

11/29/2018
Mr. Jim Tomalia
Arcadis U.S., Inc.
28550 Cabot Dr.
Suite 500
Novi MI 48377

Project Name: Ford LTP
Project #:
Workorder #: 1811424A

Dear Mr. Jim Tomalia

The following report includes the data for the above referenced project for sample(s) received on 11/20/2018 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Ausha Scott
Project Manager

WORK ORDER #: 1811424A

Work Order Summary

CLIENT:	Mr. Jim Tomalia Arcadis U.S., Inc. 28550 Cabot Dr. Suite 500 Novi, MI 48377	BILL TO:	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
PHONE:	517-819-0356	P.O. #	MI001454.0003
FAX:		PROJECT #	Ford LTP
DATE RECEIVED:	11/20/2018	CONTACT:	Ausha Scott
DATE COMPLETED:	11/29/2018		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	IAG-12070BOSTONPOST-01_111518	Modified TO-15	5.0 "Hg	5 psi
02A	IAB-12070BOSTONPOST-02_111518	Modified TO-15	5.0 "Hg	5 psi
03A	IACS-12070BOSTONPOST-03_111518	Modified TO-15	0 psi	5 psi
04A	IAF-12070BOSTONPOST-04_111518	Modified TO-15	6.0 "Hg	5 psi
05A	AA-12070BOSTONPOST-01_111518	Modified TO-15	3.0 "Hg	5 psi
06A	Lab Blank	Modified TO-15	NA	NA
07A	CCV	Modified TO-15	NA	NA
08A	LCS	Modified TO-15	NA	NA
08AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: 

 Technical Director

DATE: 11/29/18

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
 TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
 Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
 Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.

Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
 (916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15
Arcadis U.S., Inc.
Workorder# 1811424A

Five 6 Liter Summa Canister (100% Certified) samples were received on November 20, 2018. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

<i>Requirement</i>	<i>TO-15</i>	<i>ATL Modifications</i>
Initial Calibration	</=30% RSD with 2 compounds allowed out to < 40% RSD	</=30% RSD with 4 compounds allowed out to < 40% RSD
Blank and standards	Zero Air	UHP Nitrogen provides a higher purity gas matrix than zero air

Receiving Notes

Despite the use of flow controllers for sample collection, the final canister vacuum for sample IACS-12070BOSTONPOST-03_111518 was measured at ambient pressure at the laboratory. A leak test indicated that the canister valve was functioning properly.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. All The canisters used for this project have been certified to the Reporting Limit for the target analytes included in this workorder. Concentrations that are below the level at which the canister was certified may be false positives.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

- B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
- J - Estimated value.
- E - Exceeds instrument calibration range.
- S - Saturated peak.
- Q - Exceeds quality control limits.
- U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.
- UJ- Non-detected compound associated with low bias in the CCV
- N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	IAG-12070BOSTONPOST-01_111518	Date/Time Analyzed:	11/26/18 11:08 PM
Lab ID:	1811424A-01A	Dilution Factor:	1.61
Date/Time Collected:	11/16/18 10:43 AM	Instrument/Filename:	msd20.i / 20112619
Media:	6 Liter Summa Canister (100% Certified)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.34	0.57	0.64	Not Detected
1,4-Dioxane	123-91-1	0.44	0.52	0.58	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.26	0.57	0.64	Not Detected
Tetrachloroethene	127-18-4	0.62	0.98	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.40	0.57	0.64	Not Detected
Trichloroethene	79-01-6	0.34	0.78	0.86	Not Detected
Vinyl Chloride	75-01-4	0.24	0.37	0.41	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	84
4-Bromofluorobenzene	460-00-4	70-130	110
Toluene-d8	2037-26-5	70-130	95

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	IAB-12070BOSTONPOST-02_111518	Date/Time Analyzed:	11/26/18 11:53 PM
Lab ID:	1811424A-02A	Dilution Factor:	1.61
Date/Time Collected:	11/16/18 10:45 AM	Instrument/Filename:	msd20.i / 20112620
Media:	6 Liter Summa Canister (100% Certified)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.34	0.57	0.64	Not Detected
1,4-Dioxane	123-91-1	0.44	0.52	0.58	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.26	0.57	0.64	Not Detected
Tetrachloroethene	127-18-4	0.62	0.98	1.1	0.68 J
trans-1,2-Dichloroethene	156-60-5	0.40	0.57	0.64	Not Detected
Trichloroethene	79-01-6	0.34	0.78	0.86	Not Detected
Vinyl Chloride	75-01-4	0.24	0.37	0.41	Not Detected

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	87
4-Bromofluorobenzene	460-00-4	70-130	114
Toluene-d8	2037-26-5	70-130	94

