg
1,2,3,7,8-PeCDF	220	Q J	940	20	ng/kg
2,3,4,7,8-PeCDF	260	J	940	18	ng/kg
1,2,3,4,7,8-HxCDF	2900	B Q	940	11	ng/kg
1,2,3,6,7,8-HxCDF	7200	B Q	940	11	ng/kg
2,3,4,6,7,8-HxCDF	810	Q J	940	10	ng/kg
1,2,3,7,8,9-HxCDF	ND		940	15	ng/kg
1,2,3,4,6,7,8-HpCDF	41000	B	940	18	ng/kg
1,2,3,4,7,8,9-HpCDF	3000	B	940	31	ng/kg
OCDF	130000	B	1900	35	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	77	40 - 135
13C-1,2,3,7,8-PeCDD	74	40 - 135
13C-1,2,3,4,7,8-HxCDD	78	40 - 135
13C-1,2,3,6,7,8-HxCDD	91	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	110	40 - 135
13C-OCDD	99	40 - 135
13C-2,3,7,8-TCDF	79	40 - 135
13C-1,2,3,7,8-PeCDF	79	40 - 135
13C-2,3,4,7,8-PeCDF	79	40 - 135
13C-1,2,3,4,7,8-HxCDF	89	40 - 135
13C-1,2,3,6,7,8-HxCDF	85	40 - 135
13C-2,3,4,6,7,8-HxCDF	95	40 - 135
13C-1,2,3,7,8,9-HxCDF	89	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	99	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	89	40 - 135
13C-OCDF	103	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-101-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 006	**Work Order #....:**	M5T281AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	20
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.6667 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range,

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Method Blank Report

Trace Level Organic Compounds

Lot - Sample #....:	H5A070000 - 032B	**Work Order #....:**	M5WEP1AA	**Matrix....:**	SOLID
Dilution Factor:	1				
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture:**	0.0
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND		1.0	0.0029	ng/kg
1,2,3,7,8-PeCDD	ND		5.0	0.0042	ng/kg
1,2,3,4,7,8-HxCDD	ND		5.0	0.017	ng/kg
1,2,3,6,7,8-HxCDD	ND		5.0	0.017	ng/kg
1,2,3,7,8,9-HxCDD	**0.10**	**Q J**	**5.0**	**0.016**	**ng/kg**
1,2,3,4,6,7,8-HpCDD	**1.8**	**J**	**5.0**	**0.017**	**ng/kg**
OCDD	**13**		**10**	**0.011**	**ng/kg**
2,3,7,8-TCDF	ND		1.0	0.0030	ng/kg
1,2,3,7,8-PeCDF	ND		5.0	0.0088	ng/kg
2,3,4,7,8-PeCDF	ND		5.0	0.0087	ng/kg
1,2,3,4,7,8-HxCDF	**0.059**	**J**	**5.0**	**0.0081**	**ng/kg**
1,2,3,6,7,8-HxCDF	**0.073**	**Q J**	**5.0**	**0.0077**	**ng/kg**
2,3,4,6,7,8-HxCDF	ND		5.0	0.0081	ng/kg
1,2,3,7,8,9-HxCDF	ND		5.0	0.0090	ng/kg
1,2,3,4,6,7,8-HpCDF	**0.38**	**Q J**	**5.0**	**0.010**	**ng/kg**
1,2,3,4,7,8,9-HpCDF	**0.067**	**Q J**	**5.0**	**0.016**	**ng/kg**
OCDF	**1.8**	**Q J**	**10**	**0.0087**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	84	40 - 135
13C-1,2,3,7,8-PeCDD	81	40 - 135
13C-1,2,3,4,7,8-HxCDD	84	40 - 135
13C-1,2,3,6,7,8-HxCDD	83	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	84	40 - 135
13C-OCDD	71	40 - 135
13C-2,3,7,8-TCDF	80	40 - 135
13C-1,2,3,7,8-PeCDF	87	40 - 135
13C-2,3,4,7,8-PeCDF	80	40 - 135
13C-1,2,3,4,7,8-HxCDF	87	40 - 135
13C-1,2,3,6,7,8-HxCDF	81	40 - 135
13C-2,3,4,6,7,8-HxCDF	85	40 - 135
13C-1,2,3,7,8,9-HxCDF	92	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	87	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	86	40 - 135
13C-OCDF	65	40 - 135

Method Blank Report

Trace Level Organic Compounds

Lot - Sample #....:	H5A070000 - 032B	**Work Order #....:**	M5WEP1AA	**Matrix....:**	SOLID
Dilution Factor:	1				
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture:**	0.0
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

QUALIFIERS

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Client Lot # ...:	H4L260401	**Work Order # ...:**	M5WEP1AC-LCS	**Matrix .....:**	SOLID
LCS Lot-Sample# :	H5A070000 - 032				
Prep Date .....:	01/07/15	**Analysis Date ..:**	01/13/15		
Prep Batch # ...:	5007032				
Dilution Factor :	1				
Analyst ID.....:	Linda K. McWhirter	**Instrument ID..:**	D2A	**Method.....:**	SW846 8290
Initial Wgt/Vol:	10 g				

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY		RECOVERY LIMITS
2,3,7,8-TCDD	**20.0**	**22.7**	**ng/kg**	**113**		**(79 - 129)**
1,2,3,7,8-PeCDD	**100**	**112**	**ng/kg**	**112**		**(79 - 129)**
1,2,3,4,7,8-HxCDD	**100**	**106**	**ng/kg**	**106**		**(73 - 123)**
1,2,3,6,7,8-HxCDD	**100**	**103**	**ng/kg**	**103**		**(74 - 124)**
1,2,3,7,8,9-HxCDD	**100**	**109**	**ng/kg**	**109**	**B**	**(70 - 124)**
1,2,3,4,6,7,8-HpCDD	**100**	**101**	**ng/kg**	**101**	**B**	**(73 - 123)**
OCDD	**200**	**190**	**ng/kg**	**95**	**B**	**(75 - 125)**
2,3,7,8-TCDF	**20.0**	**19.8**	**ng/kg**	**99**		**(75 - 125)**
1,2,3,7,8-PeCDF	**100**	**101**	**ng/kg**	**101**		**(74 - 124)**
2,3,4,7,8-PeCDF	**100**	**106**	**ng/kg**	**106**		**(75 - 125)**
1,2,3,4,7,8-HxCDF	**100**	**95.2**	**ng/kg**	**95**	**B**	**(75 - 125)**
1,2,3,6,7,8-HxCDF	**100**	**102**	**ng/kg**	**102**	**B**	**(76 - 126)**
2,3,4,6,7,8-HxCDF	**100**	**101**	**ng/kg**	**101**		**(76 - 126)**
1,2,3,7,8,9-HxCDF	**100**	**98.7**	**ng/kg**	**99**		**(77 - 127)**
1,2,3,4,6,7,8-HpCDF	**100**	**93.6**	**ng/kg**	**94**	**B**	**(77 - 127)**
1,2,3,4,7,8,9-HpCDF	**100**	**102**	**ng/kg**	**102**	**B**	**(73 - 123)**
OCDF	**200**	**207**	**ng/kg**	**104**	**B**	**(49 - 128)**

INTERNAL STANDARD	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	73	(40 - 135)
13C-1,2,3,7,8-PeCDD	71	(40 - 135)
13C-1,2,3,4,7,8-HxCDD	79	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	77	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	85	(40 - 135)
13C-OCDD	71	(40 - 135)
13C-2,3,7,8-TCDF	74	(40 - 135)
13C-1,2,3,7,8-PeCDF	78	(40 - 135)
13C-2,3,4,7,8-PeCDF	72	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	82	(40 - 135)
13C-1,2,3,6,7,8-HxCDF	75	(40 - 135)
13C-2,3,4,6,7,8-HxCDF	77	(40 - 135)
13C-1,2,3,7,8,9-HxCDF	82	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	85	(40 - 135)
13C-1,2,3,4,7,8,9-HpCDF	81	(40 - 135)
13C-OCDF	64	(40 - 135)

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Notes:

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Sample Receipt Documentation

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

H4L260407 ~~H4K130105~~ RH 12-24-14

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessingpas	Site Contact:	COC Record 1 of 4
Company Name ARCADIS	Tel/Mobile: 218 829 4607	Lab Contact: / Carrier:	COC No: 04746
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter, MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? (Y) N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: 2 coolers
Project Name/Number: B0039310.0050.0000	☒ 2 weeks		Temperature: RT 0.2, 0.1, CT 0.1, 0.0 deg C
Site: Beazer-Morrisville NC	☐ 1 week		Shipper: ✓ FedEx __UPS __Other:
PO#	☐ 2 days		Tracking Number: 605780793691 m
Sampled by: D. Rhodes / R. Sams	☐ 1 day		Recorded by: BKD Date: 11-13-14

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans-8290	Sample Specific Notes:
EB-01 (111214)	11-12-14	0805	G	WS	2		X	Equipment blank - DI water
SS-109-10'	11-12-14	0830	G	S	1		X	
SS-109-25'	11-12-14	0840	G	S	1		X	
SS-109-50'	11-12-14	0850	G	S	1		X	
SS-108-10'	11-12-14	0900	G	S	1		X	
SS-108-25'	11-12-14	0910	G	S	1		X	
SS-108-50'	11-12-14	0920	G	S	1		X	
SS-107-10'	11-12-14	0940	G	S	1		X	

003

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:
Hold all 25' and 50' Samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1510	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (9208)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

~~HHK130105~~ RH 12-24-14 HYL260401

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessinger	Site Contact:	COC Record 2 of 4
Company Name: ARCADIS	Tel/Mobile: 218-829 4607	Lab Contact: / Carrier:	COC No: 04747
Address: 6602 Excelsior Rd.	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip: Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone: 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer-Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
PO#	☐ 2 days		Tracking Number:
Sampled by: D. Hughes / R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans-8290	Sample Specific Notes:
SS-107-25' /	11-12-14	0950	G	S	1		X	MS/MSD
SS-107-39'	11-12-14	1000	G	S	1		X	
SS-110-10'	11-12-14	1005	G	S	1		X	
006 SS-110-25' / /	11-12-14	1010	G	S	1		X	
SS-110-50' /	11-12-14	1020	G	S	1		X	
SS-105-10'	11-12-14	1050	G	S	1		X	
008 SS-105-25' / /	11-12-14	1100	G	S	1		X	
SS-105-50' /	11-12-14	1115	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold all 25' & 50' samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0208)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

Chain of Custody Record

~~HHK130115~~ RH 12-24-14 H4L210401

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessingpas	Site Contact:	COC Record 3 of 4
Company Name: ARCADIS	Tel/Mobile: 218-829 4607	Lab Contact: / Carrier:	COC No: 04749
Address: 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip: Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone: 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer - Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
P O #	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes / R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans - 8290	Sample Specific Notes:
SS-106-10'	11-12-14	1125	G	S	1		X	
SS-106-25'	11-12-14	1130	G	S	1		X	
SS-103-10'	11-12-14	1230	G	S	1		X	
SS-103-25'	11-12-14	1240	G	S	1		X	
SS-103-50'	11-12-14	1245	G	S	1		X	
SS-104-25'	11-12-14	1255	G	S	1		X	
SS-104-10'	11-12-14	1300	G	S	1		X	
SS-102-10'	11-12-14	1320	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold all 25' & 50' samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:10
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0208)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

~~HHK130405~~ HML260401
RH 12-24-14

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessinger	Site Contact:	COC Record 4 of 4
Company Name ARCADIS	Tel/Mobile: 218 829 4607	Lab Contact: / Carrier:	COC No: 04748
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer - Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
P O #	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes / R. Sams	☐ 1 day		Recorded by: _____ Date: _____

	Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Diluvs/Mrcurs-8270	Sample Specific Notes:
01H	SS-102-25' / /	11-12-14	1330	G	S	1		X	
	SS-102-50' /	11-12-14	1340	G	S	1		X	
	SS-101-50' /	11-12-14	1350	G	S	1		X	
01	SS-101-25' / /	11-12-14	1400	G	S	1		X	
	SS-101-10'	11-12-14	1405	G	S	3		X	MS/MSD
	Dup-01 (111214)	11-12-14	0000	G	S	1		X	
	Dup-02 (111214)	11-12-14	0001	G	S	1		X	
	EB-02 (111214)	11-12-14	1500	G	W	2		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold all 25' & 50' Samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1510	[signature]	12-12-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0208)

TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Lot Number: ~~H4A3145~~ H4226040 1

RH 12-24-14

Review Items	Yes	No	NA	If No, what was the problem?
1. Do sample container labels match COC? (IDs, Dates, Times)	✓			☐ **1a** Do not match COC ☐ **1b** Incomplete information ☐ **1c** Marking smeared ☐ **1d** Label torn ☐ **1e** No label ☐ **1f** COC not received ☐ **1g** Other:
2. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID : 5657 Correction factor: -0.1	✓			☐ **2a** Temp Blank = _____ ☐ **2b** Cooler Temp = _____ ☐ **2c** Cooling initiated for recently collected samples, ice present.
3. Were samples received with correct chemical preservative (excluding Encore)?			✓	☐ **3a** See box 3A for pH Preservation ☐ **3b** Other:
4. Were custody seals present/intact on cooler and/or containers?	✓			☐ **4a** Not present ☐ **4b** Not intact ☐ **4c** Other:
5. Were all of the samples listed on the COC received?	✓			☐ **5a** Samples received-not on COC ☐ **5b** Samples not received-on COC
6. Were all of the sample containers received intact?	✓			☐ **6a** Leaking ☐ **6b** Broken
7. Were VOA samples received without headspace?		✓	✓	☐ **7a** Headspace (VOA only)
8. Were samples received in appropriate containers?	✓			☐ **8a** Improper container
9. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			✓	☐ **9a** Could not be determined due to matrix interference
10. Were samples received within holding time?	✓			☐ **10a** Holding time expired
11. For rad samples, was sample activity info. provided?			✓	☐ Incomplete information
12. For 1613B water samples is pH<9?			✓	If no, was pH adjusted to pH 7 - 9 with sulfuric acid? _____
13. Are the shipping containers intact?	✓			☐ **13a** Leaking ☐ **13b** Other:
14. Was COC relinquished? (Signed/Dated/Timed)	✓			☐ **14a** Not relinquished
15. Are tests/parameters listed for each sample?	✓			☐ **15a** Incomplete information
16. Is the matrix of the samples noted?	✓			☐ **15a** Incomplete information
17. Is the date/time of sample collection noted?	✓			☐ **15a** Incomplete information
18. Is the client and project name/# identified?	✓			☐ **15a** Incomplete information
19. Was the sampler identified on the COC?	✓			☐ **19a** Other

Comments/Actions Taken

pH test strip lot number: _____

	Box 3A: pH Preservation	Box 9A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Quote #: 91874 PM Instructions: NA

Sample Receiving Associate: [signature] Date: 11-13-14

QA026R28.doc, 042414

Imagine the result

Beazer East, Inc.

