eurofins | Air Toxics

10/19/2018
Mr. Jim Tomalia
Arcadis U.S., Inc.
28550 Cabot Dr.
Suite 500
Novi MI 48377

Project Name: Ford
Project #: MI001454.0003
Workorder #: 1810282A

Dear Mr. Jim Tomalia

The following report includes the data for the above referenced project for sample(s) received on 10/12/2018 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

eurofins | Air Toxics

WORK ORDER #: 1810282A

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 #**	MI001454.0003 Ford
DATE RECEIVED:	10/12/2018	**CONTACT:**	Ausha Scott
DATE COMPLETED:	10/19/2018		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	AA-34966StandishStreet-01_100918	Modified TO-15	9.5 "Hg	5 psi
02A	IACS-34966StandishStreet-01_100918	Modified TO-15	4.5 "Hg	5 psi
03A	IACS-34966StandishStreet-02_100918	Modified TO-15	5.5 "Hg	5 psi
04A	IAF-34966StandishStreet-01_100918	Modified TO-15	6.0 "Hg	5 psi
05A	IAF-34966StandishStreet-02_100918	Modified TO-15	0.5 "Hg	5 psi
06A	IAB-34966StandishStreet-01_100918	Modified TO-15	4.5 "Hg	5 psi
07A	Lab Blank	Modified TO-15	NA	NA
08A	CCV	Modified TO-15	NA	NA
09A	LCS	Modified TO-15	NA	NA
09AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 10/19/18

Technical Director

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# 1810282A

Six 6 Liter Summa Canister (100% Certified) samples were received on October 12, 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.

Requirement	***TO-15***	***ATL Modifications***
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

There were no receiving discrepancies.

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

Client ID:	AA-34966StandishStreet-01_100918		
Lab ID:	1810282A-01A	**Date/Time Analyzed:**	10/15/18 03:36 PM
Date/Time Collected:	10/8/18 02:27 PM	**Dilution Factor:**	1.96
Media:	6 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v101509

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.38	0.70	0.78	Not Detected
1,4-Dioxane	123-91-1	0.41	0.64	0.71	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.47	0.70	0.78	Not Detected
Tetrachloroethene	127-18-4	0.66	1.2	1.3	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.66	0.70	0.78	Not Detected
Trichloroethene	79-01-6	0.48	0.95	1.0	Not Detected
Vinyl Chloride	75-01-4	0.38	0.45	0.50	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	105
4-Bromofluorobenzene	460-00-4	70-130	94
Toluene-d8	2037-26-5	70-130	100

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

Client ID:	IACS-34966StandishStreet-01_100918		
Lab ID:	1810282A-02A	**Date/Time Analyzed:**	10/15/18 04:24 PM
Date/Time Collected:	10/8/18 02:28 PM	**Dilution Factor:**	1.58
Media:	6 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v101510

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.30	0.56	0.63	Not Detected
1,4-Dioxane	123-91-1	0.33	0.51	0.57	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.38	0.56	0.63	Not Detected
Tetrachloroethene	127-18-4	0.53	0.96	1.1	0.90 J
trans-1,2-Dichloroethene	156-60-5	0.53	0.56	0.63	Not Detected
Trichloroethene	79-01-6	0.39	0.76	0.85	Not Detected
Vinyl Chloride	75-01-4	0.31	0.36	0.40	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	107
4-Bromofluorobenzene	460-00-4	70-130	93
Toluene-d8	2037-26-5	70-130	100

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

Client ID:	IACS-34966StandishStreet-02_100918		
Lab ID:	1810282A-03A	**Date/Time Analyzed:**	10/15/18 05:02 PM
Date/Time Collected:	10/8/18 02:33 PM	**Dilution Factor:**	1.64
Media:	6 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v101511

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.32	0.58	0.65	Not Detected
1,4-Dioxane	123-91-1	0.34	0.53	0.59	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.39	0.58	0.65	Not Detected
Tetrachloroethene	127-18-4	0.56	1.0	1.1	0.63 J
trans-1,2-Dichloroethene	156-60-5	0.55	0.58	0.65	Not Detected
Trichloroethene	79-01-6	0.40	0.79	0.88	Not Detected
Vinyl Chloride	75-01-4	0.32	0.38	0.42	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	114
4-Bromofluorobenzene	460-00-4	70-130	99
Toluene-d8	2037-26-5	70-130	98