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	IACS-12070BOSTONPOST-03_111518	Date/Time Analyzed:	11/27/18 05:36 AM
Lab ID:	1811424A-03A	Dilution Factor:	1.34
Date/Time Collected:	11/16/18 10:10 AM	Instrument/Filename:	msd20.i / 20112621
Media:	6 Liter Summa Canister (100% Certified)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.28	0.48	0.53	Not Detected
1,4-Dioxane	123-91-1	0.37	0.43	0.48	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.22	0.48	0.53	Not Detected
Tetrachloroethene	127-18-4	0.51	0.82	0.91	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.34	0.48	0.53	Not Detected
Trichloroethene	79-01-6	0.28	0.65	0.72	Not Detected
Vinyl Chloride	75-01-4	0.20	0.31	0.34	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	94
4-Bromofluorobenzene	460-00-4	70-130	116
Toluene-d8	2037-26-5	70-130	96

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	IAF-12070BOSTONPOST-04_111518	Date/Time Analyzed:	11/27/18 06:17 AM
Lab ID:	1811424A-04A	Dilution Factor:	1.68
Date/Time Collected:	11/16/18 10:49 AM	Instrument/Filename:	msd20.i / 20112622
Media:	6 Liter Summa Canister (100% Certified)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.35	0.60	0.67	Not Detected
1,4-Dioxane	123-91-1	0.46	0.54	0.60	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.27	0.60	0.67	Not Detected
Tetrachloroethene	127-18-4	0.64	1.0	1.1	0.69 J
trans-1,2-Dichloroethene	156-60-5	0.42	0.60	0.67	Not Detected
Trichloroethene	79-01-6	0.35	0.81	0.90	Not Detected
Vinyl Chloride	75-01-4	0.25	0.39	0.43	Not Detected

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	90
4-Bromofluorobenzene	460-00-4	70-130	111
Toluene-d8	2037-26-5	70-130	93

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	AA-12070BOSTONPOST-01_111518	Date/Time Analyzed:	11/27/18 07:05 AM
Lab ID:	1811424A-05A	Dilution Factor:	1.49
Date/Time Collected:	11/16/18 10:04 AM	Instrument/Filename:	msd20.i / 20112623
Media:	6 Liter Summa Canister (100% Certified)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.31	0.53	0.59	Not Detected
1,4-Dioxane	123-91-1	0.41	0.48	0.54	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.24	0.53	0.59	Not Detected
Tetrachloroethene	127-18-4	0.57	0.91	1.0	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.38	0.53	0.59	Not Detected
Trichloroethene	79-01-6	0.31	0.72	0.80	Not Detected
Vinyl Chloride	75-01-4	0.22	0.34	0.38	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	87
4-Bromofluorobenzene	460-00-4	70-130	111
Toluene-d8	2037-26-5	70-130	99

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	Lab Blank	Date/Time Analyzed:	11/26/18 11:46 AM
Lab ID:	1811424A-06A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20112605a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.21	0.36	0.40	Not Detected
1,4-Dioxane	123-91-1	0.27	0.32	0.36	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.16	0.36	0.40	Not Detected
Tetrachloroethene	127-18-4	0.38	0.61	0.68	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.25	0.36	0.40	Not Detected
Trichloroethene	79-01-6	0.21	0.48	0.54	Not Detected
Vinyl Chloride	75-01-4	0.15	0.23	0.26	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	89
4-Bromofluorobenzene	460-00-4	70-130	113
Toluene-d8	2037-26-5	70-130	95

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	CCV	Date/Time Analyzed:	11/26/18 08:36 AM
Lab ID:	1811424A-07A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20112602
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	82
1,4-Dioxane	123-91-1	94
cis-1,2-Dichloroethene	156-59-2	86
Tetrachloroethene	127-18-4	112
trans-1,2-Dichloroethene	156-60-5	89
Trichloroethene	79-01-6	107
Vinyl Chloride	75-01-4	79

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	80
4-Bromofluorobenzene	460-00-4	70-130	114
Toluene-d8	2037-26-5	70-130	100

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	LCS	Date/Time Analyzed:	11/26/18 09:39 AM
Lab ID:	1811424A-08A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20112603
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	82
1,4-Dioxane	123-91-1	91
cis-1,2-Dichloroethene	156-59-2	78
Tetrachloroethene	127-18-4	104
trans-1,2-Dichloroethene	156-60-5	97
Trichloroethene	79-01-6	106
Vinyl Chloride	75-01-4	79

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	77
4-Bromofluorobenzene	460-00-4	70-130	112
Toluene-d8	2037-26-5	70-130	101

* % Recovery is calculated using unrounded analytical results.

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	LCSD	Date/Time Analyzed:	11/26/18 10:35 AM
Lab ID:	1811424A-08AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20112604
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	85
1,4-Dioxane	123-91-1	88
cis-1,2-Dichloroethene	156-59-2	81
Tetrachloroethene	127-18-4	104
trans-1,2-Dichloroethene	156-60-5	100
Trichloroethene	79-01-6	102
Vinyl Chloride	75-01-4	81

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	84
4-Bromofluorobenzene	460-00-4	70-130	113
Toluene-d8	2037-26-5	70-130	96

* % Recovery is calculated using unrounded analytical results.