Koppers Company Inc. Superfund Site

Data Review

MORRISVILLE, NORTH CAROLINA

DIOXIN ANALYSES

SDG #H4L260401

Analyses Performed By:
TestAmerica Laboratories
Knoxville, Tennessee

Report #23240R
Review Level: Tier III
Project: B0039310.0000.00003

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #H4L260401 for samples collected in association with the Koppers Company Inc. Superfund Site Investigation. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis	
					Dioxins/ Furans	MISC
SS-108-25'	H4L260401001	Soil	11/12/2014		X	
SS-110-25'	H4L260401002	Soil	11/12/2014		X	
SS-105-25'	H4L260401003	Soil	11/12/2014		X	
SS-103-25'	H4L260401004	Soil	11/12/2014		X	
SS-102-25'	H4L260401005	Soil	11/12/2014		X	
SS-101-25'	H4L260401006	Soil	11/12/2014		X	

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8290. Data were reviewed in accordance with USEPA's *Guidance on Environmental Data Verification and Data Validation* (USEPA, 2002), the *USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review* (USEPA, 2011), and the USEPA Region 4 Data Validation Standard Operating Procedures for Chlorinated Dioxin/Furan Analysis by High Resolution Gas Chromatography/High Resolution Mass Spectrometry (USEPA, 2014b).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

R The sample results are rejected as unusable. The analyte may or may not be present in the sample.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

POLYCHLORINATED DIBENZODIOXINS AND POLYCHLORINATED DIBENZOFURANS (PCDD/PCDF) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8290	Water	None for collection to extraction and 45 days from extraction to analysis	Cool to <6 °C
	Soil	None for collection to extraction and 45 days from extraction to analysis	Cool to <6 °C

Note: In accordance with USEPA Region 4 guidelines, if samples are stored properly, the holding times for extraction/preparation are up to one year. Aqueous, solid, and semi-solid samples should be stored in the dark at 6 °C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks (RBs) measure contamination of samples during field operations. Note per the USEPA Region 4 guidelines, the RBs will not be used for data qualification.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were detected in the associated QA blanks; however, the associated sample results were greater than the BAL and/or were non-detect. Therefore, sample results greater than the BAL resulted in the removal of the laboratory qualifier (B). No other qualification of the sample results was required.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the daily instrument performance is satisfactory.

4.1 Initial Calibration

A maximum relative standard deviation (RSD) of 20% is allowed for all non-labeled compounds (target) and 30% is allowed for all labeled compounds (internal standards and recovery standards).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit percent difference (%D) less than the control limit (20%).

All calibration criteria were within the control limits.

5. Internal Standard Performance

Internal standard performance criteria ensure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require that the internal standard compounds exhibit recoveries within the control limits of 40% to 135%.

The internal standards exhibited responses within control limits.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed on a sample location within this SDG.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices and 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the Reporting Limit (RL), a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

The field duplicate analysis was not performed on a sample location within this SDG.

9. Compound Identification

Note: The laboratory flagged isomer 1,2,3,7,8,9-HxCDD in sample locations SS-108-25', SS-110-25, 'SS-103-25', and SS-102-25' as “C” for compounds which exhibited co-eluting isomers. The associated isomers were flagged as estimated.

PCDD/PCDF compounds are identified by using the compound’s ion abundance ratios, signal-to-noise ratios, and retention times relative to the internal standards.

An estimated maximum possible concentration (EMPC) designation is given to compounds which have signals eluting within the established retention time window which would, if positively identified, be greater than the detection limit. The signals do not, however, meet the ion abundance ratio criteria and cannot be identified as the compound of interest. The EMPC value is the estimated concentration of the interferant quantitated "as the compound of interest.” This value should be considered an elevated detection limit based on potential compound identification and quantitation interference. The laboratory qualified EMPC values with a “Q”. The qualifier UX has been added to the sample results to indicate the elevated detection limit as EMPC.

Sample ID	Compound	Laboratory Result	Reported Result
SS-108-25'	2,3,7,8-TCDD	89 QJ	89 UX
	1,2,3,4,7,8-HxCDD	1500 QJ	1500 UX
	2,3,7,8-TCDF	28 QJ	28 UX
	1,2,3,7,8-PeCDF	93 QJ	93 UX
	2,3,4,7,8-PeCDF	190 QJ	190 UX
	1,2,3,4,7,8-HxCDF	2500 QB	2500 UX
	1,2,3,6,7,8-HxCDF	5900 QB	5900 UX
	1,2,3,7,8,9-HxCDF	110 QJ	110 UX
	1,2,3,,4,7,8,9-HpCDF	3100 QB	3100 UX
SS-110-25'	2,3,7,8-TCDF	1.8 QJ	1.8 UX
	1,2,3,7,8-PeCDF	21 QJ	21 UX
	2,3,4,7,8-PeCDF	26 QJ	26 UX
	1,2,3,4,7,8-HxCDF	280 QB	280 UX
	1,2,3,6,7,8-HxCDF	850 QB	850 UX
	2,3,4,6,7,8-HxCDF	160 Q	160 UX
	1,2,3,7,8,9-HxCDF	5.2 QJ	5.2 UX
	OCDF	24000 QB	24000 UX
SS-105-25'	2,3,7,8-TCDD	10 QJ	10 UX
	2,3,7,8-TCDF	8.0 QJ	8.0 UX
	2,3,4,7,8-PeCDF	41 QJ	41 UX
	1,2,3,4,7,8-HxCDF	510 QJ	510 UX
	1,2,3,6,7,8-HxCDF	1600 QJ	1600 UX
SS-103-25'	2,3,7,8-TCDF	270 QJ	270 UX
	1,2,3,7,8-PeCDF	1800 QJ	1800 UX
	2,3,4,7,8-PeCDF	1600 QJ	1600 UX
	1,2,3,4,7,8-HxCDF	22000 QJ	22000 UX

Sample ID	Compound	Laboratory Result	Reported Result
	1,2,3,6,7,8-HxCDF	36000 QJ	36000 UX
	2,3,4,6,7,8-HxCDF	12000 QJ	12000 UX
SS-102-25'	2,3,7,8-TCDF	79 QJ	79 UX
	1,2,3,4,7,8-HxCDF	5400 QB	5400 UX
	1,2,3,6,7,8-HxCDF	11000 QB	11000 UX
	2,3,4,6,7,8-HxCDF	3800 Q	3800 UX
	1,2,3,4,6,7,8-HpCDF	77000 QB	77000 UX
	OCDF	120000 QB	120000 UX
SS-101-25'	2,3,7,8-TCDD	110 QJ	110 UX
	1,2,3,7,8-PeCDF	220 QJ	220 UX
	1,2,3,4,7,8-HxCDF	2900 QB	2900 UX
	1,2,3,6,7,8-HxCDF	7200 QB	7200 UX
	2,3,4,6,7,8-HxCDF	810 QJ	810 UX

Sample results associated with compound that exhibited a concentration greater than the linear range of the instrument calibration are summarized in the following table.

Sample ID	Compound	Original Analysis	Diluted Analysis	Reported Analysis
SS-108-25'	OCDD	2600000 E	--	2600000 EJ
SS-110-25'	1,2,3,4,6,7,8-HpCDD	--	32000 D	
	OCDD	190000 E	--	190000 EJ
SS-105-25'	OCDD	520000 E	--	520000 EJ
SS-103-25'	OCDD	26000000 E	--	26000000 EJ
SS-102-25'	OCDD	2200000 E	--	2200000 EJ
SS-101-25'	OCDD	1600000 E	--	1600000 EJ

Note: In the instance where both the original analysis and the diluted analysis sample results exhibited a concentration greater than or less than the calibration linear range of the instrument, the sample result exhibiting the greatest concentration will be reported as the final result.

Sample results associated with compounds exhibiting concentration greater than the linear range qualified as documented in the table below when reported as the final reported sample result.

Reported Sample Results	Qualification
Diluted sample result within calibration range	D
Diluted sample result less than the calibration range	DJ
Diluted sample result greater than the calibration range	EDJ
Original sample result greater than the calibration range	EJ

10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR PCDD/PCDF

PCDDs/PCDFs; SW-846 8290	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
HIGH-RESOLUTION GAS CHROMATOGRAPHY/HIGH-RESOLUTION MASS SPECTROMETRY (HRGC/HRMS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks					X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) %R					X
Matrix Spike Duplicate(MSD) %R					X
MS/MSD Precision (RPD)					X
Field/Lab Duplicate (RPD)					X
Dilution Factor		X		X	
Moisture Content		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Signal-to-noise ratio $\geq$ 10:1		X		X	
Internal standard performance		X		X	
Recovery standard performance		X		X	
Resolution mix $\leq$ 25%		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	

PCDDs/PCDFs; SW-846 8290	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
HIGH-RESOLUTION GAS CHROMATOGRAPHY/HIGH-RESOLUTION MASS SPECTROMETRY (HRGC/HRMS)					
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference, %D – difference

VALIDATION PERFORMED BY: Todd Church

SIGNATURE:

DATE: March 6, 2015

PEER REVIEW: Dennis Capria

DATE: March 10, 2015

CHAIN OF CUSTODY/
CORRECTED SAMPLE ANALYSIS DATA SHEETS

ARCADIS U.S. Inc

Sample ID: SS-108-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 001	**Work Order #....:**	M5T231AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	12
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.3367 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	89	~~Q J~~ UX	340	6.2	ng/kg
1,2,3,7,8-PeCDD	780	J	1700	16	ng/kg
1,2,3,4,7,8-HxCDD	1500	~~Q J~~ UX	1700	17	ng/kg
1,2,3,6,7,8-HxCDD	11000		1700	18	ng/kg
1,2,3,7,8,9-HxCDD	3300	~~C B~~ J	1700	17	ng/kg
1,2,3,4,6,7,8-HpCDD	300000	~~B~~	1700	45	ng/kg
OCDD	2600000	~~B~~ E J	3400	53	ng/kg
2,3,7,8-TCDF	28	~~Q J~~ UX	340	12	ng/kg
1,2,3,7,8-PeCDF	93	~~Q J~~ UX	1700	19	ng/kg
2,3,4,7,8-PeCDF	190	~~Q J~~ UX	1700	19	ng/kg
1,2,3,4,7,8-HxCDF	2500	~~Q B~~ UX	1700	16	ng/kg
1,2,3,6,7,8-HxCDF	5900	~~Q B~~ UX	1700	15	ng/kg
2,3,4,6,7,8-HxCDF	ND		1700	16	ng/kg
1,2,3,7,8,9-HxCDF	110	~~Q J~~ UX	1700	21	ng/kg
1,2,3,4,6,7,8-HpCDF	47000	~~B~~	1700	28	ng/kg
1,2,3,4,7,8,9-HpCDF	3100	~~Q B~~ UX	1700	39	ng/kg
OCDF	180000	~~B~~	3400	30	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	86	40 - 135
13C-1,2,3,7,8-PeCDD	75	40 - 135
13C-1,2,3,4,7,8-HxCDD	86	40 - 135
13C-1,2,3,6,7,8-HxCDD	96	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	109	40 - 135
13C-OCDD	106	40 - 135
13C-2,3,7,8-TCDF	77	40 - 135
13C-1,2,3,7,8-PeCDF	86	40 - 135
13C-2,3,4,7,8-PeCDF	78	40 - 135
13C-1,2,3,4,7,8-HxCDF	93	40 - 135
13C-1,2,3,6,7,8-HxCDF	93	40 - 135
13C-2,3,4,6,7,8-HxCDF	91	40 - 135
13C-1,2,3,7,8,9-HxCDF	96	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	97	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	100	40 - 135
13C-OCDF	100	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-108-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 001	**Work Order #....:**	M5T231AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	12
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.3367 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers

J = Estimated value

UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-110-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 002	**Work Order #....:**	M5T241AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	13
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	12		11	0.50	ng/kg
1,2,3,7,8-PeCDD	150		57	0.90	ng/kg
1,2,3,4,7,8-HxCDD	300		57	0.66	ng/kg
1,2,3,6,7,8-HxCDD	1200		57	0.64	ng/kg
1,2,3,7,8,9-HxCDD	540	~~C B~~ J	57	0.61	ng/kg
OCDD	190000	~~B~~ E J	110	1.3	ng/kg
2,3,7,8-TCDF	1.8	~~Q J~~ UX	11	0.36	ng/kg
1,2,3,7,8-PeCDF	21	~~Q J~~	57	0.82	ng/kg
2,3,4,7,8-PeCDF	26	~~Q J~~	57	0.76	ng/kg
1,2,3,4,7,8-HxCDF	280	~~Q B~~	57	0.41	ng/kg
1,2,3,6,7,8-HxCDF	850	~~Q B~~	57	0.42	ng/kg
2,3,4,6,7,8-HxCDF	160	~~Q~~	57	0.42	ng/kg
1,2,3,7,8,9-HxCDF	5.2	~~Q J~~ UX	57	0.55	ng/kg
1,2,3,4,6,7,8-HpCDF	5500	~~B~~	57	0.71	ng/kg
1,2,3,4,7,8,9-HpCDF	410	~~B~~	57	1.2	ng/kg
OCDF	24000	~~Q B~~ UX	110	1.0	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	78	40 - 135
13C-1,2,3,7,8-PeCDD	77	40 - 135
13C-1,2,3,4,7,8-HxCDD	85	40 - 135
13C-1,2,3,6,7,8-HxCDD	89	40 - 135
13C-OCDD	68	40 - 135
13C-2,3,7,8-TCDF	85	40 - 135
13C-1,2,3,7,8-PeCDF	84	40 - 135
13C-2,3,4,7,8-PeCDF	75	40 - 135
13C-1,2,3,4,7,8-HxCDF	89	40 - 135
13C-1,2,3,6,7,8-HxCDF	86	40 - 135
13C-2,3,4,6,7,8-HxCDF	89	40 - 135
13C-1,2,3,7,8,9-HxCDF	91	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	101	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	90	40 - 135
13C-OCDF	85	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-110-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 002	**Work Order #....:**	M5T241AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	13
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
C	Co-eluting isomer.
E	Estimated result. Result concentration exceeds the calibration range.
J	Estimated Result.
Q	Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
J = Estimated value
UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-110-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 002	**Work Order #....:**	M5T242AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	20
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	13
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	10.1 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT	MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,6,7,8-HpCDD	32000 ~~B~~ D	110	2.9	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-1,2,3,4,6,7,8-HpCDD	95	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Data Validation Qualifiers