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

Client ID:	IAF-34966StandishStreet-01_100918		
Lab ID:	1810282A-04A	**Date/Time Analyzed:**	10/15/18 05:39 PM
Date/Time Collected:	10/8/18 02:38 PM	**Dilution Factor:**	1.68
Media:	6 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v101512

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.32	0.60	0.67	Not Detected
1,4-Dioxane	123-91-1	0.35	0.54	0.60	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.40	0.60	0.67	Not Detected
Tetrachloroethene	127-18-4	0.57	1.0	1.1	7.1
trans-1,2-Dichloroethene	156-60-5	0.56	0.60	0.67	Not Detected
Trichloroethene	79-01-6	0.41	0.81	0.90	Not Detected
Vinyl Chloride	75-01-4	0.32	0.39	0.43	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	109
4-Bromofluorobenzene	460-00-4	70-130	101
Toluene-d8	2037-26-5	70-130	96

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

Client ID:	IAF-34966StandishStreet-02_100918		
Lab ID:	1810282A-05A	**Date/Time Analyzed:**	10/15/18 06:17 PM
Date/Time Collected:	10/8/18 02:41 PM	**Dilution Factor:**	1.36
Media:	6 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v101513

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.26	0.48	0.54	Not Detected
1,4-Dioxane	123-91-1	0.28	0.44	0.49	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.33	0.48	0.54	Not Detected
Tetrachloroethene	127-18-4	0.46	0.83	0.92	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.46	0.48	0.54	Not Detected
Trichloroethene	79-01-6	0.34	0.66	0.73	Not Detected
Vinyl Chloride	75-01-4	0.26	0.31	0.35	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	121
4-Bromofluorobenzene	460-00-4	70-130	96
Toluene-d8	2037-26-5	70-130	99

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

Client ID:	IAB-34966StandishStreet-01_100918		
Lab ID:	1810282A-06A	**Date/Time Analyzed:**	10/15/18 06:54 PM
Date/Time Collected:	10/8/18 03:20 PM	**Dilution Factor:**	1.58
Media:	6 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v101514

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.30	0.56	0.63	Not Detected
1,4-Dioxane	123-91-1	0.33	0.51	0.57	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.38	0.56	0.63	Not Detected
Tetrachloroethene	127-18-4	0.53	0.96	1.1	3.5
trans-1,2-Dichloroethene	156-60-5	0.53	0.56	0.63	Not Detected
Trichloroethene	79-01-6	0.39	0.76	0.85	Not Detected
Vinyl Chloride	75-01-4	0.31	0.36	0.40	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	114
4-Bromofluorobenzene	460-00-4	70-130	96
Toluene-d8	2037-26-5	70-130	99

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

Client ID:	Lab Blank		
Lab ID:	1810282A-07A	**Date/Time Analyzed:**	10/15/18 12:39 PM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v101506a

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.19	0.36	0.40	Not Detected
1,4-Dioxane	123-91-1	0.21	0.32	0.36	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.24	0.36	0.40	Not Detected
Tetrachloroethene	127-18-4	0.34	0.61	0.68	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.34	0.36	0.40	Not Detected
Trichloroethene	79-01-6	0.25	0.48	0.54	Not Detected
Vinyl Chloride	75-01-4	0.19	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	107
4-Bromofluorobenzene	460-00-4	70-130	94
Toluene-d8	2037-26-5	70-130	97

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

Client ID:	CCV		
Lab ID:	1810282A-08A	**Date/Time Analyzed:**	10/15/18 09:16 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v101502

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	89
1,4-Dioxane	123-91-1	96
cis-1,2-Dichloroethene	156-59-2	92
Tetrachloroethene	127-18-4	100
trans-1,2-Dichloroethene	156-60-5	95
Trichloroethene	79-01-6	98
Vinyl Chloride	75-01-4	93

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	100
4-Bromofluorobenzene	460-00-4	70-130	99
Toluene-d8	2037-26-5	70-130	101

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

Client ID:	LCS		
Lab ID:	1810282A-09A	**Date/Time Analyzed:**	10/15/18 10:05 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v101503

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	92
1,4-Dioxane	123-91-1	104
cis-1,2-Dichloroethene	156-59-2	90
Tetrachloroethene	127-18-4	106
trans-1,2-Dichloroethene	156-60-5	112
Trichloroethene	79-01-6	111
Vinyl Chloride	75-01-4	96

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	105
4-Bromofluorobenzene	460-00-4	70-130	98
Toluene-d8	2037-26-5	70-130	97

* % Recovery is calculated using unrounded analytical results.