November 29, 2018

Kris Hinskey
Arcadis Inc
10559 Citation Ave
Suite 100
Brighton, MI 48116

CADENA project ID: E203631
Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater
Project number: MI001454.0002/3/4.00002/2B/3B
Client project scope reference: Sample COC only was used to define project analytical requirements.
Laboratory: Eurofins Air Toxics - Folsom
Laboratory submittal: 1811424A
Sample date: 2018-11-16
Report received by CADENA: 2018-11-29
Initial Data Verification completed by CADENA: 2018-11-29

5 Air samples were analyzed for TO-15 parameters.

There were no significant QC anomalies or exceptions to report.

Data verification for the report specified above was completed using the Ford Motor Company Environmental Laboratory Technical Specification, the CADENA Standard Operating Procedure for the Verification of Environmental Analytical Data and the associated analytical methods as references for evaluating the batch QC, sample data and report content. The EPA National Functional Guidelines for validating organic and inorganic data were used as guidance when addressing out of control QC results and the associated data qualifiers.

Qualifiers added during verification have been added to the electronic data which is available for download from the CADENA CLMS. Refer to the attached table of analytical results that have been qualified during verification.

The definitions of the qualifiers used for this data package are defined in the analytical report. CADENA valid qualifiers are defined in the table below. To view and download a PDF copy of the laboratory analytical report access the CADENA CLMS at <http://clms.cadenaco.com/index.cfm>.

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

CADENA Inc, 1099 Highland Drive, Suite E, Ann Arbor, MI 48108 517-819-0356

CADENA Valid Qualifiers

Valid Qualifiers	Description
<	Less than the reported concentration.
>	Greater than the reported concentration.
B	The analyte / compound was detected in the associated blank. For Organic methods the sample concentration was greater than the RDL and less than 5x (or 10x for common lab contaminants) the blank concentration and is considered non-detect at the reported concentration. For Inorganic methods the sample concentration was greater than the RDL and less than 10x the blank concentration and is considered non-detect at the reported concentration.
E	The analyte / Compound reported exceeds the calibration range and is considered estimated.
EMPC	Estimated Minimum Potential Contamination - Dioxin/Furan analyses only.
J	Indicates an estimated value. This flag is used either when estimating a concentration for a tentatively identified compound or when the data indicates the presence of an analyte / compound but the result is less than the sample Quantitation limit, but greater than zero. The flag is also used in data validation to indicate a reported value should be considered estimated due to associated quality assurance deficiencies.
J-	The result is an estimated quantity, but the result may be biased low.
JB	NON-DETECT AT THE CONCENTRATION REPORTED AND ESTIMATED
JH	The sample result is considered estimated and is potentially biased high.
JL	The sample result is considered estimated and is potentially biased low.
JUB	NON-DETECT AT THE REPORTING LIMIT AND ESTIMATED
NJ	Tentatively identified compound with approximated concentration.
R	Indicates the value is considered to be unusable. (Note: The analyte / compound may or may not be present.)
TNTC	Too Numerous to Count - Asbestos and Microbiological Results.
U	Indicates that the analyte / compound was analyzed for, but not detected.
UB	The analyte / compound was detected in the associated blank. For Organic methods the sample concentration was less than the RDL and less than 5x (or 10x for common lab contaminants) the blank concentration and is considered non-detect at the RDL. For Inorganic methods the sample concentration was less than the RDL and less than 10x the blank concentration and is considered non-detect at the RDL.
UJ	The analyte / compound was not detected above the reported sample Quantitation limit. However, the Quantitation limit is considered to be approximate due to associated quality assurance results and may or may not represent the actual limit of Quantitation to accurately and precisely report the analyte in the sample.

11/28/2018
Mr. Jim Tomalia
Arcadis U.S., Inc.
28550 Cabot Dr.
Suite 500
Novi MI 48377

Project Name: Ford LTP
Project #:
Workorder #: 1811424B

Dear Mr. Jim Tomalia

The following report includes the data for the above referenced project for sample(s) received on 11/20/2018 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Ausha Scott
Project Manager

WORK ORDER #: 1811424B

Work Order Summary

CLIENT:	Mr. Jim Tomalia Arcadis U.S., Inc. 28550 Cabot Dr. Suite 500 Novi, MI 48377	BILL TO:	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
PHONE:	517-819-0356	P.O. #	MI001454.0003
FAX:		PROJECT #	Ford LTP
DATE RECEIVED:	11/20/2018	CONTACT:	Ausha Scott
DATE COMPLETED:	11/28/2018		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
06A	SSMP-12070BOSTONPOST-01_111618	TO-15	1.2 "Hg	15.2 psi
07A	Lab Blank	TO-15	NA	NA
08A	CCV	TO-15	NA	NA
09A	LCS	TO-15	NA	NA
09AA	LCSD	TO-15	NA	NA

CERTIFIED BY: 
 Technical Director

DATE: 11/28/18

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
 TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
 Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
 Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.

Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.
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 (916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15
Arcadis U.S., Inc.
Workorder# 1811424B

One 1 Liter Summa Canister sample was received on November 20, 2018. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per client project requirements, the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified (0.2 ppbv for compounds reported at 0.5 ppbv and 0.8 ppbv for compounds reported at 2.0 ppbv) may be false positives.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	SSMP-12070BOSTONPOST-01_111618	Date/Time Analyzed:	11/27/18 12:31 AM
Lab ID:	1811424B-06A	Dilution Factor:	2.12
Date/Time Collected:	11/16/18 11:10 AM	Instrument/Filename:	msd17.i / 17112621
Media:	1 Liter Summa Canister		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	1.8	3.4	4.2	Not Detected
1,4-Dioxane	123-91-1	3.4	11	15	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.67	3.4	4.2	Not Detected
Tetrachloroethene	127-18-4	1.0	5.8	7.2	790
trans-1,2-Dichloroethene	156-60-5	1.3	3.4	4.2	Not Detected
Trichloroethene	79-01-6	2.2	4.6	5.7	Not Detected
Vinyl Chloride	75-01-4	0.65	2.2	2.7	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	91
4-Bromofluorobenzene	460-00-4	70-130	93
Toluene-d8	2037-26-5	70-130	109

EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	Lab Blank	Date/Time Analyzed:	11/26/18 01:12 PM
Lab ID:	1811424B-07A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd17.i / 17112606c
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.87	1.6	2.0	Not Detected
1,4-Dioxane	123-91-1	1.6	5.4	7.2	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.32	1.6	2.0	Not Detected
Tetrachloroethene	127-18-4	0.47	2.7	3.4	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.59	1.6	2.0	Not Detected
Trichloroethene	79-01-6	1.0	2.1	2.7	Not Detected
Vinyl Chloride	75-01-4	0.31	1.0	1.3	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	93
4-Bromofluorobenzene	460-00-4	70-130	98
Toluene-d8	2037-26-5	70-130	109

EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	CCV	Date/Time Analyzed:	11/26/18 10:57 AM
Lab ID:	1811424B-08A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd17.i / 17112603
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	87
1,4-Dioxane	123-91-1	126
cis-1,2-Dichloroethene	156-59-2	100
Tetrachloroethene	127-18-4	106
trans-1,2-Dichloroethene	156-60-5	92
Trichloroethene	79-01-6	121
Vinyl Chloride	75-01-4	79

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	88
4-Bromofluorobenzene	460-00-4	70-130	97
Toluene-d8	2037-26-5	70-130	114

EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	LCS	Date/Time Analyzed:	11/26/18 11:37 AM
Lab ID:	1811424B-09A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd17.i / 17112604
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	82
1,4-Dioxane	123-91-1	123
cis-1,2-Dichloroethene	156-59-2	91
Tetrachloroethene	127-18-4	102
trans-1,2-Dichloroethene	156-60-5	98
Trichloroethene	79-01-6	116
Vinyl Chloride	75-01-4	80

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	90
4-Bromofluorobenzene	460-00-4	70-130	96
Toluene-d8	2037-26-5	70-130	113

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS FULL SCAN
Ford LTP

Client ID:	LCSD	Date/Time Analyzed:	11/26/18 12:04 PM
Lab ID:	1811424B-09AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd17.i / 17112605
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	84
1,4-Dioxane	123-91-1	118
cis-1,2-Dichloroethene	156-59-2	90
Tetrachloroethene	127-18-4	101
trans-1,2-Dichloroethene	156-60-5	96
Trichloroethene	79-01-6	112
Vinyl Chloride	75-01-4	78

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	90
4-Bromofluorobenzene	460-00-4	70-130	96
Toluene-d8	2037-26-5	70-130	110

* % Recovery is calculated using unrounded analytical results.



November 28, 2018

Kris Hinskey
Arcadis Inc
10559 Citation Ave
Suite 100
Brighton, MI 48116

CADENA project ID: E203631
Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater
Project number: MI001454.0002/3/4.00002/2B/3B
Client project scope reference: Sample COC only was used to define project analytical requirements.
Laboratory: Eurofins Air Toxics - Folsom
Laboratory submittal: 1811424B
Sample date: 2018-11-16
Report received by CADENA: 2018-11-28
Initial Data Verification completed by CADENA: 2018-11-28

1 Air sample was analyzed for TO-15 parameters.

There were no significant QC anomalies or exceptions to report.

Data verification for the report specified above was completed using the Ford Motor Company Environmental Laboratory Technical Specification, the CADENA Standard Operating Procedure for the Verification of Environmental Analytical Data and the associated analytical methods as references for evaluating the batch QC, sample data and report content. The EPA National Functional Guidelines for validating organic and inorganic data were used as guidance when addressing out of control QC results and the associated data qualifiers.

The definitions of the qualifiers used for this data package are defined in the analytical report. CADENA valid qualifiers are defined in the table below. To view and download a PDF copy of the laboratory analytical report access the CADENA CLMS at <http://clms.cadenaco.com/index.cfm>.