D = Concentration is based on a diluted sample analysis

ARCADIS U.S. Inc

Sample ID: SS-105-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 003	**Work Order #....:**	M5T251AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	23
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.3333 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	10	~~Q J~~ UX	39	1.5	ng/kg
1,2,3,7,8-PeCDD	220		200	3.1	ng/kg
1,2,3,4,7,8-HxCDD	540		200	2.5	ng/kg
1,2,3,6,7,8-HxCDD	2000		200	2.5	ng/kg
1,2,3,7,8,9-HxCDD	1000	~~B~~	200	2.4	ng/kg
1,2,3,4,6,7,8-HpCDD	53000	~~B~~	200	10	ng/kg
OCDD	520000	~~B~~ E J	390	16	ng/kg
2,3,7,8-TCDF	8.0	~~Q J~~ UX	39	1.6	ng/kg
1,2,3,7,8-PeCDF	35	J	200	4.3	ng/kg
2,3,4,7,8-PeCDF	41	~~Q J~~ UX	200	4.1	ng/kg
1,2,3,4,7,8-HxCDF	510	~~Q B~~ UX	200	2.7	ng/kg
1,2,3,6,7,8-HxCDF	1600	~~Q B~~ UX	200	2.6	ng/kg
2,3,4,6,7,8-HxCDF	300		200	2.6	ng/kg
1,2,3,7,8,9-HxCDF	ND		200	3.1	ng/kg
1,2,3,4,6,7,8-HpCDF	11000	~~B~~	200	4.7	ng/kg
1,2,3,4,7,8,9-HpCDF	710	~~B~~	200	7.0	ng/kg
OCDF	40000	~~B~~	390	5.2	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	75	40 - 135
13C-1,2,3,7,8-PeCDD	74	40 - 135
13C-1,2,3,4,7,8-HxCDD	79	40 - 135
13C-1,2,3,6,7,8-HxCDD	81	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	85	40 - 135
13C-OCDD	69	40 - 135
13C-2,3,7,8-TCDF	76	40 - 135
13C-1,2,3,7,8-PeCDF	79	40 - 135
13C-2,3,4,7,8-PeCDF	76	40 - 135
13C-1,2,3,4,7,8-HxCDF	82	40 - 135
13C-1,2,3,6,7,8-HxCDF	76	40 - 135
13C-2,3,4,6,7,8-HxCDF	81	40 - 135
13C-1,2,3,7,8,9-HxCDF	86	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	82	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	85	40 - 135
13C-OCDF	75	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-105-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 003	**Work Order #....:**	M5T251AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	1
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	23
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.3333 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
J = Estimated value
UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-103-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 004	**Work Order #....:**	M5T261AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	5
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	8.7
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.0286 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	440	J	1900	48	ng/kg
1,2,3,7,8-PeCDD	9500	J	9600	110	ng/kg
1,2,3,4,7,8-HxCDD	23000		9600	190	ng/kg
1,2,3,6,7,8-HxCDD	64000		9600	160	ng/kg
1,2,3,7,8,9-HxCDD	43000	~~C B~~ J	9600	160	ng/kg
1,2,3,4,6,7,8-HpCDD	1700000	~~B~~	9600	310	ng/kg
OCDD	26000000	~~B~~ E J	19000	360	ng/kg
2,3,7,8-TCDF	270	~~Q J~~ UX	1900	110	ng/kg
1,2,3,7,8-PeCDF	1800	~~Q J~~	9600	190	ng/kg
2,3,4,7,8-PeCDF	1600	~~Q J~~	9600	170	ng/kg
1,2,3,4,7,8-HxCDF	22000	~~Q B~~	9600	150	ng/kg
1,2,3,6,7,8-HxCDF	36000	~~Q B~~	9600	130	ng/kg
2,3,4,6,7,8-HxCDF	12000	~~Q~~	9600	140	ng/kg
1,2,3,7,8,9-HxCDF	ND		9600	180	ng/kg
1,2,3,4,6,7,8-HpCDF	290000	~~B~~	9600	210	ng/kg
1,2,3,4,7,8,9-HpCDF	22000	~~B~~	9600	350	ng/kg
OCDF	750000	~~B~~	19000	200	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	82	40 - 135
13C-1,2,3,7,8-PeCDD	67	40 - 135
13C-1,2,3,4,7,8-HxCDD	74	40 - 135
13C-1,2,3,6,7,8-HxCDD	93	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	99	40 - 135
13C-OCDD	102	40 - 135
13C-2,3,7,8-TCDF	79	40 - 135
13C-1,2,3,7,8-PeCDF	76	40 - 135
13C-2,3,4,7,8-PeCDF	74	40 - 135
13C-1,2,3,4,7,8-HxCDF	78	40 - 135
13C-1,2,3,6,7,8-HxCDF	86	40 - 135
13C-2,3,4,6,7,8-HxCDF	83	40 - 135
13C-1,2,3,7,8,9-HxCDF	89	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	90	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	92	40 - 135
13C-OCDF	94	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-103-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 004	**Work Order #....:**	M5T261AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	5
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	8.7
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.0286 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

C Co-eluting isomer.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
J = Estimated value
UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-102-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 005	**Work Order #....:**	M5T271AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	17
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.404 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	210	J	300	23	ng/kg
1,2,3,7,8-PeCDD	3000		1500	26	ng/kg
1,2,3,4,7,8-HxCDD	7000		1500	23	ng/kg
1,2,3,6,7,8-HxCDD	16000		1500	26	ng/kg
1,2,3,7,8,9-HxCDD	13000	~~C B~~ J	1500	23	ng/kg
1,2,3,4,6,7,8-HpCDD	310000	~~B~~	1500	53	ng/kg
OCDD	2200000	~~B~~ E J	3000	56	ng/kg
2,3,7,8-TCDF	79	~~Q J~~ UX	300	19	ng/kg
1,2,3,7,8-PeCDF	520	J	1500	31	ng/kg
2,3,4,7,8-PeCDF	600	J	1500	29	ng/kg
1,2,3,4,7,8-HxCDF	5400	~~Q B~~ UX	1500	21	ng/kg
1,2,3,6,7,8-HxCDF	11000	~~Q B~~ UX	1500	19	ng/kg
2,3,4,6,7,8-HxCDF	3800	~~Q~~ UX	1500	22	ng/kg
1,2,3,7,8,9-HxCDF	ND		1500	26	ng/kg
1,2,3,4,6,7,8-HpCDF	77000	~~Q B~~ UX	1500	29	ng/kg
1,2,3,4,7,8,9-HpCDF	3800	~~B~~	1500	44	ng/kg
OCDF	120000	~~Q B~~ UX	3000	17	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	76	40 - 135
13C-1,2,3,7,8-PeCDD	67	40 - 135
13C-1,2,3,4,7,8-HxCDD	75	40 - 135
13C-1,2,3,6,7,8-HxCDD	78	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	104	40 - 135
13C-OCDD	104	40 - 135
13C-2,3,7,8-TCDF	68	40 - 135
13C-1,2,3,7,8-PeCDF	69	40 - 135
13C-2,3,4,7,8-PeCDF	69	40 - 135
13C-1,2,3,4,7,8-HxCDF	81	40 - 135
13C-1,2,3,6,7,8-HxCDF	78	40 - 135
13C-2,3,4,6,7,8-HxCDF	78	40 - 135
13C-1,2,3,7,8,9-HxCDF	85	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	88	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	85	40 - 135
13C-OCDF	93	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-102-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 005	**Work Order #....:**	M5T271AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	17
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.404 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
C	Co-eluting isomer.
E	Estimated result. Result concentration exceeds the calibration range.
J	Estimated Result.
Q	Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
J = Estimated value
UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-101-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 006	**Work Order #....:**	M5T281AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	20
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.6667 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	110	~~Q J~~	UX	190	11	ng/kg
1,2,3,7,8-PeCDD	1800			940	13	ng/kg
1,2,3,4,7,8-HxCDD	3500			940	18	ng/kg
1,2,3,6,7,8-HxCDD	10000			940	19	ng/kg
1,2,3,7,8,9-HxCDD	5600	~~B~~		940	18	ng/kg
1,2,3,4,6,7,8-HpCDD	210000	~~B~~		940	28	ng/kg
OCDD	1600000	~~B~~ E	J	1900	42	ng/kg
2,3,7,8-TCDF	88	J		190	10	ng/kg
1,2,3,7,8-PeCDF	220	~~Q J~~	UX	940	20	ng/kg
2,3,4,7,8-PeCDF	260	J		940	18	ng/kg
1,2,3,4,7,8-HxCDF	2900	~~B Q~~	UX	940	11	ng/kg
1,2,3,6,7,8-HxCDF	7200	~~B Q~~	UX	940	11	ng/kg
2,3,4,6,7,8-HxCDF	810	~~Q J~~	UX	940	10	ng/kg
1,2,3,7,8,9-HxCDF	ND			940	15	ng/kg
1,2,3,4,6,7,8-HpCDF	41000	~~B~~		940	18	ng/kg
1,2,3,4,7,8,9-HpCDF	3000	~~B~~		940	31	ng/kg
OCDF	130000	~~B~~		1900	35	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	77	40 - 135
13C-1,2,3,7,8-PeCDD	74	40 - 135
13C-1,2,3,4,7,8-HxCDD	78	40 - 135
13C-1,2,3,6,7,8-HxCDD	91	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	110	40 - 135
13C-OCDD	99	40 - 135
13C-2,3,7,8-TCDF	79	40 - 135
13C-1,2,3,7,8-PeCDF	79	40 - 135
13C-2,3,4,7,8-PeCDF	79	40 - 135
13C-1,2,3,4,7,8-HxCDF	89	40 - 135
13C-1,2,3,6,7,8-HxCDF	85	40 - 135
13C-2,3,4,6,7,8-HxCDF	95	40 - 135
13C-1,2,3,7,8,9-HxCDF	89	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	99	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	89	40 - 135
13C-OCDF	103	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-101-25'

Trace Level Organic Compounds

Lot - Sample #....:	H4L260401 - 006	**Work Order #....:**	M5T281AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	01/07/15	**Analysis Date....:**	01/14/15	**Percent Moisture**	20
Prep Batch # ....:	5007032				
Initial Wgt/Vol :	0.6667 g	**Instrument ID....:**	D2A	**Method:**	SW846 8290
Analyst ID....:	Melissa A. Davidson				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
E	Estimated result. Result concentration exceeds the calibration range,
J	Estimated Result.
Q	Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
J = Estimated value
UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

H4L260407 ~~H4K130105~~ RH 12-24-14

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessingpas	Site Contact:	COC Record 1 of 4
Company Name ARCADIS	Tel/Mobile: 218 829 4607	Lab Contact: / Carrier:	COC No: 04746
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter, MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? (Y) N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: 2 coolers
Project Name/Number: B0039310.0050.0000	☒ 2 weeks		Temperature: RT 0.2, 0.1, CT 0.1, 0.0 deg C
Site: Beazer-Morrisville NC	☐ 1 week		Shipper: ✓ FedEx __UPS __Other:
PO#	☐ 2 days		Tracking Number: 605780793691 m
Sampled by: D. Rhodes / R. Sams	☐ 1 day		Recorded by: BKD Date: 11-13-14

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans-8290	Sample Specific Notes:
EB-01 (111214)	11-12-14	0805	G	WS	2		X	Equipment blank - DI water
SS-109-10'	11-12-14	0830	G	S	1		X	
SS-109-25'	11-12-14	0840	G	S	1		X	
SS-109-50'	11-12-14	0850	G	S	1		X	
SS-108-10'	11-12-14	0900	G	S	1		X	
SS-108-25'	11-12-14	0910	G	S	1		X	
SS-108-50'	11-12-14	0920	G	S	1		X	
SS-107-10'	11-12-14	0940	G	S	1		X	

003

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:
Hold all 25' and 50' Samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1510	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (9208)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

~~HHK130105~~ RH 12-24-14 HYL260401

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessinger	Site Contact:	COC Record 2 of 4
Company Name: ARCADIS	Tel/Mobile: 218-829 4607	Lab Contact: / Carrier:	COC No: 04747
Address: 6602 Excelsior Rd.	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip: Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone: 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer-Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
PO#	☐ 2 days		Tracking Number:
Sampled by: D. Hughes / R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans-8290	Sample Specific Notes:
SS-107-25' /	11-12-14	0950	G	S	1		X	MS/MSD
SS-107-39'	11-12-14	1000	G	S	1		X	
SS-110-10'	11-12-14	1005	G	S	1		X	
006 SS-110-25' / /	11-12-14	1010	G	S	1		X	
SS-110-50' /	11-12-14	1020	G	S	1		X	
SS-105-10'	11-12-14	1050	G	S	1		X	
008 SS-105-25' / /	11-12-14	1100	G	S	1		X	
SS-105-50' /	11-12-14	1115	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold all 25' & 50' samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0208)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

Chain of Custody Record

~~HHK130115~~ RH 12-24-14 H4L210401

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessingpas	Site Contact:	COC Record 3 of 4
Company Name: ARCADIS	Tel/Mobile: 218-829 4607	Lab Contact: / Carrier:	COC No: 04749
Address: 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip: Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone: 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer - Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
P O #	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes / R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans - 8290	Sample Specific Notes:
SS-106-10'	11-12-14	1125	G	S	1		X	
SS-106-25'	11-12-14	1130	G	S	1		X	
SS-103-10'	11-12-14	1230	G	S	1		X	
SS-103-25'	11-12-14	1240	G	S	1		X	
SS-103-50'	11-12-14	1245	G	S	1		X	
SS-104-25'	11-12-14	1255	G	S	1		X	
SS-104-10'	11-12-14	1300	G	S	1		X	
SS-102-10'	11-12-14	1320	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold all 25' & 50' samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:10
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0208)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

~~HHK130405~~ HML260401
RH 12-24-14

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessinger	Site Contact:	COC Record 4 of 4
Company Name ARCADIS	Tel/Mobile: 218 829 4607	Lab Contact: / Carrier:	COC No: 04748
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer - Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
P O #	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes / R. Sams	☐ 1 day		Recorded by: _____ Date: _____

	Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Diluvs/Mrcurs-8270	Sample Specific Notes:
01H	SS-102-25' / /	11-12-14	1330	G	S	1		X	
	SS-102-50' /	11-12-14	1340	G	S	1		X	
	SS-101-50' /	11-12-14	1350	G	S	1		X	
01	SS-101-25' / /	11-12-14	1400	G	S	1		X	
	SS-101-10'	11-12-14	1405	G	S	3		X	MS/MSD
	Dup-01 (111214)	11-12-14	0000	G	S	1		X	
	Dup-02 (111214)	11-12-14	0001	G	S	1		X	
	EB-02 (111214)	11-12-14	1500	G	W	2		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold all 25' & 50' Samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1510	[signature]	12-12-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0208)

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

ANALYTICAL REPORT

PROJECT NO. B0039310.0000.00001

Beazer-Morrisville NC

Lot #: H5A290431

David Bessingpas

ARCADIS U.S. Inc
6602 Excelsior Road
Baxter, MN 56425

TESTAMERICA LABORATORIES, INC.

Ryan Henry

Ryan Henry
Project Manager

March 3, 2015

ANALYTICAL METHODS SUMMARY

H5A290431

PARAMETER	ANALYTICAL METHOD
Dibenzodioxins and Dibenzofurans, HRGC/HRMS	SW846 8290
Percent Moisture	MCAWW 160.3 MOD

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

H5A290431

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
M53RG	001	SS-108-50'	11/12/14	09:20
M53RK	002	SS-110-50'	11/12/14	10:20
M53RL	003	SS-105-50'	11/12/14	11:15
M53RM	004	SS-103-50'	11/12/14	12:45
M53RN	005	SS-102-50'	11/12/14	13:40
M53RP	006	SS-101-50'	11/12/14	13:50
M53RT	007	DUP-02(111214)	11/12/14	00:01

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

PROJECT NARRATIVE
H5A290431

The results reported herein are applicable to the samples submitted for analysis only. If you have any questions about this report, please call (865) 291-3000 to speak with the TestAmerica project manager listed on the cover page.

This report shall not be reproduced except in full, without the written approval of the laboratory.

The original chain of custody documentation is included with this report.

Sample Receipt

There were no problems with the condition of the samples received.

Quality Control and Data Interpretation

Unless otherwise noted, all holding times and QC criteria were met and the test results shown in this report meet all applicable NELAC requirements.

For solid and sediments samples, when percent moisture is included in the report header field, the sample results are reported on a dry weight basis. When percent moisture is not contained in the header field, sample results are reported on an as received or wet weight basis.

All samples were extracted outside the method holding time as requested by the client.

The method blank associated with these samples had analytes 1,2,3,46,7,8-HpCDD and OCDD above the ML. The sample results for these analytes are twenty times higher than the amount detected in the method blank. The data is reported as is.