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

Client ID:	LCSD		
Lab ID:	1810282A-09AA	**Date/Time Analyzed:**	10/15/18 10:50 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v101504

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	94
1,4-Dioxane	123-91-1	103
cis-1,2-Dichloroethene	156-59-2	90
Tetrachloroethene	127-18-4	104
trans-1,2-Dichloroethene	156-60-5	110
Trichloroethene	79-01-6	111
Vinyl Chloride	75-01-4	96

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	108
4-Bromofluorobenzene	460-00-4	70-130	98
Toluene-d8	2037-26-5	70-130	102

* % Recovery is calculated using unrounded analytical results.

October 20, 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: 1810282A
Sample date: 2018-10-08
Report received by CADENA: 2018-10-19
Initial Data Verification completed by CADENA: 2018-10-20

6 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.

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 contaminates) 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 contaminates) 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.

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10/19/2018
Mr. Jim Tomalia
Arcadis U.S., Inc.
28550 Cabot Dr.
Suite 500
Novi MI 48377

Project Name: Ford
Project #: MI001454.0003
Workorder #: 1810282B

Dear Mr. Jim Tomalia

The following report includes the data for the above referenced project for sample(s) received on 10/12/2018 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

eurofins | Air Toxics

WORK ORDER #: 1810282B

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 #**	MI001454.0003 Ford
DATE RECEIVED:	10/12/2018	**CONTACT:**	Ausha Scott
DATE COMPLETED:	10/19/2018		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
07A	SSMP-34966StandishStreet-02_100918	TO-15	4.7 "Hg	14.8 psi
08A	SSMP-34966StandishStreet-01_100918	TO-15	4.5 "Hg	15.1 psi
09A	Lab Blank	TO-15	NA	NA
10A	CCV	TO-15	NA	NA
11A	LCS	TO-15	NA	NA
11AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 10/19/18

Technical Director

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

eurofins | Air Toxics

LABORATORY NARRATIVE
EPA Method TO-15
Arcadis U.S., Inc.
Workorder# 1810282B

Two 1 Liter Summa Canister (100% Certified) samples were received on October 12, 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

Client ID:	SSMP-34966StandishStreet-02_100918		
Lab ID:	1810282B-07A	**Date/Time Analyzed:**	10/16/18 01:40 AM
Date/Time Collected:	10/9/18 02:01 PM	**Dilution Factor:**	2.38
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msd17.i / 17101527

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	2.1	3.8	4.7	Not Detected
1,4-Dioxane	123-91-1	3.8	13	17	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.75	3.8	4.7	Not Detected
Tetrachloroethene	127-18-4	1.1	6.4	8.1	1.7 J
trans-1,2-Dichloroethene	156-60-5	1.4	3.8	4.7	Not Detected
Trichloroethene	79-01-6	2.4	5.1	6.4	7.9
Vinyl Chloride	75-01-4	0.73	2.4	3.0	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	96
4-Bromofluorobenzene	460-00-4	70-130	97
Toluene-d8	2037-26-5	70-130	105

EPA METHOD TO-15 GC/MS FULL SCAN
Ford

Client ID:	SSMP-34966StandishStreet-01_100918		
Lab ID:	1810282B-08A	**Date/Time Analyzed:**	10/16/18 01:12 AM
Date/Time Collected:	10/9/18 02:32 PM	**Dilution Factor:**	2.38
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msd17.i / 17101526

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	2.1	3.8	4.7	Not Detected
1,4-Dioxane	123-91-1	3.8	13	17	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.75	3.8	4.7	1.3 J
Tetrachloroethene	127-18-4	1.1	6.4	8.1	6.3 J
trans-1,2-Dichloroethene	156-60-5	1.4	3.8	4.7	Not Detected
Trichloroethene	79-01-6	2.4	5.1	6.4	Not Detected
Vinyl Chloride	75-01-4	0.73	2.4	3.0	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	94
4-Bromofluorobenzene	460-00-4	70-130	89
Toluene-d8	2037-26-5	70-130	108

EPA METHOD TO-15 GC/MS FULL SCAN
Ford

Client ID:	Lab Blank		
Lab ID:	1810282B-09A	**Date/Time Analyzed:**	10/15/18 12:13 PM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msd17.i / 17101505c

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	94
4-Bromofluorobenzene	460-00-4	70-130	87
Toluene-d8	2037-26-5	70-130	106