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

CADENA Inc, 1099 Highland Drive, Suite E, Ann Arbor, MI 48108 517-819-0356

CADENA Valid Qualifiers

Valid Qualifiers	Description
<	Less than the reported concentration.
>	Greater than the reported concentration.
B	The analyte / compound was detected in the associated blank. For Organic methods the sample concentration was greater than the RDL and less than 5x (or 10x for common lab contaminants) the blank concentration and is considered non-detect at the reported concentration. For Inorganic methods the sample concentration was greater than the RDL and less than 10x the blank concentration and is considered non-detect at the reported concentration.
E	The analyte / Compound reported exceeds the calibration range and is considered estimated.
EMPC	Estimated Minimum Potential Contamination - Dioxin/Furan analyses only.
J	Indicates an estimated value. This flag is used either when estimating a concentration for a tentatively identified compound or when the data indicates the presence of an analyte / compound but the result is less than the sample Quantitation limit, but greater than zero. The flag is also used in data validation to indicate a reported value should be considered estimated due to associated quality assurance deficiencies.
J-	The result is an estimated quantity, but the result may be biased low.
JB	NON-DETECT AT THE CONCENTRATION REPORTED AND ESTIMATED
JH	The sample result is considered estimated and is potentially biased high.
JL	The sample result is considered estimated and is potentially biased low.
JUB	NON-DETECT AT THE REPORTING LIMIT AND ESTIMATED
NJ	Tentatively identified compound with approximated concentration.
R	Indicates the value is considered to be unusable. (Note: The analyte / compound may or may not be present.)
TNTC	Too Numerous to Count - Asbestos and Microbiological Results.
U	Indicates that the analyte / compound was analyzed for, but not detected.
UB	The analyte / compound was detected in the associated blank. For Organic methods the sample concentration was less than the RDL and less than 5x (or 10x for common lab contaminants) the blank concentration and is considered non-detect at the RDL. For Inorganic methods the sample concentration was less than the RDL and less than 10x the blank concentration and is considered non-detect at the RDL.
UJ	The analyte / compound was not detected above the reported sample Quantitation limit. However, the Quantitation limit is considered to be approximate due to associated quality assurance results and may or may not represent the actual limit of Quantitation to accurately and precisely report the analyte in the sample.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-104660-1

Client Project/Site: Ford LTP Livonia MI - E203631

For:

ARCADIS U.S., Inc.
28550 Cabot Drive
Suite 500
Novi, Michigan 48377

Attn: Kristoffer Hinskey



Authorized for release by:
12/3/2018 4:19:02 PM

Michael DelMonico, Project Manager I
(330)497-9396
michael.delmonico@testamericainc.com

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104660-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.
X	Surrogate is outside control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104660-1

Job ID: 240-104660-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-104660-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

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

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The sample was received on 11/20/2018 9:50 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.7° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Sample SUMP_12070BOSTONPOST_111518 (240-104660-1) was analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The sample was analyzed on 11/29/2018.

Dibromofluoromethane (Surr) failed the surrogate recovery criteria high for SUMP_12070BOSTONPOST_111518 (240-104660-1). Refer to the QC report for details.

No MS/MSD in batch 357563 due to an incorrect spike: SUMP_12070BOSTONPOST_111518 (240-104660-1).

Surrogate recovery for the following sample was outside the upper control limit: SUMP_12070BOSTONPOST_111518 (240-104660-1). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOLATILE ORGANIC COMPOUNDS (GCMS SIM)

Sample SUMP_12070BOSTONPOST_111518 (240-104660-1) was analyzed for volatile organic compounds (GCMS SIM) in accordance

Case Narrative

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104660-1

Job ID: 240-104660-1 (Continued)

Laboratory: TestAmerica Canton (Continued)

with EPA SW-846 Method 8260B SIM. The sample was analyzed on 11/26/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104660-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
8260B SIM	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
5030B	Purge and Trap	SW846	TAL CAN

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396



Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104660-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-104660-1	SUMP_12070BOSTONPOST_111518	Water	11/15/18 10:45	11/20/18 09:50

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Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104660-1

Client Sample ID: SUMP_12070BOSTONPOST_111518

Lab Sample ID: 240-104660-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dioxane	1.2	J	2.0	0.86	ug/L	1		8260B SIM	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Canton

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Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104660-1

Client Sample ID: SUMP_12070BOSTONPOST_111518

Lab Sample ID: 240-104660-1

Date Collected: 11/15/18 10:45

Matrix: Water

Date Received: 11/20/18 09:50

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	1.2	J	2.0	0.86	ug/L			11/26/18 23:31	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	105		63 - 125					11/26/18 23:31	1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/29/18 17:55	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			11/29/18 17:55	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/29/18 17:55	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/29/18 17:55	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/29/18 17:55	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/29/18 17:55	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	112		70 - 121					11/29/18 17:55	1
4-Bromofluorobenzene (Surr)	75		59 - 120					11/29/18 17:55	1
Toluene-d8 (Surr)	89		70 - 123					11/29/18 17:55	1
Dibromofluoromethane (Surr)	131	X	75 - 128					11/29/18 17:55	1