All positive 2378-TCDF results at or above the minimum level were confirmed on a DB-225 column. The lower of the 2378-TCDF results are reported for each sample. The 2378-TCDF was reported from the primary Rtx-5 column for samples SS-102-50' and DUP-02(111214). This column is not isomer specific for this 2378-TCDF. All results which were reported from the Rtx-5 column are qualified with an "X". Please note that raw data is provided for reported results only.

Samples SS-108-50', SS-105-50' and SS-101-50' were reported at a 10-fold dilution due to high levels of native analytes.

Samples SS-110-50', SS-102-50' and DUP-02(111214) were post dilution spiked. These samples were extracted based on screening results, an appropriate amount of sample was removed and spiked with internal standards and processed. The post dilution spike amount is accounted for in the sample weight.

Samples SS-110-50', SS-102-50' and DUP-02(111214) were reported from two runs to bring all native analytes within the upper calibration range.

PROJECT NARRATIVE
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Several samples exhibited native OCDD above the upper calibration range. The method does not require further action be taken; therefore, the results were reported as is with an "E" qualifier.

The following flags are used to qualify results for chlorinated dioxin and furan results:

J – The reported result is an estimate. The amount reported is below the Minimum Level (ML). The qualitative definition of the ML is "the lowest level at which the analytical system must give a reliable signal and an acceptable calibration point". The ML was introduced in EPA Methods 1624 and 1625 in 1980 and was promulgated in these methods in 1984 at 40 CFR Part 136, Appendix A. For the purposes of this report, the ML is qualitatively defined as described above, and quantitatively defined as follows:

Minimum Level: The concentration or mass of analyte in the sample that corresponds to the lowest calibration level in the initial calibration. It represents a concentration (in the sample extract) equivalent to that of the lowest calibration standard, after corrections for method-specified sample weights, volumes and cleanup procedures has been employed.

Example: The lowest calibration level for TCDD in the initial calibration is 0.5 pg/uL. A mass of 10 pg of 2,3,7,8-TCDD in the sample would result in a concentration of 0.5 pg/uL in the sample extract (at a final volume of 20 uL). Since the concentration in the sample extract corresponds to the concentration in the lowest calibration standard, the 10 pg mass in the sample components is the ML. If the sample extract is further diluted, the ML will increase by the dilution factor.

Example: A 1/10 dilution is performed on the sample extract described above. The ML for 2,3,7,8-TCDD becomes 100 pg rather than the default of 10 pg.

E – The reported result is an estimate. The amount reported is above the Upper Calibration Level (UCL) described below. The quantitative definition of the UCL is listed below:

Upper Calibration Level: The concentration or mass of analyte in the sample that corresponds to the highest calibration level in the initial calibration. It is equivalent to the concentration of the highest calibration standard, assuming that all method-specified sample weights, volumes, and cleanup procedures have been employed.

Example: The maximum calibration level for TCDD in the initial calibration is 200 pg/uL. A mass of 4000 pg of 2,3,7,8-TCDD in the sampling components would result in a concentration of 200 pg/uL in the sample extract (at a final volume of 20 uL). Since the concentration in the sample extract corresponds to the concentration in the highest calibration standard, the 4000 pg mass in the sample components is the UCL. If the sample extract is further diluted, the ML will increase by the dilution factor.

Example: A 1/10 dilution is performed on the sample extract described above. The UCL for 2,3,7,8-TCDD becomes 40,000 pg rather than the default of 4000 pg. In this example, all positive 2,3,7,8-TCDD results above 40,000 pg are flagged with an E.

PROJECT NARRATIVE
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B – The analyte is present in the associated method blank at a detectable level. For this analysis, there is no method specified reporting level other than the qualitative criterion that peaks must exhibit a signal-to-noise ratio of ≥2.5 to 1. Therefore, the presence of any reportable amount of the analyte in the blank will result in a B qualifier on all associated samples.

Q – Estimated maximum possible concentration. This qualifier is used when the result is generated from chromatographic data that does not meet all the qualitative criteria for a positive identification given in the method. These criteria include the following:

- Ion abundance ratios must be within specified limits (+/-15% of theoretical ion abundance ratio).
- Retention time criteria (relative to the method-specified isotope labeled retention time standard).
- Co-maximization criterion. The two quantitation ion peaks must reach their maxima within 2 seconds of each other.
- Polychlorinated dibenzofuran purity. No peak can be identified as a polychlorinated dibenzofuran if a polychlorinated diphenyl ether peak maximizes within +/- 2 seconds of the furan candidate.

S – Ion suppression evident. The trace indicating the signal from the lock mass of the calibration compound shows a deflection at the retention time of the analyte. This may indicate a temporary suppression of the instrument sensitivity due to a matrix-borne interference.

C – Coeluting Isomer. The isomer is known to coelute with another member of its homologue group, or the peak shape is shouldered, indicating the likelihood of a coeluting isomer.

X – Other. See explanation in narrative.

Laboratory studies supporting risk assessment and Total Maximum Daily Load (TMDL) evaluations, frequently use qualified data reported as low as the Method Detection Limit (MDL), or the Estimated Detection Limit (EDL). Several of EPA's isotope dilution methods employ the EDL.[1,2,3] The EDL is based on a direct measurement of the signal-to-noise (S/N) ratio acquired during sample analysis. This S/N measurement is used to calculate the concentration in the sample corresponding to the minimum intensity of the smallest quantifiable peak. The EDL reflects the amount of the particular analyte which would be required to cause a positive result for the particular analysis. Because the S/N obtained covaries with recovery, instrument sensitivity and sample-specific cleanup efficacy, the EDL is a more valid measure of the sensitivity of the entire analytical process for the specific sample than is an MDL run periodically on a reference matrix.

The EDL is typically calculated according to the following equation:

$$\text{Estimated Detection Limit} = \frac{N \times 2.5 \times Qis}{His \times RRF \times W \times S}$$

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Where:

N	=	peak to peak noise of quantitation ion signal in the region of the ion chromatogram where the compound of interest is expected to elute
His	=	peak height of quantitation ion for appropriate internal standard
Qis	=	ng of internal standard added to sample
RRF	=	mean relative response factor of compound obtained during initial calibration
W	=	amount of sample extracted (grams or liters)
S	=	percent solids (optional, if results are requested to be reported on dry weight basis)

(The area of the internal standard is sometimes used instead of height, along with an area-to-height conversion factor.)

This method of estimating the detection limit differs from the MDL in that it does not carry the requirement that the sample be statistically distinguished as being from a contaminated population. As results approach the EDL, the risk of false positives and the analytical uncertainty increase significantly. However, a low false positive well below the ML or MDL is often closer to the true value than an assumption that the target analyte is present at the detection or reporting limits. For relatively clean samples, MDL studies may give an elevated estimate of the detection limit. Additionally, on contaminated samples, the MDL may give a falsely low estimate of the detection limit.

$$\text{Analyte Concentration} = \frac{As \times Qis}{Ais \times RRF \times W \times S}$$

Where:

As	=	Sum of areas of the target peaks
Qis	=	ng of internal standard added to sample
Ais	=	Sum of areas of the internal standard peaks
RRF	=	mean relative response factor of compound obtained during initial calibration
W	=	amount of sample extracted (grams or liters)
S	=	percent solids (optional, if results are requested to be reported on dry weight basis)

In sample data, peaks must have an intensity of $\geq$2.5 times the height of the background noise in order to be considered. Careful examination of the two equations above reveals that for the concentration of the smallest peak detectable (per the EDL equation) to exactly equal the smallest peaks that are calculated, requires that the average height to area ratio obtained during the calibration must equal the area to height ratio for every peak obtained near 2.5 times the noise. When the area to height ratio on a peak in a sample is less than the average obtained during calibration, the calculated result will correspond to a peak that would have been less than 2.5 times the noise on the calibration. This is the result of normal variability. Because the source methods for the EDL (SW-846 8290 and 8280A) do not provide for censoring of results by any other magnitude standard than being 2.5 times the noise, the laboratory does not censor at the calculated EDL. Hence, detections may be reported below the estimated detection limits.

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Footnotes:

1. Code of Federal Regulations, Part 136, Chapter 1, Appendix 1, October 1994: Method 1613 Tetra- Through Octa-Chlorinated Dioxins and Furans by Isotope Dilution High Resolution Gas Chromatography/High Resolution Mass Spectrometry.
2. U.S. EPA. Test Methods for Evaluating Solid Waste, Volume II, SW-846, Update III, December 1996. Method 8280A: The Analysis of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by High Resolution Gas Chromatography/Low Resolution Mass Spectrometry.
3. U.S. EPA. Test Methods for Evaluating Solid Waste, SW-846. Third Edition. March 1995 Method 8290: Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by High Resolution Gas Chromatography/High Resolution Mass Spectrometry.

CERTIFICATION SUMMARY

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Knoxville	L-A-B	DoD ELAP		L2311
TestAmerica Knoxville	Arkansas DEQ	State Program	6	88-0688
TestAmerica Knoxville	California	State Program	9	2423
TestAmerica Knoxville	Colorado	State Program	8	N/A
TestAmerica Knoxville	Connecticut	State Program	1	PH-0223
TestAmerica Knoxville	Florida	NELAC	4	E87177
TestAmerica Knoxville	Georgia	State Program	4	906
TestAmerica Knoxville	Hawaii	State Program	9	N/A
TestAmerica Knoxville	Indiana	State Program	5	C-TN-02
TestAmerica Knoxville	Iowa	State Program	7	375
TestAmerica Knoxville	Kansas	NELAC	7	E-10349
TestAmerica Knoxville	Kentucky	State Program	4	90101
TestAmerica Knoxville	Louisiana DOHH	State Program	6	LA110001
TestAmerica Knoxville	Louisiana DEQ	NELAC	6	83979
TestAmerica Knoxville	Maryland	State Program	3	277
TestAmerica Knoxville	Michigan	State Program	5	9933
TestAmerica Knoxville	Minnesota	NELAC	5	047-999-429
TestAmerica Knoxville	Nevada	State Program	9	TN00009
TestAmerica Knoxville	New Jersey	NELAC	2	TN001
TestAmerica Knoxville	New York	NELAC	2	10781
TestAmerica Knoxville	North Carolina DENR	State Program	4	64
TestAmerica Knoxville	North Carolina DHHS	State Program	4	21705
TestAmerica Knoxville	Ohio	OVAP	5	CL0059
TestAmerica Knoxville	Oklahoma	State Program	6	9415
TestAmerica Knoxville	Pennsylvania	NELAC	3	68-00576
TestAmerica Knoxville	South Carolina	State Program	4	84001
TestAmerica Knoxville	Tennessee	State Program	4	2014
TestAmerica Knoxville	Texas	NELAC	6	T104704380-TX
TestAmerica Knoxville	Federal	USDA		P330-11-00035
TestAmerica Knoxville	Utah	NELAC	8	QUAN3
TestAmerica Knoxville	Virginia	NELAC	3	460176
TestAmerica Knoxville	Virginia	State Program	3	165
TestAmerica Knoxville	Washington	State Program	10	C593
TestAmerica Knoxville	West Virginia DEP	State Program	3	345
TestAmerica Knoxville	West Virginia DHHR	State Program	3	9955C