EPA METHOD TO-15 GC/MS FULL SCAN
Ford

Client ID:	CCV		
Lab ID:	1810282B-10A	**Date/Time Analyzed:**	10/15/18 10:20 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msd17.i / 17101502

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	97
1,4-Dioxane	123-91-1	102
cis-1,2-Dichloroethene	156-59-2	100
Tetrachloroethene	127-18-4	104
trans-1,2-Dichloroethene	156-60-5	100
Trichloroethene	79-01-6	116
Vinyl Chloride	75-01-4	105

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	96
4-Bromofluorobenzene	460-00-4	70-130	93
Toluene-d8	2037-26-5	70-130	111

EPA METHOD TO-15 GC/MS FULL SCAN
Ford

Client ID:	LCS		
Lab ID:	1810282B-11A	**Date/Time Analyzed:**	10/15/18 10:59 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msd17.i / 17101503

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	97
1,4-Dioxane	123-91-1	101
cis-1,2-Dichloroethene	156-59-2	92
Tetrachloroethene	127-18-4	100
trans-1,2-Dichloroethene	156-60-5	110
Trichloroethene	79-01-6	119
Vinyl Chloride	75-01-4	107

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	97
4-Bromofluorobenzene	460-00-4	70-130	91
Toluene-d8	2037-26-5	70-130	108

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS FULL SCAN
Ford

Client ID:	LCSD		
Lab ID:	1810282B-11AA	**Date/Time Analyzed:**	10/15/18 11:25 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msd17.i / 17101504

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	97
1,4-Dioxane	123-91-1	103
cis-1,2-Dichloroethene	156-59-2	92
Tetrachloroethene	127-18-4	102
trans-1,2-Dichloroethene	156-60-5	112
Trichloroethene	79-01-6	118
Vinyl Chloride	75-01-4	107

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	96
4-Bromofluorobenzene	460-00-4	70-130	92
Toluene-d8	2037-26-5	70-130	108

* % Recovery is calculated using unrounded analytical results.

October 20, 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: 1810282B
Sample date: 2018-10-09
Report received by CADENA: 2018-10-19
Initial Data Verification completed by CADENA: 2018-10-20

2 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.

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 contaminates) 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 contaminates) 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: 240-102560-1
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:
10/19/2018 4:16:53 PM

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

LINKS
Review your project results through TotalAccess
Have a Question? Ask The Expert
Visit us at: 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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Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	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)

Job ID: 240-102560-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-102560-1

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 10/10/2018 8:50 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.7° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Sample SUMP-34966STANDISHSTREET_100818 (240-102560-1) was analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 10/19/2018.

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

VOLATILE ORGANIC COMPOUNDS (GCMS SIM)

Sample SUMP-34966STANDISHSTREET_100818 (240-102560-1) was analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The samples were analyzed on 10/15/2018.

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

Method Summary

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

TestAmerica Job ID: 240-102560-1

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: 240-102560-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-102560-1	SUMP-34966STANDISHSTREET_100818	Water	10/08/18 13:15	10/10/18 08:50

Detection Summary

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

TestAmerica Job ID: 240-102560-1

Client Sample ID: SUMP-34966STANDISHSTREET_100818 **Lab Sample ID: 240-102560-1**

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: SUMP-34966STANDISHSTREET_100818
Lab Sample ID: 240-102560-1
Date Collected: 10/08/18 13:15
Matrix: Water
Date Received: 10/10/18 08:50

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			10/15/18 12:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*63 - 125*		*10/15/18 12:47*	*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			10/19/18 12:38	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			10/19/18 12:38	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			10/19/18 12:38	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/19/18 12:38	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			10/19/18 12:38	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			10/19/18 12:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 121*		*10/19/18 12:38*	*1*
4-Bromofluorobenzene (Surr)	*86*		*59 - 120*		*10/19/18 12:38*	*1*
Toluene-d8 (Surr)	*79*		*70 - 123*		*10/19/18 12:38*	*1*
Dibromofluoromethane (Surr)	*110*		*75 - 128*		*10/19/18 12:38*	*1*

Surrogate Summary

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

TestAmerica Job ID: 240-102560-1

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

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	TOL	DBFM
Lab Sample ID	Client Sample ID	(70-121)	(59-120)	(70-123)	(75-128)
240-102560-1	SUMP-34966STANDISHSTREE	98	86	79	110
LCS 240-350985/4	Lab Control Sample	96	96	84	105
MB 240-350985/6	Method Blank	105	93	83	117