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104660-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA (70-121)	BFB (59-120)	TOL (70-123)	DBFM (75-128)
240-104660-1	SUMP_12070BOSTONPOST_1	112	75	89	131 X
LCS 240-357563/4	Lab Control Sample	90	95	98	104
MB 240-357563/6	Method Blank	99	73	84	116

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA (63-125)
240-104549-F-13 MS	Matrix Spike	101
240-104549-F-13 MSD	Matrix Spike Duplicate	103
240-104660-1	SUMP_12070BOSTONPOST_1	105
	1518	
LCS 240-357015/4	Lab Control Sample	100
MB 240-357015/5	Method Blank	99

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)

QC Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104660-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-357563/6
Matrix: Water
Analysis Batch: 357563

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/29/18 10:38	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			11/29/18 10:38	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/29/18 10:38	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/29/18 10:38	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/29/18 10:38	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/29/18 10:38	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		70 - 121		11/29/18 10:38	1
4-Bromofluorobenzene (Surr)	73		59 - 120		11/29/18 10:38	1
Toluene-d8 (Surr)	84		70 - 123		11/29/18 10:38	1
Dibromofluoromethane (Surr)	116		75 - 128		11/29/18 10:38	1

Lab Sample ID: LCS 240-357563/4
Matrix: Water
Analysis Batch: 357563

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	10.0	10.0		ug/L		100	65 - 139
cis-1,2-Dichloroethene	10.0	10.8		ug/L		108	76 - 128
Tetrachloroethene	10.0	10.9		ug/L		109	74 - 130
trans-1,2-Dichloroethene	10.0	11.4		ug/L		114	78 - 133
Trichloroethene	10.0	9.75		ug/L		98	76 - 125
Vinyl chloride	10.0	10.0		ug/L		100	58 - 143

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	90		70 - 121
4-Bromofluorobenzene (Surr)	95		59 - 120
Toluene-d8 (Surr)	98		70 - 123
Dibromofluoromethane (Surr)	104		75 - 128

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-357015/5
Matrix: Water
Analysis Batch: 357015

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			11/26/18 14:29	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		63 - 125		11/26/18 14:29	1

TestAmerica Canton

QC Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104660-1

Method: 8260B SIM - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-357015/4
Matrix: Water
Analysis Batch: 357015

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	10.0	9.12		ug/L		91	59 - 131
Surrogate	%Recovery	LCS Qualifier	Limits				
1,2-Dichloroethane-d4 (Surr)	100		63 - 125				

Lab Sample ID: 240-104549-F-13 MS
Matrix: Water
Analysis Batch: 357015

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	7.7		10.0	18.2		ug/L		105	52 - 129
Surrogate	%Recovery	MS Qualifier	Limits						
1,2-Dichloroethane-d4 (Surr)	101		63 - 125						

Lab Sample ID: 240-104549-F-13 MSD
Matrix: Water
Analysis Batch: 357015

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,4-Dioxane	7.7		10.0	17.7		ug/L		100	52 - 129	3	13
Surrogate	%Recovery	MSD Qualifier	Limits								
1,2-Dichloroethane-d4 (Surr)	103		63 - 125								

QC Association Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104660-1

GC/MS VOA

Analysis Batch: 357015

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-104660-1	SUMP_12070BOSTONPOST_111518	Total/NA	Water	8260B SIM	
MB 240-357015/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-357015/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-104549-F-13 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-104549-F-13 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

Analysis Batch: 357563

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-104660-1	SUMP_12070BOSTONPOST_111518	Total/NA	Water	8260B	
MB 240-357563/6	Method Blank	Total/NA	Water	8260B	
LCS 240-357563/4	Lab Control Sample	Total/NA	Water	8260B	

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104660-1

Client Sample ID: SUMP_12070BOSTONPOST_111518

Lab Sample ID: 240-104660-1

Date Collected: 11/15/18 10:45

Matrix: Water

Date Received: 11/20/18 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	357563	11/29/18 17:55	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	357015	11/26/18 23:31	SAM	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.

TestAmerica Job ID: 240-104660-1

Project/Site: Ford LTP Livonia MI - E203631

Laboratory: TestAmerica Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	2927	02-23-19
Connecticut	State Program	1	PH-0590	12-31-19
Florida	NELAP	4	E87225	06-30-19
Illinois	NELAP	5	200004	07-31-19
Kansas	NELAP	7	E-10336	01-31-19
Kentucky (UST)	State Program	4	58	02-23-19
Kentucky (WW)	State Program	4	98016	12-31-18 *
Minnesota	NELAP	5	039-999-348	12-31-18 *
Minnesota (Petrofund)	State Program	1	3506	07-31-19
Nevada	State Program	9	OH00048	07-31-19
New Jersey	NELAP	2	OH001	06-30-19
New York	NELAP	2	10975	03-31-19
Ohio VAP	State Program	5	CL0024	09-06-19
Oregon	NELAP	10	4062	02-23-19
Pennsylvania	NELAP	3	68-00340	08-31-19 *
Texas	NELAP	6	T104704517-18-10	08-31-19
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-19
Washington	State Program	10	C971	01-12-19
West Virginia DEP	State Program	3	210	12-31-18 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Canton