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

Sample Data Summary

ARCADIS U.S. Inc

Sample ID: SS-108-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 001	**Work Order #....:**	M53RG1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	8.6
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Kathryn B. Lay				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND		110	57	ng/kg
1,2,3,7,8-PeCDD	ND		550	59	ng/kg
1,2,3,4,7,8-HxCDD	**1200**		**550**	**42**	**ng/kg**
1,2,3,6,7,8-HxCDD	**6600**	**B**	**550**	**36**	**ng/kg**
1,2,3,7,8,9-HxCDD	**2900**	**B**	**550**	**36**	**ng/kg**
1,2,3,4,6,7,8-HpCDD	**170000**	**B**	**550**	**75**	**ng/kg**
OCDD	**1400000**	**B E**	**1100**	**66**	**ng/kg**
2,3,7,8-TCDF	ND		110	36	ng/kg
1,2,3,7,8-PeCDF	ND		550	71	ng/kg
2,3,4,7,8-PeCDF	ND		550	45	ng/kg
1,2,3,4,7,8-HxCDF	**730**	**Q**	**550**	**32**	**ng/kg**
1,2,3,6,7,8-HxCDF	**560**	**Q**	**550**	**33**	**ng/kg**
2,3,4,6,7,8-HxCDF	ND		550	34	ng/kg
1,2,3,7,8,9-HxCDF	ND		550	39	ng/kg
1,2,3,4,6,7,8-HpCDF	**29000**	**B**	**550**	**33**	**ng/kg**
1,2,3,4,7,8,9-HpCDF	**2600**		**550**	**51**	**ng/kg**
OCDF	**110000**	**B**	**1100**	**40**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	57	40 - 135
13C-1,2,3,7,8-PeCDD	61	40 - 135
13C-1,2,3,4,7,8-HxCDD	73	40 - 135
13C-1,2,3,6,7,8-HxCDD	68	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	88	40 - 135
13C-OCDD	114	40 - 135
13C-2,3,7,8-TCDF	51	40 - 135
13C-1,2,3,7,8-PeCDF	49	40 - 135
13C-2,3,4,7,8-PeCDF	53	40 - 135
13C-1,2,3,4,7,8-HxCDF	66	40 - 135
13C-1,2,3,6,7,8-HxCDF	63	40 - 135
13C-2,3,4,6,7,8-HxCDF	63	40 - 135
13C-1,2,3,7,8,9-HxCDF	65	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	79	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	78	40 - 135
13C-OCDF	98	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-108-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 001	**Work Order #....:**	M53RG1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	8.6
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Kathryn B. Lay				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-110-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 002	**Work Order #....:**	M53RK1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/26/15	**Percent Moisture**	19
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	0.51 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Kathryn B. Lay				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,7,8-HxCDD	560	Q J	1200	87	ng/kg
1,2,3,6,7,8-HxCDD	1500	B	1200	78	ng/kg
1,2,3,7,8,9-HxCDD	740	B J	1200	76	ng/kg
1,2,3,4,6,7,8-HpCDD	33000	B	1200	110	ng/kg
OCDD	100000	B	2400	130	ng/kg
1,2,3,4,7,8-HxCDF	340	J	1200	74	ng/kg
1,2,3,6,7,8-HxCDF	260	Q J	1200	70	ng/kg
2,3,4,6,7,8-HxCDF	170	Q J	1200	69	ng/kg
1,2,3,7,8,9-HxCDF	ND		1200	91	ng/kg
1,2,3,4,6,7,8-HpCDF	8000	B	1200	91	ng/kg
1,2,3,4,7,8,9-HpCDF	690	Q J	1200	150	ng/kg
OCDF	21000	B	2400	180	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-1,2,3,4,7,8-HxCDD	90	40 - 135
13C-1,2,3,6,7,8-HxCDD	110	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	100	40 - 135
13C-OCDD	94	40 - 135
13C-1,2,3,4,7,8-HxCDF	87	40 - 135
13C-1,2,3,6,7,8-HxCDF	87	40 - 135
13C-2,3,4,6,7,8-HxCDF	89	40 - 135
13C-1,2,3,7,8,9-HxCDF	83	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	95	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	85	40 - 135
13C-OCDF	79	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-110-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 002	**Work Order #....:**	M53RK2AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	19
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	10.2 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	18	Q	12	6.5	ng/kg
1,2,3,7,8-PeCDD	360	B	61	8.6	ng/kg
2,3,7,8-TCDF	11	Q J	12	5.0	ng/kg
1,2,3,7,8-PeCDF	59	J	61	8.2	ng/kg
2,3,4,7,8-PeCDF	44	J	61	6.8	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	70	40 - 135
13C-1,2,3,7,8-PeCDD	53	40 - 135
13C-2,3,7,8-TCDF	58	40 - 135
13C-1,2,3,7,8-PeCDF	48	40 - 135
13C-2,3,4,7,8-PeCDF	47	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-105-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 003	**Work Order #....:**	M53RL1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	5.6
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND		110	48	ng/kg
1,2,3,7,8-PeCDD	**370**	**Q B J**	**530**	**64**	**ng/kg**
1,2,3,4,7,8-HxCDD	**1300**		**530**	**46**	**ng/kg**
1,2,3,6,7,8-HxCDD	**4700**	**B**	**530**	**43**	**ng/kg**
1,2,3,7,8,9-HxCDD	**3000**	**B**	**530**	**41**	**ng/kg**
1,2,3,4,6,7,8-HpCDD	**120000**	**B**	**530**	**49**	**ng/kg**
OCDD	**1100000**	**B E**	**1100**	**56**	**ng/kg**
2,3,7,8-TCDF	ND		110	38	ng/kg
1,2,3,7,8-PeCDF	ND		530	60	ng/kg
2,3,4,7,8-PeCDF	**96**	**J**	**530**	**52**	**ng/kg**
1,2,3,4,7,8-HxCDF	**990**		**530**	**33**	**ng/kg**
1,2,3,6,7,8-HxCDF	**830**		**530**	**38**	**ng/kg**
2,3,4,6,7,8-HxCDF	**460**	**Q J**	**530**	**34**	**ng/kg**
1,2,3,7,8,9-HxCDF	ND		530	36	ng/kg
1,2,3,4,6,7,8-HpCDF	**25000**	**B**	**530**	**36**	**ng/kg**
1,2,3,4,7,8,9-HpCDF	**1900**		**530**	**67**	**ng/kg**
OCDF	**75000**	**B**	**1100**	**45**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	66	40 - 135
13C-1,2,3,7,8-PeCDD	53	40 - 135
13C-1,2,3,4,7,8-HxCDD	70	40 - 135
13C-1,2,3,6,7,8-HxCDD	73	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	88	40 - 135
13C-OCDD	118	40 - 135
13C-2,3,7,8-TCDF	59	40 - 135
13C-1,2,3,7,8-PeCDF	67	40 - 135
13C-2,3,4,7,8-PeCDF	62	40 - 135
13C-1,2,3,4,7,8-HxCDF	64	40 - 135
13C-1,2,3,6,7,8-HxCDF	59	40 - 135
13C-2,3,4,6,7,8-HxCDF	64	40 - 135
13C-1,2,3,7,8,9-HxCDF	66	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	75	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	72	40 - 135
13C-OCDF	93	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-105-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 003	**Work Order #....:**	M53RL1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	5.6
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-103-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 004	Work Order #....:	M53RM1AC	Matrix....:	SO
Date Sampled....:	11/12/14	Date Received....:	11/13/14	Dilution Factor:	10
Prep Date....:	02/05/15	Analysis Date....:	02/23/15	Percent Moisture	19
Prep Batch #....:	5036029				
Initial Wgt/Vol :	0.5 g	Instrument ID....:	M2A	Method:	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND		250	180	ng/kg
1,2,3,7,8-PeCDD	**1400**	**B**	**1200**	**160**	**ng/kg**
1,2,3,4,7,8-HxCDD	**3200**		**1200**	**160**	**ng/kg**
1,2,3,6,7,8-HxCDD	**12000**	**B**	**1200**	**150**	**ng/kg**
1,2,3,7,8,9-HxCDD	**6700**	**B**	**1200**	**140**	**ng/kg**
1,2,3,4,6,7,8-HpCDD	**230000**	**B**	**1200**	**200**	**ng/kg**
OCDD	**1700000**	**B E**	**2500**	**170**	**ng/kg**
2,3,7,8-TCDF	ND		250	110	ng/kg
1,2,3,7,8-PeCDF	**100**	**Q J**	**1200**	**150**	**ng/kg**
2,3,4,7,8-PeCDF	ND		1200	140	ng/kg
1,2,3,4,7,8-HxCDF	**2800**		**1200**	**100**	**ng/kg**
1,2,3,6,7,8-HxCDF	**1900**		**1200**	**100**	**ng/kg**
2,3,4,6,7,8-HxCDF	**920**	**Q J**	**1200**	**100**	**ng/kg**
1,2,3,7,8,9-HxCDF	ND		1200	120	ng/kg
1,2,3,4,6,7,8-HpCDF	**66000**	**B**	**1200**	**120**	**ng/kg**
1,2,3,4,7,8,9-HpCDF	**4100**		**1200**	**170**	**ng/kg**
OCDF	**170000**	**B**	**2500**	**160**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	68	40 - 135
13C-1,2,3,7,8-PeCDD	68	40 - 135
13C-1,2,3,4,7,8-HxCDD	70	40 - 135
13C-1,2,3,6,7,8-HxCDD	67	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	83	40 - 135
13C-OCDD	106	40 - 135
13C-2,3,7,8-TCDF	71	40 - 135
13C-1,2,3,7,8-PeCDF	74	40 - 135
13C-2,3,4,7,8-PeCDF	74	40 - 135
13C-1,2,3,4,7,8-HxCDF	62	40 - 135
13C-1,2,3,6,7,8-HxCDF	66	40 - 135
13C-2,3,4,6,7,8-HxCDF	64	40 - 135
13C-1,2,3,7,8,9-HxCDF	70	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	62	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	71	40 - 135
13C-OCDF	93	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-103-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 004	**Work Order #....:**	M53RM1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	19
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	0.5 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-102-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 005	**Work Order #....:**	M53RN1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/26/15	**Percent Moisture**	23
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	0.34 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Kathryn B. Lay				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,7,8-HxCDD	3400	Q	1900	220	ng/kg
1,2,3,6,7,8-HxCDD	8000	B	1900	220	ng/kg
1,2,3,7,8,9-HxCDD	6400	B	1900	200	ng/kg
1,2,3,4,6,7,8-HpCDD	130000	B	1900	350	ng/kg
OCDD	110000	B	3800	420	ng/kg
1,2,3,4,7,8-HxCDF	2500		1900	190	ng/kg
1,2,3,6,7,8-HxCDF	2200		1900	160	ng/kg
2,3,4,6,7,8-HxCDF	1100	Q J	1900	170	ng/kg
1,2,3,7,8,9-HxCDF	ND		1900	240	ng/kg
1,2,3,4,6,7,8-HpCDF	48000	B	1900	200	ng/kg
1,2,3,4,7,8,9-HpCDF	3700	Q	1900	470	ng/kg
OCDF	83000	B	3800	350	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-1,2,3,4,7,8-HxCDD	76	40 - 135
13C-1,2,3,6,7,8-HxCDD	105	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	87	40 - 135
13C-OCDD	68	40 - 135
13C-1,2,3,4,7,8-HxCDF	70	40 - 135
13C-1,2,3,6,7,8-HxCDF	88	40 - 135
13C-2,3,4,6,7,8-HxCDF	86	40 - 135
13C-1,2,3,7,8,9-HxCDF	71	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	88	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	67	40 - 135
13C-OCDF	70	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: SS-102-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 005	Work Order #....:	M53RN2AC	Matrix....:	SO
Date Sampled....:	11/12/14	Date Received....:	11/13/14	Dilution Factor:	10
Prep Date....:	02/05/15	Analysis Date....:	02/23/15	Percent Moisture	23
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	10.2 g	Instrument ID....:	M2A	Method:	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	250		13	11	ng/kg
1,2,3,7,8-PeCDD	2300	B	64	14	ng/kg
2,3,7,8-TCDF	74	Q X	13	8.7	ng/kg
1,2,3,7,8-PeCDF	510		64	27	ng/kg
2,3,4,7,8-PeCDF	370		64	15	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	63	40 - 135
13C-1,2,3,7,8-PeCDD	61	40 - 135
13C-2,3,7,8-TCDF	61	40 - 135
13C-1,2,3,7,8-PeCDF	47	40 - 135
13C-2,3,4,7,8-PeCDF	48	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Q Estimated maximum possible concentration (EMPC).

X See project narrative.

ARCADIS U.S. Inc

Sample ID: SS-101-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 006	**Work Order #....:**	M53RP1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	14
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	1.1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND		110	47	ng/kg
1,2,3,7,8-PeCDD	**250**	**Q B J**	**530**	**62**	**ng/kg**
1,2,3,4,7,8-HxCDD	**440**	**Q J**	**530**	**67**	**ng/kg**
1,2,3,6,7,8-HxCDD	**2100**	**B**	**530**	**66**	**ng/kg**
1,2,3,7,8,9-HxCDD	**1300**	**B**	**530**	**62**	**ng/kg**
1,2,3,4,6,7,8-HpCDD	**56000**	**B**	**530**	**91**	**ng/kg**
OCDD	**320000**	**B**	**1100**	**73**	**ng/kg**
2,3,7,8-TCDF	ND		110	39	ng/kg
1,2,3,7,8-PeCDF	ND		530	64	ng/kg
2,3,4,7,8-PeCDF	ND		530	57	ng/kg
1,2,3,4,7,8-HxCDF	**680**		**530**	**58**	**ng/kg**
1,2,3,6,7,8-HxCDF	**250**	**Q J**	**530**	**53**	**ng/kg**
2,3,4,6,7,8-HxCDF	**180**	**J**	**530**	**55**	**ng/kg**
1,2,3,7,8,9-HxCDF	ND		530	65	ng/kg
1,2,3,4,6,7,8-HpCDF	**12000**	**B**	**530**	**46**	**ng/kg**
1,2,3,4,7,8,9-HpCDF	**950**		**530**	**67**	**ng/kg**
OCDF	**44000**	**B**	**1100**	**70**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	68	40 - 135
13C-1,2,3,7,8-PeCDD	52	40 - 135
13C-1,2,3,4,7,8-HxCDD	66	40 - 135
13C-1,2,3,6,7,8-HxCDD	74	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	81	40 - 135
13C-OCDD	111	40 - 135
13C-2,3,7,8-TCDF	57	40 - 135
13C-1,2,3,7,8-PeCDF	66	40 - 135
13C-2,3,4,7,8-PeCDF	63	40 - 135
13C-1,2,3,4,7,8-HxCDF	63	40 - 135
13C-1,2,3,6,7,8-HxCDF	66	40 - 135
13C-2,3,4,6,7,8-HxCDF	66	40 - 135
13C-1,2,3,7,8,9-HxCDF	64	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	71	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	70	40 - 135
13C-OCDF	89	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-101-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 006	**Work Order #....:**	M53RP1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	14
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	1.1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: DUP-02(111214)

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 007	**Work Order #....:**	M53RT1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/26/15	**Percent Moisture**	24
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	0.26 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Kathryn B. Lay				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,7,8-HxCDD	**2300**	**J**	**2500**	**380**	**ng/kg**
1,2,3,6,7,8-HxCDD	**6300**	**B**	**2500**	**310**	**ng/kg**
1,2,3,7,8,9-HxCDD	**3600**	**Q B**	**2500**	**310**	**ng/kg**
1,2,3,4,6,7,8-HpCDD	**130000**	**B**	**2500**	**380**	**ng/kg**
OCDD	**190000**	**B**	**5100**	**890**	**ng/kg**
1,2,3,4,7,8-HxCDF	**2000**	**J**	**2500**	**220**	**ng/kg**
1,2,3,6,7,8-HxCDF	**1200**	**Q J**	**2500**	**190**	**ng/kg**
2,3,4,6,7,8-HxCDF	**490**	**Q J**	**2500**	**220**	**ng/kg**
1,2,3,7,8,9-HxCDF	ND		2500	370	ng/kg
1,2,3,4,6,7,8-HpCDF	**35000**	**B**	**2500**	**230**	**ng/kg**
1,2,3,4,7,8,9-HpCDF	**3300**		**2500**	**440**	**ng/kg**
OCDF	**79000**	**B**	**5100**	**550**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-1,2,3,4,7,8-HxCDD	101	40 - 135
13C-1,2,3,6,7,8-HxCDD	108	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	88	40 - 135
13C-OCDD	64	40 - 135
13C-1,2,3,4,7,8-HxCDF	89	40 - 135
13C-1,2,3,6,7,8-HxCDF	106	40 - 135
13C-2,3,4,6,7,8-HxCDF	93	40 - 135
13C-1,2,3,7,8,9-HxCDF	62	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	107	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	73	40 - 135
13C-OCDF	74	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

ARCADIS U.S. Inc

Sample ID: DUP-02(111214)

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 007	**Work Order #....:**	M53RT2AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	24
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	5.1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	220	Q	26	23	ng/kg
1,2,3,7,8-PeCDD	2800	B	130	42	ng/kg
2,3,7,8-TCDF	50	Q X	26	15	ng/kg
1,2,3,7,8-PeCDF	470		130	32	ng/kg
2,3,4,7,8-PeCDF	420		130	27	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	67	40 - 135
13C-1,2,3,7,8-PeCDD	52	40 - 135
13C-2,3,7,8-TCDF	65	40 - 135
13C-1,2,3,7,8-PeCDF	55	40 - 135
13C-2,3,4,7,8-PeCDF	50	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Q Estimated maximum possible concentration (EMPC).

X See project narrative.