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)
		DCA
Lab Sample ID	Client Sample ID	(63-125)
240-102560-1	SUMP-34966STANDISHSTREE	100
LCS 240-350058/4	Lab Control Sample	95
MB 240-350058/5	Method Blank	95

Surrogate Legend

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

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

Lab Sample ID: MB 240-350985/6
Matrix: Water
Analysis Batch: 350985

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			10/19/18 11:53	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			10/19/18 11:53	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			10/19/18 11:53	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/19/18 11:53	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			10/19/18 11:53	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			10/19/18 11:53	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*70 - 121*		*10/19/18 11:53*	*1*
4-Bromofluorobenzene (Surr)	*93*		*59 - 120*		*10/19/18 11:53*	*1*
Toluene-d8 (Surr)	*83*		*70 - 123*		*10/19/18 11:53*	*1*
Dibromofluoromethane (Surr)	*117*		*75 - 128*		*10/19/18 11:53*	*1*

Lab Sample ID: LCS 240-350985/4
Matrix: Water
Analysis Batch: 350985

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	9.58		ug/L		96	65 - 139
cis-1,2-Dichloroethene	10.0	10.1		ug/L		101	76 - 128
Tetrachloroethene	10.0	11.3		ug/L		113	74 - 130
trans-1,2-Dichloroethene	10.0	10.5		ug/L		105	78 - 133
Trichloroethene	10.0	10.7		ug/L		107	76 - 125
Vinyl chloride	10.0	9.80		ug/L		98	58 - 143

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 121*
4-Bromofluorobenzene (Surr)	*96*		*59 - 120*
Toluene-d8 (Surr)	*84*		*70 - 123*
Dibromofluoromethane (Surr)	*105*		*75 - 128*

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

Lab Sample ID: MB 240-350058/5
Matrix: Water
Analysis Batch: 350058

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			10/15/18 11:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*63 - 125*		*10/15/18 11:08*	*1*

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

Lab Sample ID: LCS 240-350058/4
Matrix: Water
Analysis Batch: 350058

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	10.7		ug/L		107	59 - 131		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*63 - 125*

QC Association Summary

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

TestAmerica Job ID: 240-102560-1

GC/MS VOA

Analysis Batch: 350058

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-102560-1	SUMP-34966STANDISHSTREET_100818	Total/NA	Water	8260B SIM	
MB 240-350058/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-350058/4	Lab Control Sample	Total/NA	Water	8260B SIM	

Analysis Batch: 350985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-102560-1	SUMP-34966STANDISHSTREET_100818	Total/NA	Water	8260B	
MB 240-350985/6	Method Blank	Total/NA	Water	8260B	
LCS 240-350985/4	Lab Control Sample	Total/NA	Water	8260B	

Lab Chronicle

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

TestAmerica Job ID: 240-102560-1

Client Sample ID: SUMP-34966STANDISHSTREET_100818 **Lab Sample ID: 240-102560-1**
Date Collected: 10/08/18 13:15 **Matrix: Water**
Date Received: 10/10/18 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	350985	10/19/18 12:38	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	350058	10/15/18 12:47	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.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-102560-1

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	T104704517-17-9	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
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

0.8 | C 1.7

Chain of Custody Record

MICHIGAN 190

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: R STERN, D RICHMOND	Lab PM: DelMonico, Michael	Carrier Tracking No(s):	COC No: 240-54172-23325.2
Client Contact: Kristoffer Hinskey	Phone: 248-746-6331	E-Mail: michael.delmonico@testamericainc.com		Page: Page 2 of 5
Company: ARCADIS U.S., Inc.		Analysis Requested		Job #:
Address: 28550 Cabot Drive Suite 500	Due Date Requested:			Preservation Codes:
City: Novi	TAT Requested (days): 5			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
State, Zip: MI, 48377				
Phone:	PO #: MI001454.0002.0001A			
Email: kristoffer.hinskey@arcadis-us.com	WO #: CADENA #: E203631			
Project Name: Ford LTP Livonia MI - E203631	Project #: 24015353			
Site:	SSOW#:			

240-102560 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - (MOD) 8260B,TCL OLM03.1/4.2 VOCs w/o/TMB	8260B - 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, VC	8260B - SIM - 1,4-Dioxane	TC	Special Instructions/Note:
			Preservation Code:				A				
SUMP-34966StandishStreet-01_100818	10/8/2018	1315	G	Water	N	N		X			
SUMP-34966StandishStreet-02_100818			G	Water				X			
SUMP-34966StandishStreet-03_100818			G	Water				X			
SUMP-34966StandishStreet-04_100818			G	Water					X		
SUMP-34966StandishStreet-05_100818			G	Water					X		
SUMP-34966StandishStreet-06_100818			G	Water					X		
				Water							
				Water							
				Water							
				Water							
				Water							