Chain of Custody Record

TestAmerica Laboratory location: N. Canton — 4101 Studer Street NW North Canton, OH 44720 / 330-497-9398

Client Contact Company Name: Arcadis Address: 28550 Cahol Drive, Suite 500 City/State/Zip: Novi, MI, 48377 Phone: 248-994-2240 Project Name: Finc 3.1.3P Project Number: M1001454.0003 PO # M1001454.0003		Regulatory program: <input type="checkbox"/> DW <input type="checkbox"/> NPDES <input type="checkbox"/> RCRA <input type="checkbox"/> Other	
Client Project Manager: Kris Hinkley Telephone: 248-994-2240 Email: khrinkley@arcadis.com		Site Contact: Angela DeGraaf Telephone: 330-497-9396	
Method of Shipments/Carrier: Shipping/Tracking No:		Analyses 1,4-Dioxane 8260B SIM VM Chloride 8260B TCE 8260B PCE 8260B Trans-1,2-DCE 8260B cis-1,2-DCE 8260B 1,1-DCE 8260B	
Sample Identification SUMP - TESTED - 11/15/18 12070 BOSTON POST		Sample Specific Notes / Special Instructions: 6 CONTAINERS	
Matrix Aqueous <input type="checkbox"/> Solid <input type="checkbox"/> Sediment <input type="checkbox"/> Other:		Containers & Preservatives HCT <input type="checkbox"/> HNO3 <input type="checkbox"/> H2SO4 <input type="checkbox"/> Other:	
Sample Date: 11-15-18 Sample Time: 1045		Filtered Sample (Y/N) Composite/C Grab <input type="checkbox"/>	
Analysis Turnaround Time TAT if different from below: <input type="checkbox"/> 1 week <input type="checkbox"/> 2 weeks <input checked="" type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For: _____ Months	
Possible Hazard Identification <input checked="" type="checkbox"/> Non-hazard <input type="checkbox"/> Inimicable		Retrieved by: Arcadis Date/Time: 11/15/18/1221	
Special Instructions/OC Requirements & Comments:		Relinquished by: Arcadis Date/Time: 11/15/18 12:47	
Submit all results through Cardina at jim.tomalia@cardina.com. Cardina #E203631 Level 1 Reporting.		Relinquished by: NOV Cold Storage Date/Time: 11/19/18 12:47	
TestAmerica Laboratory, Inc. All rights reserved. Software & Design are trademarks of TestAmerica Laboratory, Inc.		Relinquished by: NOV Cold Storage Date/Time: 11/19/18 12:47	



TestAmerica Canton Sample Receipt Form/Narrative
Canton Facility

Login #: 104640

Client Arco d's Site Name _____

Cooler unpacked by:

Cooler Received on 11/20/18 Opened on 11/20/18

DS

FedEx: 1st Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # TA Foam Box Client Cooler Box Other _____

Packing material used: Bubble Wrap Foam Plastic Bag None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt See Multiple Cooler Form
 IR GUN# IR-8 (CF +0.9 °C) Observed Cooler Temp. 1.8 °C Corrected Cooler Temp. 2.7 °C
 IR GUN #36 (CF +0.6 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity / _____ Yes No
 -Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
 -Were tamper/custody seals intact and uncompromised? Yes No NA

3. Shippers' packing slip attached to the cooler(s)? Yes No

4. Did custody papers accompany the sample(s)? Yes No

5. Were the custody papers relinquished & signed in the appropriate place? Yes No

6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No

7. Did all bottles arrive in good condition (Unbroken)? Yes No

8. Could all bottle labels be reconciled with the COC? Yes No

9. Were correct bottle(s) used for the test(s) indicated? Yes No

10. Sufficient quantity received to perform indicated analyses? Yes No

11. Are these work share samples? Yes No

If yes, Questions 12-16 have been checked at the originating laboratory.

12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA

13. Were VOAs on the COC? Yes No

14. Were air bubbles >6 mm in any VOA vials? Yes NA Larger than this.

15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes No

16. Was a LL Hg or Me Hg trip blank present? Yes No

Tests that are not checked for pH by Receiving:
 VOAs
 Oil and Grease
 TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by:

Por

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.

Sample(s) _____ were received in a broken container.

Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.

Time preserved: _____ Preservative(s) added/Lot number(s): _____



December 03, 2018

Kris Hinskey
Arcadis Inc
10559 Citation Ave
Suite 100
Brighton, MI 48116

CADENA project ID: E203631
Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater
Project number: MI001454.0002/3/4.00002/2B/3B
Client project scope reference: Sample COC only was used to define project analytical requirements.
Laboratory: TestAmerica - North Canton
Laboratory submittal: 104660-1
Sample date: 2018-11-15
Report received by CADENA: 2018-12-03
Initial Data Verification completed by CADENA: 2018-12-03

The following minor QC exceptions or missing information were noted:

GCMS VOC sample -001 SURROGATE recovery was outlying biased high for 1 surrogate. Associated client sample results were non-detect so qualification was not required based on this high bias QC outlier.