Method Blank Report

Trace Level Organic Compounds

Lot - Sample #....:	H5B050000 - 029B	**Work Order #....:**	M540H1AA	**Matrix....:**	SOLID
Dilution Factor:	1				
Prep Date....:	02/05/15	**Analysis Date....:**	02/20/15	**Percent Moisture:**	0.0
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Patricia(Trish) M. Parsly				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND		1.0	0.39	ng/kg
1,2,3,7,8-PeCDD	**0.27**	**Q J**	**5.0**	**0.23**	**ng/kg**
1,2,3,4,7,8-HxCDD	ND		5.0	0.15	ng/kg
1,2,3,6,7,8-HxCDD	**0.25**	**Q J**	**5.0**	**0.14**	**ng/kg**
1,2,3,7,8,9-HxCDD	**0.17**	**Q J**	**5.0**	**0.14**	**ng/kg**
1,2,3,4,6,7,8-HpCDD	**5.9**		**5.0**	**0.18**	**ng/kg**
OCDD	**36**		**10**	**0.24**	**ng/kg**
2,3,7,8-TCDF	ND		1.0	0.20	ng/kg
1,2,3,7,8-PeCDF	ND		5.0	0.19	ng/kg
2,3,4,7,8-PeCDF	ND		5.0	0.17	ng/kg
1,2,3,4,7,8-HxCDF	ND		5.0	0.10	ng/kg
1,2,3,6,7,8-HxCDF	ND		5.0	0.11	ng/kg
2,3,4,6,7,8-HxCDF	ND		5.0	0.099	ng/kg
1,2,3,7,8,9-HxCDF	ND		5.0	0.11	ng/kg
1,2,3,4,6,7,8-HpCDF	**1.5**	**Q J**	**5.0**	**0.11**	**ng/kg**
1,2,3,4,7,8,9-HpCDF	ND		5.0	0.16	ng/kg
OCDF	**6.8**	**J**	**10**	**0.25**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	66	40 - 135
13C-1,2,3,7,8-PeCDD	64	40 - 135
13C-1,2,3,4,7,8-HxCDD	71	40 - 135
13C-1,2,3,6,7,8-HxCDD	74	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	76	40 - 135
13C-OCDD	69	40 - 135
13C-2,3,7,8-TCDF	60	40 - 135
13C-1,2,3,7,8-PeCDF	61	40 - 135
13C-2,3,4,7,8-PeCDF	57	40 - 135
13C-1,2,3,4,7,8-HxCDF	64	40 - 135
13C-1,2,3,6,7,8-HxCDF	63	40 - 135
13C-2,3,4,6,7,8-HxCDF	62	40 - 135
13C-1,2,3,7,8,9-HxCDF	63	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	68	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	69	40 - 135
13C-OCDF	63	40 - 135

Method Blank Report

Trace Level Organic Compounds

Lot - Sample #....:	H5B050000 - 029B	**Work Order #....:**	M540H1AA	**Matrix....:**	SOLID
Dilution Factor:	1				
Prep Date....:	02/05/15	**Analysis Date....:**	02/20/15	**Percent Moisture:**	0.0
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	10 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Patricia(Trish) M. Parsly				

QUALIFIERS

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Client Lot # ...:	H5A290431	**Work Order # ...:**	M540H1AC-LCS	**Matrix .....:**	SOLID
LCS Lot-Sample# :	H5B050000 - 029				
Prep Date .....:	02/05/15	**Analysis Date ..:**	02/19/15		
Prep Batch # ...:	5036029				
Dilution Factor :	1				
Analyst ID.....:	Patricia(Trish) M. Parsl	**Instrument ID..:**	M2A	**Method.....:**	SW846 8290
Initial Wgt/Vol:	10 g				

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY		RECOVERY LIMITS
2,3,7,8-TCDD	**20.0**	**20.7**	**ng/kg**	**104**		**(79 - 129)**
1,2,3,7,8-PeCDD	**100**	**100**	**ng/kg**	**100**	**B**	**(79 - 129)**
1,2,3,4,7,8-HxCDD	**100**	**96.8**	**ng/kg**	**97**		**(73 - 123)**
1,2,3,6,7,8-HxCDD	**100**	**93.6**	**ng/kg**	**94**	**B**	**(74 - 124)**
1,2,3,7,8,9-HxCDD	**100**	**99.0**	**ng/kg**	**99**	**B**	**(70 - 124)**
1,2,3,4,6,7,8-HpCDD	**100**	**94.2**	**ng/kg**	**94**	**B**	**(73 - 123)**
OCDD	**200**	**192**	**ng/kg**	**96**	**B**	**(75 - 125)**
2,3,7,8-TCDF	**20.0**	**20.0**	**ng/kg**	**100**		**(75 - 125)**
1,2,3,7,8-PeCDF	**100**	**92.9**	**ng/kg**	**93**		**(74 - 124)**
2,3,4,7,8-PeCDF	**100**	**93.8**	**ng/kg**	**94**		**(75 - 125)**
1,2,3,4,7,8-HxCDF	**100**	**96.1**	**ng/kg**	**96**		**(75 - 125)**
1,2,3,6,7,8-HxCDF	**100**	**94.4**	**ng/kg**	**94**		**(76 - 126)**
2,3,4,6,7,8-HxCDF	**100**	**95.9**	**ng/kg**	**96**		**(76 - 126)**
1,2,3,7,8,9-HxCDF	**100**	**93.8**	**ng/kg**	**94**		**(77 - 127)**
1,2,3,4,6,7,8-HpCDF	**100**	**90.2**	**ng/kg**	**90**	**B**	**(77 - 127)**
1,2,3,4,7,8,9-HpCDF	**100**	**93.3**	**ng/kg**	**93**		**(73 - 123)**
OCDF	**200**	**182**	**ng/kg**	**91**	**B**	**(49 - 128)**

INTERNAL STANDARD	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	65	(40 - 135)
13C-1,2,3,7,8-PeCDD	66	(40 - 135)
13C-1,2,3,4,7,8-HxCDD	69	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	72	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	78	(40 - 135)
13C-OCDD	74	(40 - 135)
13C-2,3,7,8-TCDF	60	(40 - 135)
13C-1,2,3,7,8-PeCDF	59	(40 - 135)
13C-2,3,4,7,8-PeCDF	56	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	62	(40 - 135)
13C-1,2,3,6,7,8-HxCDF	61	(40 - 135)
13C-2,3,4,6,7,8-HxCDF	61	(40 - 135)
13C-1,2,3,7,8,9-HxCDF	64	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	67	(40 - 135)
13C-1,2,3,4,7,8,9-HpCDF	71	(40 - 135)
13C-OCDF	69	(40 - 135)

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Notes:

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Sample Receipt Documentation

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

HSA290431

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessingpas	Site Contact:	COC Record 1 of 4
Company Name ARCADIS	Tel/Mobile: 218 829 4607	Lab Contact: / Carrier:	COC No: 04746
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter, MN 56425	Calendar (C) or Work Days (W)		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below		Number of Packages: 2 coolers
Project Name/Number: B0039310.0000.0000	☒ 2 weeks		Temperature: RT 0.2, 0.1, CT 0.1, 0.0 deg C
Site: Beazer-Morrisville NC	☐ 1 week		Shipper: ☑ FedEx ☐ UPS ☐ Other:
P O #	☐ 2 days		Tracking Number: 605780793691 m
Sampled by: D. Rhodes / R. Sams	☐ 1 day		Recorded by: BKD Date: 11-13-14

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans-8290	Sample Specific Notes:
EB-01 (111214)	11-12-14	0805	G	WS	2		X	Equipment blank - DI water
SS-109-10'	11-12-14	0830	G	S	1		X	
SS-109-25'	11-12-14	0840	G	S	1		X	
SS-109-50'	11-12-14	0850	G	S	1		X	
SS-108-10'	11-12-14	0900	G	S	1		X	
SS-108-25'	11-12-14	0910	G	S	1		X	
SS-108-50'	11-12-14	0920	G	S	1		X	
SS-107-10'	11-12-14	0940	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:
Hold 25' and 50' Samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1510	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0308)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

~~HSA130408~~ 0150 1-29-15 HSA290431

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessinger	Site Contact:	COC Record 2 of 4
Company Name: ARCADIS	Tel/Mobile: 218-829-4607	Lab Contact: / Carrier:	COC No: 04747
Address: 6602 Excelsior Rd.	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip: Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone: 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer-Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
P O #	☐ 2 days		Tracking Number:
Sampled by: D. Akdes/R. Sans	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans-8290	Sample Specific Notes:
SS-107-25' /	11-12-14	0950	G	S	3		X	MS/MSD
SS-107-39'	11-12-14	1000	G	S	1		X	
SS-110-10'	11-12-14	1005	G	S	1		X	
SS-110-25' /	11-12-14	1010	G	S	1		X	
SS-110-50' / /	11-12-14	1020	G	S	1		X	
SS-105-10'	11-12-14	1050	G	S	1		X	
SS-105-25' /	11-12-14	1100	G	S	1		X	
SS-105-50' / /	11-12-14	1115	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:
Hold all 25' & 50' samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0208)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessingpas	Site Contact:	COC Record 3 of 4
Company Name ARCADIS	Tel/Mobile: 218-829 4607	Lab Contact: / Carrier:	COC No: 04749
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer - Morrisville MC	☐ 1 week		Shipper: __FedEx __UPS __Other:
P O #	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes/R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dixon/Firms - 8290	Sample Specific Notes:
SS-106-10'	11-12-14	1125	G	S	1		X	
SS-106-25'	11-12-14	1130	G	S	1		X	
SS-103-10'	11-12-14	1230	G	S	1		X	
SS-103-25'	11-12-14	1240	G	S	1		X	
SS-103-50'	11-12-14	1245	G	S	1		X	
SS-104-25'	11-12-14	1255	G	S	1		X	
SS-104-10'	11-12-14	1300	G	S	1		X	
SS-102-10'	11-12-14	1320	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold off 25' + 50' samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (8208)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

~~174K13040~~ HSA 240431
DXD 1-27-15

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessinger	Site Contact:	COC Record 4 of 4
Company Name ARCADIS	Tel/Mobile: 218 829 4607	Lab Contact: / Carrier:	COC No: 04748
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer - Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
PO#	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes/R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	D. Rhodes/R. Sams-8920	Sample Specific Notes:
SS-102-25'	11-12-14	1330	G	S	1		X	
SS-102-50'	11-12-14	1340	G	S	1		X	
SS-101-50'	11-12-14	1350	G	S	1		X	
SS-101-25'	11-12-14	1400	G	S	1		X	
SS-101-10'	11-12-14	1405	G	S	3		X	MS/MSD
Dup-01 (111214)	11-12-14	0000	G	S	1		X	
Dup-02 (111214)	11-12-14	0001	G	S	1		X	
EB-02 (111214)	11-12-14	1500	G	W	2		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4= HNO_3; 5= NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold all 25' & 50' Samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0208)

TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Lot Number: ~~[illegible]~~ HSA291731

Review Items	Yes	No	NA	If No, what was the problem? (SRD 12-9-15)	Comments/Actions Taken
1. Do sample container labels match COC? (IDs, Dates, Times)	✓			☐ 1a Do not match COC ☐ 1b Incomplete information ☐ 1c Marking smeared ☐ 1d Label torn ☐ 1e No label ☐ 1f COC not received ☐ 1g Other:	
2. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID: SGS7 Correction factor: -0.1	✓			☐ 2a Temp Blank = _____ ☐ 2b Cooler Temp = _____ ☐ 2c Cooling initiated for recently collected samples, ice present.	
3. Were samples received with correct chemical preservative (excluding Encore)?			✓	☐ 3a See box 3A for pH Preservation ☐ 3b Other:	
4. Were custody seals present/intact on cooler and/or containers?	✓			☐ 4a Not present ☐ 4b Not intact ☐ 4c Other:	
5. Were all of the samples listed on the COC received?	✓			☐ 5a Samples received-not on COC ☐ 5b Samples not received-on COC	
6. Were all of the sample containers received intact?	✓			☐ 6a Leaking ☐ 6b Broken	
7. Were VOA samples received without headspace?		✓	✓	☐ 7a Headspace (VOA only)	
8. Were samples received in appropriate containers?	✓			☐ 8a Improper container	
9. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			✓	☐ 9a Could not be determined due to matrix interference	
10. Were samples received within holding time?	✓			☐ 10a Holding time expired	
11. For rad samples, was sample activity info. provided?			✓	☐ Incomplete information	
12. For 1613B water samples is pH<9?			✓	If no, was pH adjusted to pH 7 - 9 with sulfuric acid? _____	**pH test strip lot number:** _____
13. Are the shipping containers intact?	✓			☐ 13a Leaking ☐ 13b Other:	
14. Was COC relinquished? (Signed/Dated/Timed)	✓			☐ 14a Not relinquished	
15. Are tests/parameters listed for each sample?	✓			☐ 15a Incomplete information	
16. Is the matrix of the samples noted?	✓			☐ 15a Incomplete information	
17. Is the date/time of sample collection noted?	✓			☐ 15a Incomplete information	
18. Is the client and project name/# identified?	✓			☐ 15a Incomplete information	
19. Was the sampler identified on the COC?	✓			☐ 19a Other	

	Box 3A: pH Preservation	Box 9A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Quote #: 91874 PM Instructions: NA

Sample Receiving Associate: [signature] Date: 11-13-14

QA026R28.doc, 042414

Imagine the result

Beazer East, Inc.

Koppers Company Inc. Superfund Site

Data Review

MORRISVILLE, NORTH CAROLINA

DIOXIN ANALYSES

SDG #H5A290431

Analyses Performed By:
TestAmerica Laboratories
Knoxville, Tennessee

Report # 23241R
Review Level: Tier III
Project: B0039310.0000.00003

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #H5A290431 for samples collected in association with the Koppers Company Inc. Superfund Site Investigation. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis	
					Dioxins/ Furans	MISC
SS-108-50'	H5A290431001	Soil	11/12/2014		X	
SS-110-50'	H5A290431002	Soil	11/12/2014		X	
SS-105-50'	H5A290431003	Soil	11/12/2014		X	
SS-103-50'	H5A290431004	Soil	11/12/2014		X	
SS-102-50'	H5A290431005	Soil	11/12/2014		X	
SS-101-50'	H5A290431006	Soil	11/12/2014		X	
DUP-02(111214)	H5A290431007	Soil	11/12/2014	SS-102-50'	X	

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8290. Data were reviewed in accordance with USEPA's *Guidance on Environmental Data Verification and Data Validation* (USEPA, 2002), the *USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review* (USEPA, 2011), and the USEPA Region 4 Data Validation Standard Operating Procedures for Chlorinated Dioxin/Furan Analysis by High Resolution Gas Chromatography/High Resolution Mass Spectrometry (USEPA, 2014b).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

R The sample results are rejected as unusable. The analyte may or may not be present in the sample.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

POLYCHLORINATED DIBENZODIOXINS AND POLYCHLORINATED DIBENZOFURANS (PCDD/PCDF) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8290	Water	None and 45 days from extraction to analysis	Cool to <6 °C
	Soil	None and 45 days from extraction to analysis	Cool to <6 °C

Note: In accordance with USEPA Region 4 guidelines, if samples are stored properly, the holding times for extraction/preparation are up to one year. Aqueous, solid, and semi-solid samples should be stored in the dark at 6 °C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks (RBs) measure contamination of samples during field operations. Note per the USEPA Region 4 guidelines, the RBs will not be used for data qualification.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the estimate detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were detected in the associated QA blanks; however, the associated sample results were greater than the BAL and/or were non-detect. Therefore, sample results greater than the BAL resulted in the removal of the laboratory qualifier (B). No other qualification of the sample results was required.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the daily instrument performance is satisfactory.

4.1 Initial Calibration

A maximum relative standard deviation (RSD) of 20% is allowed for all non-labeled compounds (target) and 30% is allowed for all labeled compounds (internal standards and recovery standards).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit percent difference (%D) less than the control limit (20%).

All calibration criteria were within the control limits.

5. Internal Standard Performance

Internal standard performance criteria ensure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require that the internal standard compounds exhibit recoveries within the control limits of 40% to 135%.

The internal standards exhibited responses within control limits.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis was not performed on a sample location within this SDG.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices and 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the Reporting Limit (RL), a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/ Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
SS-102-50'/ DUP-02(111214)	1,2,3,4,6,7,8-HpCDD	130000	130000	0.0%
	1,2,3,4,6,7,8-HpCDF	48000	35000	31.3%
	1,2,3,4,7,8,9-HpCDF	3700 UX	3300	AC
	1,2,3,4,7,8-HxCDD	3400 UX	2300 J	AC
	1,2,3,4,7,8-HxCDF	2500	2000 J	AC
	1,2,3,6,7,8-HxCDD	8000	6300	AC
	1,2,3,6,7,8-HxCDF	2200	1200 UX	AC
	1,2,3,7,8,9-HxCDD	6400	3600 UX	AC
	1,2,3,7,8-PeCDD	2300	2800	19.6%
	1,2,3,7,8-PeCDF	510	470	8.1%
	2,3,4,7,8-PeCDF	370	420	12.6%
	2,3,7,8-TCDD	250	220 UX	AC
	OCDD	110000	190000	53.3%
	OCDF	83000	79000	4.9%

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

9. Compound Identification

PCDD/PCDF compounds are identified by using the compound's ion abundance ratios, signal-to-noise ratios, and retention times relative to the internal standards.