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

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

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
RACHEL STERN / Paul	10/8/18 1630	ARCADIS	DIVYA KAMATH	10/8/18 1630	ARCADIS
DIVYA KAMATH	10/8/18 1700	ARCADIS	NOVI FRIDGE	10/8/18 1700	ARCADIS
NOVI FRIDGE RACHEL WISMAN	10/9/18 10:30	ARCADIS		10/9/18 1050	TAL

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Relinquished: Jeff Bent 10/9/18 1134 TAL (Received)

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: R STERN, D RICHMOND	Lab PM: DelMonico, Michael	Carrier Tracking No(s):	COC No: 240-54172-23325.2
Client Contact: Kristoffer Hinskey	Phone: 248-746-6331	E-Mail: michael.delmonico@testamericainc.com		Page: Page 2 of 5
Company: ARCADIS U.S., Inc.				Job #:
Address: 28550 Cabot Drive Suite 500	Due Date Requested:			
City: Novi	TAT Requested (days): 5			
State, Zip: MI, 48377				
Phone:	PO #: MI001454.0002.0001A			
Email: kristoffer.hinskey@arcadis-us.com	WO #: CADENA #: E203631			
Project Name: Ford LTP Livonia MI - E203631	Project #: 24015353			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - (MOD) 8260B,TCL OLM03.1/4.2 VOCs w/TMB	8260B-1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, VC	8260B-SIM - 1,4-dioxane	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A				
SUMP-34966StandishStreet-01_100818	10/8/2018	1315	G	Water	N	N		X			
SUMP-34966StandishStreet-02_100818			G	Water				X			
SUMP-34966StandishStreet-03_100818			G	Water				X			
SUMP-34966StandishStreet-04_100818			G	Water					X		
SUMP-34966StandishStreet-05_100818			G	Water					X		
SUMP-34966StandishStreet-06_100818			G	Water					X		
				Water							
				Water							
				Water							
				Water							
				Water							

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

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

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by: RACHEL STERN / Rachel Stern	Date/Time: 10/8/18 1630	Company: ARCADIS	Received by: DIVYA KAMATH / Divya Kamath
Relinquished by: DIVYA KAMATH / Divya Kamath	Date/Time: 10/8/18 1700	Company: ARCADIS	Received by: NOVI FRIDGE
Relinquished by: NOVI FRIDGE / RACHEL WISMAN	Date/Time: 10/9/18 10:50	Company: ARCADIS	Received by:

Received by: DIVYA KAMATH / Divya Kamath	Date/Time: 10/8/18 1630	Company: ARCADIS	
Received by: NOVI FRIDGE	Date/Time: 10/8/18 1700	Company: ARCADIS	
Received by:	Date/Time: 10/9/18 1050	Company: TA	

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 102560**
Canton Facility

Client Arcadis | Site Name | Cooler unpacked by: SZ

Cooler Received on 10/10/18 | Opened on 10/10/18

FedEx: 1st (Grd) Exp | UPS | FAS | Clipper | Client Drop Off | TestAmerica Courier | Other

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

TestAmerica Cooler # | (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. 0.8 °C Corrected Cooler Temp. 1.7 °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 1 — (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)? Unsalvageble — (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) pH Strip Lot# **HC849161**
13. Were VOAs on the COC? — (Yes) No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. — Yes (No) NA
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: JR

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): ____

October 22, 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: 102560-1
Sample date: 2018-10-08
Report received by CADENA: 2018-10-19
Initial Data Verification completed by CADENA: 2018-10-22

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.

1 Water sample(s) 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.

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 contaminates) 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 contaminates) 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.

Analytical Results Summary

CADENA Project ID: E203631
Laboratory: TestAmerica - North Canton
Laboratory Submittal: 102560-1

Sample Name: SUMP-34966STANDISHSTREET_10081
Lab Sample ID: 2401025601
Sample Date: 10/8/2018

Analyte	Cas No.	Result	Report Limit	Units	Valid Qualifier
GC/MS VOC					
OSW-8260B					
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	---
OSW-8260BBSim					
1,4-Dioxane	123-91-1	ND	2.0	ug/l	---