GCMS VOC QC batch unavailable MS/MSD as noted in the laboratory submittal case narrative were not used to qualify client sample results as part of this level 2 data package verification review.

Data verification for the report specified above was completed using the Ford Motor Company Environmental Laboratory Technical Specification, the CADENA Standard Operating Procedure for the Verification of Environmental Analytical Data and the associated analytical methods as references for evaluating the batch QC, sample data and report content. The EPA National Functional Guidelines for validating organic and inorganic data were used as guidance when addressing out of control QC results and the associated data qualifiers.

1 Water sample was analyzed for GCMS VOC parameter(s).

Sample/MS/MSD Surrogate Recovery, Blank/LCS Surrogate Recovery, LCS/LCD Recovery, Blank Contamination and Hold Time Exception were reviewed as part of our verification.

Analytical results reported between RDL and MDL are flagged 'J' and considered estimated values.

The definitions of the qualifiers used for this data package are defined in the analytical report. CADENA valid qualifiers are defined in the table below. To view and download a PDF copy of the laboratory analytical report access the CADENA CLMS at <http://clms.cadenaco.com/index.cfm>.

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

CADENA Valid Qualifiers

Valid Qualifiers	Description
<	Less than the reported concentration.
>	Greater than the reported concentration.
B	The analyte / compound was detected in the associated blank. For Organic methods the sample concentration was greater than the RDL and less than 5x (or 10x for common lab contaminants) the blank concentration and is considered non-detect at the reported concentration. For Inorganic methods the sample concentration was greater than the RDL and less than 10x the blank concentration and is considered non-detect at the reported concentration.
E	The analyte / Compound reported exceeds the calibration range and is considered estimated.
EMPC	Estimated Minimum Potential Contamination - Dioxin/Furan analyses only.
J	Indicates an estimated value. This flag is used either when estimating a concentration for a tentatively identified compound or when the data indicates the presence of an analyte / compound but the result is less than the sample Quantitation limit, but greater than zero. The flag is also used in data validation to indicate a reported value should be considered estimated due to associated quality assurance deficiencies.
J-	The result is an estimated quantity, but the result may be biased low.
JB	NON-DETECT AT THE CONCENTRATION REPORTED AND ESTIMATED
JH	The sample result is considered estimated and is potentially biased high.
JL	The sample result is considered estimated and is potentially biased low.
JUB	NON-DETECT AT THE REPORTING LIMIT AND ESTIMATED
NJ	Tentatively identified compound with approximated concentration.
R	Indicates the value is considered to be unusable. (Note: The analyte / compound may or may not be present.)
TNTC	Too Numerous to Count - Asbestos and Microbiological Results.
U	Indicates that the analyte / compound was analyzed for, but not detected.
UB	The analyte / compound was detected in the associated blank. For Organic methods the sample concentration was less than the RDL and less than 5x (or 10x for common lab contaminants) the blank concentration and is considered non-detect at the RDL. For Inorganic methods the sample concentration was less than the RDL and less than 10x the blank concentration and is considered non-detect at the RDL.
UJ	The analyte / compound was not detected above the reported sample Quantitation limit. However, the Quantitation limit is considered to be approximate due to associated quality assurance results and may or may not represent the actual limit of Quantitation to accurately and precisely report the analyte in the sample.

SAMPLING AND ANALYSIS SUMMARY

CADENA Project ID: E203631

Laboratory: TestAmerica-North Canton

Laboratory Submittal: 104660-1

Lab Sample ID	Sample ID	Collection Date (mm/yy/dd)	Collection Time (hh:mm:ss)	Volatile Organics by GCMS	8260B with Single Ion Monitoring	Comment
2401046601	SUMP_12070BOSTONPOST_111518	11/15/2018	10:45:00	X	X	

Analytical Results Summary

Reportable Results Only

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton

Laboratory Submittal: 104660-1

Sample Name: SUMP_12070BOSTONPOST_111518

Lab Sample ID: 2401046601

Sample Date: 11/15/2018

Analyte	Cas No.	Result	Report Limit	Units	Valid Qualifier
GC/MS VOC					
<u>OSW-8260B</u>					
1,1-Dichloroethene	75-35-4	ND	1.0	ug/l	---
cis-1,2-Dichloroethene	156-59-2	ND	1.0	ug/l	---
Tetrachloroethene	127-18-4	ND	1.0	ug/l	---
trans-1,2-Dichloroethene	156-60-5	ND	1.0	ug/l	---
Trichloroethene	79-01-6	ND	1.0	ug/l	---
Vinyl chloride	75-01-4	ND	1.0	ug/l	---
<u>OSW-8260BBSim</u>					
1,4-Dioxane	123-91-1	1.2	2.0	ug/l	J