An estimated maximum possible concentration (EMPC) designation is given to compounds which have signals eluting within the established retention time window which would, if positively identified, be greater than the detection limit. The signals do not, however, meet the ion abundance ratio criteria and cannot be identified as the compound of interest. The EMPC value is the estimated concentration of the interferant quantitated "as the compound of interest." This value should be considered an elevated detection limit based on potential compound identification and quantitation interference. The laboratory qualified EMPC values with a "Q". The qualifier UX has been added to the sample results to indicate the elevated detection limit as EMPC.

Sample ID	Compound	Laboratory Result	Reported Result
SS-108-50'	1,2,3,4,7,8-HxCDF	730 Q	730 UX
	1,2,3,6,7,8-HxCDF	560 Q	560 UX
SS-110-50'	1,2,3,4,7,8-HxCDD	560 Q J	560 UX
	1,2,3,6,7,8-HxCDF	260 Q J	260 UX
	2,3,4,6,7,8-HxCDF	170 Q J	170 UX
	1,2,3,4,7,8,9-HpCDF	690 Q J	690 UX

Sample ID	Compound	Laboratory Result	Reported Result
	2,3,7,8-TCDD	18 Q	18 UX
	2,3,7,8-TCDF	11 Q J	11 UX
SS-105-50'	1,2,3,7,8-PeCDD	370 Q J	370 UX
	2,3,4,6,7,8-HxCDF	460 Q J	460 UX
SS-103-50'	1,2,3,7,8-PeCDD	100 Q J	100 UX
	2,3,4,6,7,8-HxCDF	920 Q J	920 UX
SS-102-50'	1,2,3,4,7,8-HxCDD	3400 Q	3400 UX
	2,3,4,6,7,8-HxCDF	1100 Q J	1100 UX
	1,2,3,4,7,8,9-HpCDF	3700 Q	3700 UX
	2,3,7,8-TCDF	74 Q X	74 UX
SS-101-50'	1,2,3,7,8-PeCDD	250 Q J	250 UX
	1,2,3,4,7,8-HxCDD	440 Q J	440 UX
	1,2,3,6,7,8-HxCDF	250 Q J	250 UX
DUP-02(111214)	1,2,3,7,8,9-HxCDD	3600 Q	3600 UX
	1,2,3,6,7,8-HxCDF	1200 Q J	1200 UX
	2,3,4,7,8,9-HpCDF	490 Q J	490 UX
	2,3,7,8-TCDD	220 Q	220 UX
	2,3,7,8-TCDF	50 Q X	50 UX

Sample results associated with compound that exhibited a concentration greater than the linear range of the instrument calibration are summarized in the following table.

Sample ID	Compound	Original Analysis	Diluted Analysis	Reported Analysis
SS-108-50'	OCDD	1400000 E	--	1400000 EJ
SS-105-50'	OCDD	1100000 E	--	1100000 EJ
SS-103-50'	OCDD	1700000 E	--	1700000 EJ
SS-110-50'	1,2,3,7,8-PeCDD	--	360 D	360 D
	1,2,3,7,8-PeCDF	--	59 D	59 D
	2,3,4,7,8-PeCDF	--	44 D	44 D
SS-102-50'	2,3,7,8-TCDD	--	250 D	250 D
	1,2,3,7,8-PeCDD	--	2300 D	2300 D
	1,2,3,7,8-PeCDF	--	510 D	510 D
	2,3,4,7,8-PeCDF	--	370 D	370 D
DUP-02(111214)	2,3,7,8-TCDD	--	220 D	220 D
	1,2,3,7,8-PeCDD	--	2800 D	2800 D
	1,2,3,7,8-PeCDF	--	470 D	470 D

Sample ID	Compound	Original Analysis	Diluted Analysis	Reported Analysis
	2,3,4,7,8-PeCDF	--	420 D	420 D

Note: In the instance where both the original analysis and the diluted analysis sample results exhibited a concentration greater than or less than the calibration linear range of the instrument, the sample result exhibiting the greatest concentration will be reported as the final result.

Sample results associated with compounds exhibiting concentration greater than the linear range qualified as documented in the table below when reported as the final reported sample result.

Reported Sample Results	Qualification
Diluted sample result within calibration range	D
Diluted sample result less than the calibration range	DJ
Diluted sample result greater than the calibration range	EDJ
Original sample result greater than the calibration range	EJ

10. System Performance and Overall Assessment

All positive results for the isomer 2,3,7,8-TCDF associated with sample locations SS-102-50' and DUP-02(111214), were confirmed on a DB-225 column. The results were reported from the RTX-5 column and qualified with an “X.” Since this has no impact on the data, the “X” qualifier was removed.

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR PCDD/PCDF

PCDDs/PCDFs; SW-846 8290	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
HIGH-RESOLUTION GAS CHROMATOGRAPHY/HIGH-RESOLUTION MASS SPECTROMETRY (HRGC/HRMS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X	X		
B. Equipment blanks					X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) %R					X
Matrix Spike Duplicate(MSD) %R					X
MS/MSD Precision (RPD)					X
Field/Lab Duplicate (RPD)		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Signal-to-noise ratio $\geq$ 10:1		X		X	
Internal standard performance		X		X	
Recovery standard performance		X		X	
Resolution mix $\leq$ 25%		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	

PCDDs/PCDFs; SW-846 8290	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
HIGH-RESOLUTION GAS CHROMATOGRAPHY/HIGH-RESOLUTION MASS SPECTROMETRY (HRGC/HRMS)					
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference, %D – difference

VALIDATION PERFORMED BY: Todd Church

SIGNATURE:

DATE: March 9, 2015

PEER REVIEW: Dennis Capria

DATE: March 11, 2015

CHAIN OF CUSTODY /
CORRECTED SAMPLE ANALYSIS DATA SHEETS

ARCADIS U.S. Inc

Sample ID: SS-108-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 001	**Work Order #....:**	M53RG1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	8.6
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Kathryn B. Lay				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND			110	57	ng/kg
1,2,3,7,8-PeCDD	ND			550	59	ng/kg
1,2,3,4,7,8-HxCDD	**1200**			**550**	**42**	**ng/kg**
1,2,3,6,7,8-HxCDD	**6600**	~~B~~		**550**	**36**	**ng/kg**
1,2,3,7,8,9-HxCDD	**2900**	~~B~~		**550**	**36**	**ng/kg**
1,2,3,4,6,7,8-HpCDD	**170000**	~~B~~		**550**	**75**	**ng/kg**
OCDD	**1400000**	~~B~~ E	J	**1100**	**66**	**ng/kg**
2,3,7,8-TCDF	ND			110	36	ng/kg
1,2,3,7,8-PeCDF	ND			550	71	ng/kg
2,3,4,7,8-PeCDF	ND			550	45	ng/kg
1,2,3,4,7,8-HxCDF	**730**	~~Q~~	UX	**550**	**32**	**ng/kg**
1,2,3,6,7,8-HxCDF	**560**	~~Q~~	UX	**550**	**33**	**ng/kg**
2,3,4,6,7,8-HxCDF	ND			550	34	ng/kg
1,2,3,7,8,9-HxCDF	ND			550	39	ng/kg
1,2,3,4,6,7,8-HpCDF	**29000**	~~B~~		**550**	**33**	**ng/kg**
1,2,3,4,7,8,9-HpCDF	**2600**			**550**	**51**	**ng/kg**
OCDF	**110000**	~~B~~		**1100**	**40**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	57	40 - 135
13C-1,2,3,7,8-PeCDD	61	40 - 135
13C-1,2,3,4,7,8-HxCDD	73	40 - 135
13C-1,2,3,6,7,8-HxCDD	68	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	88	40 - 135
13C-OCDD	114	40 - 135
13C-2,3,7,8-TCDF	51	40 - 135
13C-1,2,3,7,8-PeCDF	49	40 - 135
13C-2,3,4,7,8-PeCDF	53	40 - 135
13C-1,2,3,4,7,8-HxCDF	66	40 - 135
13C-1,2,3,6,7,8-HxCDF	63	40 - 135
13C-2,3,4,6,7,8-HxCDF	63	40 - 135
13C-1,2,3,7,8,9-HxCDF	65	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	79	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	78	40 - 135
13C-OCDF	98	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-108-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 001	**Work Order #....:**	M53RG1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	8.6
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Kathryn B. Lay				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers

J = Estimated value

UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-110-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 002	**Work Order #....:**	M53RK1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/26/15	**Percent Moisture**	19
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	0.51 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Kathryn B. Lay				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,7,8-HxCDD	560	~~Q J~~	UX	1200	87	ng/kg
1,2,3,6,7,8-HxCDD	1500	~~B~~		1200	78	ng/kg
1,2,3,7,8,9-HxCDD	740	~~B~~ J		1200	76	ng/kg
1,2,3,4,6,7,8-HpCDD	33000	~~B~~		1200	110	ng/kg
OCDD	100000	~~B~~		2400	130	ng/kg
1,2,3,4,7,8-HxCDF	340	J		1200	74	ng/kg
1,2,3,6,7,8-HxCDF	260	~~Q J~~	UX	1200	70	ng/kg
2,3,4,6,7,8-HxCDF	170	~~Q J~~	UX	1200	69	ng/kg
1,2,3,7,8,9-HxCDF	ND			1200	91	ng/kg
1,2,3,4,6,7,8-HpCDF	8000	~~B~~		1200	91	ng/kg
1,2,3,4,7,8,9-HpCDF	690	~~Q J~~	UX	1200	150	ng/kg
OCDF	21000	~~B~~		2400	180	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-1,2,3,4,7,8-HxCDD	90	40 - 135
13C-1,2,3,6,7,8-HxCDD	110	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	100	40 - 135
13C-OCDD	94	40 - 135
13C-1,2,3,4,7,8-HxCDF	87	40 - 135
13C-1,2,3,6,7,8-HxCDF	87	40 - 135
13C-2,3,4,6,7,8-HxCDF	89	40 - 135
13C-1,2,3,7,8,9-HxCDF	83	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	95	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	85	40 - 135
13C-OCDF	79	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers

UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-110-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 002	**Work Order #....:**	M53RK2AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	19
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	10.2 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	18	~~Q~~ UX	12	6.5	ng/kg
1,2,3,7,8-PeCDD	360	~~B~~ D	61	8.6	ng/kg
2,3,7,8-TCDF	11	~~Q J~~ UX	12	5.0	ng/kg
1,2,3,7,8-PeCDF	59	J D	61	8.2	ng/kg
2,3,4,7,8-PeCDF	44	J D	61	6.8	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	70	40 - 135
13C-1,2,3,7,8-PeCDD	53	40 - 135
13C-2,3,7,8-TCDF	58	40 - 135
13C-1,2,3,7,8-PeCDF	48	40 - 135
13C-2,3,4,7,8-PeCDF	47	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers

D = Concentration is based on a diluted sample analysis

UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-105-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 003	**Work Order #....:**	M53RL1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	5.6
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND		110	48	ng/kg
1,2,3,7,8-PeCDD	**370**	~~Q B J~~ UX	**530**	**64**	**ng/kg**
1,2,3,4,7,8-HxCDD	**1300**		**530**	**46**	**ng/kg**
1,2,3,6,7,8-HxCDD	**4700**	~~B~~	**530**	**43**	**ng/kg**
1,2,3,7,8,9-HxCDD	**3000**	~~B~~	**530**	**41**	**ng/kg**
1,2,3,4,6,7,8-HpCDD	**120000**	~~B~~	**530**	**49**	**ng/kg**
OCDD	**1100000**	~~B~~ E J	**1100**	**56**	**ng/kg**
2,3,7,8-TCDF	ND		110	38	ng/kg
1,2,3,7,8-PeCDF	ND		530	60	ng/kg
2,3,4,7,8-PeCDF	**96**	J	**530**	**52**	**ng/kg**
1,2,3,4,7,8-HxCDF	**990**		**530**	**33**	**ng/kg**
1,2,3,6,7,8-HxCDF	**830**		**530**	**38**	**ng/kg**
2,3,4,6,7,8-HxCDF	**460**	~~Q J~~ UX	**530**	**34**	**ng/kg**
1,2,3,7,8,9-HxCDF	ND		530	36	ng/kg
1,2,3,4,6,7,8-HpCDF	**25000**	~~B~~	**530**	**36**	**ng/kg**
1,2,3,4,7,8,9-HpCDF	**1900**		**530**	**67**	**ng/kg**
OCDF	**75000**	~~B~~	**1100**	**45**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	66	40 - 135
13C-1,2,3,7,8-PeCDD	53	40 - 135
13C-1,2,3,4,7,8-HxCDD	70	40 - 135
13C-1,2,3,6,7,8-HxCDD	73	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	88	40 - 135
13C-OCDD	118	40 - 135
13C-2,3,7,8-TCDF	59	40 - 135
13C-1,2,3,7,8-PeCDF	67	40 - 135
13C-2,3,4,7,8-PeCDF	62	40 - 135
13C-1,2,3,4,7,8-HxCDF	64	40 - 135
13C-1,2,3,6,7,8-HxCDF	59	40 - 135
13C-2,3,4,6,7,8-HxCDF	64	40 - 135
13C-1,2,3,7,8,9-HxCDF	66	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	75	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	72	40 - 135
13C-OCDF	93	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-105-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 003	**Work Order #....:**	M53RL1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	5.6
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
J = Estimated value
UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-103-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 004	**Work Order #....:**	M53RM1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	19
Prep Batch #....:	5036029				
Initial Wgt/Vol :	0.5 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT		MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND		250	180	ng/kg
1,2,3,7,8-PeCDD	**1400**	~~B~~	**1200**	**160**	**ng/kg**
1,2,3,4,7,8-HxCDD	**3200**		**1200**	**160**	**ng/kg**
1,2,3,6,7,8-HxCDD	**12000**	~~B~~	**1200**	**150**	**ng/kg**
1,2,3,7,8,9-HxCDD	**6700**	~~B~~	**1200**	**140**	**ng/kg**
1,2,3,4,6,7,8-HpCDD	**230000**	~~B~~	**1200**	**200**	**ng/kg**
OCDD	**1700000**	~~B~~ E J	**2500**	**170**	**ng/kg**
2,3,7,8-TCDF	ND		250	110	ng/kg
1,2,3,7,8-PeCDF	**100**	~~Q J~~ UX	**1200**	**150**	**ng/kg**
2,3,4,7,8-PeCDF	ND		1200	140	ng/kg
1,2,3,4,7,8-HxCDF	**2800**		**1200**	**100**	**ng/kg**
1,2,3,6,7,8-HxCDF	**1900**		**1200**	**100**	**ng/kg**
2,3,4,6,7,8-HxCDF	**920**	~~Q J~~ UX	**1200**	**100**	**ng/kg**
1,2,3,7,8,9-HxCDF	ND		1200	120	ng/kg
1,2,3,4,6,7,8-HpCDF	**66000**	~~B~~	**1200**	**120**	**ng/kg**
1,2,3,4,7,8,9-HpCDF	**4100**		**1200**	**170**	**ng/kg**
OCDF	**170000**	~~B~~	**2500**	**160**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	68	40 - 135
13C-1,2,3,7,8-PeCDD	68	40 - 135
13C-1,2,3,4,7,8-HxCDD	70	40 - 135
13C-1,2,3,6,7,8-HxCDD	67	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	83	40 - 135
13C-OCDD	106	40 - 135
13C-2,3,7,8-TCDF	71	40 - 135
13C-1,2,3,7,8-PeCDF	74	40 - 135
13C-2,3,4,7,8-PeCDF	74	40 - 135
13C-1,2,3,4,7,8-HxCDF	62	40 - 135
13C-1,2,3,6,7,8-HxCDF	66	40 - 135
13C-2,3,4,6,7,8-HxCDF	64	40 - 135
13C-1,2,3,7,8,9-HxCDF	70	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	62	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	71	40 - 135
13C-OCDF	93	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-103-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 004	**Work Order #....:**	M53RM1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	19
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	0.5 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers
J = Estimated value
UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-102-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 005	**Work Order #....:**	M53RN1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/26/15	**Percent Moisture**	23
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	0.34 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Kathryn B. Lay				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,7,8-HxCDD	3400	~~Q~~	UX	1900	220	ng/kg
1,2,3,6,7,8-HxCDD	8000	~~B~~		1900	220	ng/kg
1,2,3,7,8,9-HxCDD	6400	~~B~~		1900	200	ng/kg
1,2,3,4,6,7,8-HpCDD	130000	~~B~~		1900	350	ng/kg
OCDD	110000	~~B~~		3800	420	ng/kg
1,2,3,4,7,8-HxCDF	2500			1900	190	ng/kg
1,2,3,6,7,8-HxCDF	2200			1900	160	ng/kg
2,3,4,6,7,8-HxCDF	1100	~~Q J~~	UX	1900	170	ng/kg
1,2,3,7,8,9-HxCDF	ND			1900	240	ng/kg
1,2,3,4,6,7,8-HpCDF	48000	~~B~~		1900	200	ng/kg
1,2,3,4,7,8,9-HpCDF	3700	~~Q~~	UX	1900	470	ng/kg
OCDF	83000	~~B~~		3800	350	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-1,2,3,4,7,8-HxCDD	76	40 - 135
13C-1,2,3,6,7,8-HxCDD	105	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	87	40 - 135
13C-OCDD	68	40 - 135
13C-1,2,3,4,7,8-HxCDF	70	40 - 135
13C-1,2,3,6,7,8-HxCDF	88	40 - 135
13C-2,3,4,6,7,8-HxCDF	86	40 - 135
13C-1,2,3,7,8,9-HxCDF	71	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	88	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	67	40 - 135
13C-OCDF	70	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers

UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-102-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 005	Work Order #....:	M53RN2AC	Matrix....:	SO
Date Sampled....:	11/12/14	Date Received....:	11/13/14	Dilution Factor:	10
Prep Date....:	02/05/15	Analysis Date....:	02/23/15	Percent Moisture	23
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	10.2 g	Instrument ID....:	M2A	Method:	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	250	D		13	11	ng/kg
1,2,3,7,8-PeCDD	2300	D	~~B~~	64	14	ng/kg
2,3,7,8-TCDF	74		~~Q X~~ UX	13	8.7	ng/kg
1,2,3,7,8-PeCDF	510	D		64	27	ng/kg
2,3,4,7,8-PeCDF	370	D		64	15	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	63	40 - 135
13C-1,2,3,7,8-PeCDD	61	40 - 135
13C-2,3,7,8-TCDF	61	40 - 135
13C-1,2,3,7,8-PeCDF	47	40 - 135
13C-2,3,4,7,8-PeCDF	48	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Q Estimated maximum possible concentration (EMPC).

X See project narrative.

Data Validation Qualifiers

D = Concentration is based on a diluted sample analysis

UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: SS-101-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 006	**Work Order #....:**	M53RP1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	14
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	1.1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	ND			110	47	ng/kg
1,2,3,7,8-PeCDD	**250**	~~Q B J~~	UX	**530**	**62**	**ng/kg**
1,2,3,4,7,8-HxCDD	**440**	~~Q J~~	UX	**530**	**67**	**ng/kg**
1,2,3,6,7,8-HxCDD	**2100**	~~B~~		**530**	**66**	**ng/kg**
1,2,3,7,8,9-HxCDD	**1300**	~~B~~		**530**	**62**	**ng/kg**
1,2,3,4,6,7,8-HpCDD	**56000**	~~B~~		**530**	**91**	**ng/kg**
OCDD	**320000**	~~B~~		**1100**	**73**	**ng/kg**
2,3,7,8-TCDF	ND			110	39	ng/kg
1,2,3,7,8-PeCDF	ND			530	64	ng/kg
2,3,4,7,8-PeCDF	ND			530	57	ng/kg
1,2,3,4,7,8-HxCDF	**680**			**530**	**58**	**ng/kg**
1,2,3,6,7,8-HxCDF	**250**	~~Q J~~	UX	**530**	**53**	**ng/kg**
2,3,4,6,7,8-HxCDF	**180**	**J**		**530**	**55**	**ng/kg**
1,2,3,7,8,9-HxCDF	ND			530	65	ng/kg
1,2,3,4,6,7,8-HpCDF	**12000**	~~B~~		**530**	**46**	**ng/kg**
1,2,3,4,7,8,9-HpCDF	**950**			**530**	**67**	**ng/kg**
OCDF	**44000**	~~B~~		**1100**	**70**	**ng/kg**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	68	40 - 135
13C-1,2,3,7,8-PeCDD	52	40 - 135
13C-1,2,3,4,7,8-HxCDD	66	40 - 135
13C-1,2,3,6,7,8-HxCDD	74	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	81	40 - 135
13C-OCDD	111	40 - 135
13C-2,3,7,8-TCDF	57	40 - 135
13C-1,2,3,7,8-PeCDF	66	40 - 135
13C-2,3,4,7,8-PeCDF	63	40 - 135
13C-1,2,3,4,7,8-HxCDF	63	40 - 135
13C-1,2,3,6,7,8-HxCDF	66	40 - 135
13C-2,3,4,6,7,8-HxCDF	66	40 - 135
13C-1,2,3,7,8,9-HxCDF	64	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	71	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	70	40 - 135
13C-OCDF	89	40 - 135

ARCADIS U.S. Inc

Sample ID: SS-101-50'

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 006	**Work Order #....:**	M53RP1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	14
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	1.1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers

UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: DUP-02(111214)

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 007	**Work Order #....:**	M53RT1AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/26/15	**Percent Moisture**	24
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	0.26 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Kathryn B. Lay				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
1,2,3,4,7,8-HxCDD	2300	J		2500	380	ng/kg
1,2,3,6,7,8-HxCDD	6300	~~B~~		2500	310	ng/kg
1,2,3,7,8,9-HxCDD	3600	~~Q B~~	UX	2500	310	ng/kg
1,2,3,4,6,7,8-HpCDD	130000	~~B~~		2500	380	ng/kg
OCDD	190000	~~B~~		5100	890	ng/kg
1,2,3,4,7,8-HxCDF	2000	J		2500	220	ng/kg
1,2,3,6,7,8-HxCDF	1200	~~Q J~~	UX	2500	190	ng/kg
2,3,4,6,7,8-HxCDF	490	~~Q J~~	UX	2500	220	ng/kg
1,2,3,7,8,9-HxCDF	ND			2500	370	ng/kg
1,2,3,4,6,7,8-HpCDF	35000	~~B~~		2500	230	ng/kg
1,2,3,4,7,8,9-HpCDF	3300			2500	440	ng/kg
OCDF	79000	~~B~~		5100	550	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-1,2,3,4,7,8-HxCDD	101	40 - 135
13C-1,2,3,6,7,8-HxCDD	108	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	88	40 - 135
13C-OCDD	64	40 - 135
13C-1,2,3,4,7,8-HxCDF	89	40 - 135
13C-1,2,3,6,7,8-HxCDF	106	40 - 135
13C-2,3,4,6,7,8-HxCDF	93	40 - 135
13C-1,2,3,7,8,9-HxCDF	62	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	107	40 - 135
13C-1,2,3,4,7,8,9-HpCDF	73	40 - 135
13C-OCDF	74	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

J Estimated Result.

Q Estimated maximum possible concentration (EMPC).

Data Validation Qualifiers

UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

ARCADIS U.S. Inc

Sample ID: DUP-02(111214)

Trace Level Organic Compounds

Lot - Sample #....:	H5A290431 - 007	**Work Order #....:**	M53RT2AC	**Matrix....:**	SO
Date Sampled....:	11/12/14	**Date Received....:**	11/13/14	**Dilution Factor:**	10
Prep Date....:	02/05/15	**Analysis Date....:**	02/23/15	**Percent Moisture**	24
Prep Batch # ....:	5036029				
Initial Wgt/Vol :	5.1 g	**Instrument ID....:**	M2A	**Method:**	SW846 8290
Analyst ID....:	Linda K. McWhirter				

PARAMETER	RESULT			MINIMUM LEVEL	ESTIMATED DETECTION LIMIT	UNITS
2,3,7,8-TCDD	220	~~Q~~	UX	26	23	ng/kg
1,2,3,7,8-PeCDD	2800	~~B~~	D	130	42	ng/kg
2,3,7,8-TCDF	50	~~Q X~~	UX	26	15	ng/kg
1,2,3,7,8-PeCDF	470	D		130	32	ng/kg
2,3,4,7,8-PeCDF	420	D		130	27	ng/kg

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	67	40 - 135
13C-1,2,3,7,8-PeCDD	52	40 - 135
13C-2,3,7,8-TCDF	65	40 - 135
13C-1,2,3,7,8-PeCDF	55	40 - 135
13C-2,3,4,7,8-PeCDF	50	40 - 135

Sample results, minimum levels, and estimated detection limits are reported on a dry weight basis and have been adjusted for percent moisture.

QUALIFIERS

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Q Estimated maximum possible concentration (EMPC).

X See project narrative.

Data Validation Qualifiers

D = Concentration is based on a diluted sample analysis

UX = Estimated Maximum Possible Concentration (EMPC); see Page 7 of the Data Review Report for additional details

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

HSA290431

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessingpas	Site Contact:	COC Record 1 of 4
Company Name ARCADIS	Tel/Mobile: 218 829 4607	Lab Contact: / Carrier:	COC No: 04746
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter, MN 56425	Calendar (C) or Work Days (W)		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below		Number of Packages: 2 coolers
Project Name/Number: B0039310.0000.0000	☒ 2 weeks		Temperature: RT 0.2, 0.1, CT 0.1, 0.0 deg C
Site: Beazer-Morrisville NC	☐ 1 week		Shipper: ☑ FedEx ☐ UPS ☐ Other:
P O #	☐ 2 days		Tracking Number: 605780793691 m
Sampled by: D. Rhodes / R. Sams	☐ 1 day		Recorded by: BKD Date: 11-13-14

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans-8290	Sample Specific Notes:
EB-01 (111214)	11-12-14	0805	G	WS	2		X	Equipment blank - DI water
SS-109-10'	11-12-14	0830	G	S	1		X	
SS-109-25'	11-12-14	0840	G	S	1		X	
SS-109-50'	11-12-14	0850	G	S	1		X	
SS-108-10'	11-12-14	0900	G	S	1		X	
SS-108-25'	11-12-14	0910	G	S	1		X	
SS-108-50'	11-12-14	0920	G	S	1		X	
SS-107-10'	11-12-14	0940	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:
Hold 25' and 50' Samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1510	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0308)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

~~HSA130408~~ 0150 1-29-15 HSA290431

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessinger	Site Contact:	COC Record 2 of 4
Company Name: ARCADIS	Tel/Mobile: 218-829-4607	Lab Contact: / Carrier:	COC No: 04747
Address: 6602 Excelsior Rd.	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip: Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone: 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer-Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
P O #	☐ 2 days		Tracking Number:
Sampled by: D. Akdes/R. Sans	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dioxins/Furans-8290	Sample Specific Notes:
SS-107-25' /	11-12-14	0950	G	S	3		X	MS/MSD
SS-107-39'	11-12-14	1000	G	S	1		X	
SS-110-10'	11-12-14	1005	G	S	1		X	
SS-110-25' /	11-12-14	1010	G	S	1		X	
SS-110-50' / /	11-12-14	1020	G	S	1		X	
SS-105-10'	11-12-14	1050	G	S	1		X	
SS-105-25' /	11-12-14	1100	G	S	1		X	
SS-105-50' / /	11-12-14	1115	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:
Hold all 25' & 50' samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

RETURN WHITE COPY TO LAB WITH SAMPLES
KEEP YELLOW COPY FOR YOUR RECORDS

TAL-0046-140 (0208)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessingpas	Site Contact:	COC Record 3 of 4
Company Name ARCADIS	Tel/Mobile: 218-829 4607	Lab Contact: / Carrier:	COC No: 04749
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer - Morrisville MC	☐ 1 week		Shipper: __FedEx __UPS __Other:
P O #	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes/R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	Dixon/Firms - 8290	Sample Specific Notes:
SS-106-10'	11-12-14	1125	G	S	1		X	
SS-106-25'	11-12-14	1130	G	S	1		X	
SS-103-10'	11-12-14	1230	G	S	1		X	
SS-103-25'	11-12-14	1240	G	S	1		X	
SS-103-50'	11-12-14	1245	G	S	1		X	
SS-104-25'	11-12-14	1255	G	S	1		X	
SS-104-10'	11-12-14	1300	G	S	1		X	
SS-102-10'	11-12-14	1320	G	S	1		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold off 25' + 50' samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

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TAL-0046-140 (8208)

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone 865 291-3000 (Main)
Phone 865-291-3031 (Receiving)

~~174K13040~~ HSA 240431
DXD 1-27-15

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact	Project Manager: David Bessinger	Site Contact:	COC Record 4 of 4
Company Name ARCADIS	Tel/Mobile: 218 829 4607	Lab Contact: / Carrier:	COC No: 04748
Address 6602 Excelsior Rd	Analysis Turnaround Time	Analysis (Attach list if more space is needed)	Lab Use Only:
City/State/Zip Baxter MN 56425	Calendar (C) or Work Days (W) _____		Custody Seals Intact? Y N NA
Phone 218 829 4607	TAT if different from Below _____		Number of Packages: _____
Project Name/Number: B0039310.0000.00001	☒ 2 weeks		Temperature: _____ deg C
Site: Beazer - Morrisville NC	☐ 1 week		Shipper: __FedEx __UPS __Other:
PO#	☐ 2 days		Tracking Number:
Sampled by: D. Rhodes/R. Sams	☐ 1 day		Recorded by: _____ Date: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Field Filtered Sample	D. Rhodes/R. Sams-8920	Sample Specific Notes:
SS-102-25'	11-12-14	1330	G	S	1		X	
SS-102-50'	11-12-14	1340	G	S	1		X	
SS-101-50'	11-12-14	1350	G	S	1		X	
SS-101-25'	11-12-14	1400	G	S	1		X	
SS-101-10'	11-12-14	1405	G	S	3		X	MS/MSD
Dup-01 (111214)	11-12-14	0000	G	S	1		X	
Dup-02 (111214)	11-12-14	0001	G	S	1		X	
EB-02 (111214)	11-12-14	1500	G	W	2		X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4= HNO_3; 5= NaOH; 6= $Na_2S_2O_3$ Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:
Hold all 25' & 50' Samples

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	ARCADIS	11-12-14 1570	[signature]	11-13-14 10:00
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

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TAL-0046-140 (0208)