

ANALYTICAL REPORT

Eurofins TestAmerica, Canton
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Tel: (330)497-9396

Laboratory Job ID: 240-116449-1
Client Project/Site: Ford LTP Livonia MI - E203631

For:
ARCADIS U.S., Inc.
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Attn: Kristoffer Hinskey



Authorized for release by:
8/5/2019 3:29:46 PM

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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

Job ID: 240-116449-1

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)

Case Narrative

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

Job ID: 240-116449-1

Job ID: 240-116449-1

Laboratory: Eurofins TestAmerica, Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-116449-1

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.

Eurofins TestAmerica, Canton attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins 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 Eurofins TestAmerica and its client.

RECEIPT

The samples were received on 7/26/2019 8:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.1° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples SUMP-34600BEACON-01_072419 (240-116449-1) and TRIP BLANK (240-116449-2) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 08/01/2019.

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-34600BEACON-01_072419 (240-116449-1) was analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The sample was analyzed on 07/30/2019.

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

Job ID: 240-116449-1

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 = Eurofins 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

Job ID: 240-116449-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-116449-1	SUMP-34600BEACON-01_072419	Water	07/24/19 14:50	07/26/19 08:30	
240-116449-2	TRIP BLANK	Water	07/24/19 00:00	07/26/19 08:30	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

Detection Summary

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

Job ID: 240-116449-1

Client Sample ID: SUMP-34600BEACON-01_072419

Lab Sample ID: 240-116449-1

No Detections.

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-116449-2

No Detections.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton

Client Sample Results

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

Job ID: 240-116449-1

Client Sample ID: SUMP-34600BEACON-01_072419

Lab Sample ID: 240-116449-1

Date Collected: 07/24/19 14:50

Matrix: Water

Date Received: 07/26/19 08:30

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			07/30/19 13:58	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		63 - 125		07/30/19 13:58	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			08/01/19 13:42	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/01/19 13:42	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/01/19 13:42	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/01/19 13:42	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/01/19 13:42	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/01/19 13:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	101		70 - 121		08/01/19 13:42	1
4-Bromofluorobenzene (Surr)	103		59 - 120		08/01/19 13:42	1
Toluene-d8 (Surr)	93		70 - 123		08/01/19 13:42	1
Dibromofluoromethane (Surr)	92		75 - 128		08/01/19 13:42	1

Client Sample Results

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

Job ID: 240-116449-1

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-116449-2

Date Collected: 07/24/19 00:00

Matrix: Water

Date Received: 07/26/19 08:30

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			08/01/19 14:04	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/01/19 14:04	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/01/19 14:04	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/01/19 14:04	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/01/19 14:04	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/01/19 14:04	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	101		70 - 121		08/01/19 14:04	1
4-Bromofluorobenzene (Surr)	101		59 - 120		08/01/19 14:04	1
Toluene-d8 (Surr)	101		70 - 123		08/01/19 14:04	1
Dibromofluoromethane (Surr)	99		75 - 128		08/01/19 14:04	1

Surrogate Summary

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

Job ID: 240-116449-1

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DCA (70-121)	BFB (59-120)	TOL (70-123)	DBFM (75-128)
240-116449-1	SUMP-34600BEACON-01_0724	101	103	93	92
240-116449-2	TRIP BLANK	101	101	101	99
240-116521-B-8 MS	Matrix Spike	101	100	100	105
240-116521-B-8 MSD	Matrix Spike Duplicate	99	93	98	95
LCS 240-393939/4	Lab Control Sample	102	104	104	102
MB 240-393939/6	Method Blank	110	95	101	107

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

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)
		DCA (63-125)
240-116376-C-3 MS	Matrix Spike	110
240-116376-C-3 MSD	Matrix Spike Duplicate	109
240-116449-1	SUMP-34600BEACON-01_0724	106
	19	
LCS 240-393526/4	Lab Control Sample	103
MB 240-393526/5	Method Blank	107

Surrogate Legend

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

QC Sample Results

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

Job ID: 240-116449-1

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

Lab Sample ID: MB 240-393939/6
Matrix: Water
Analysis Batch: 393939

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			08/01/19 11:06	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/01/19 11:06	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/01/19 11:06	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/01/19 11:06	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/01/19 11:06	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/01/19 11:06	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	110		70 - 121		08/01/19 11:06	1
4-Bromofluorobenzene (Surr)	95		59 - 120		08/01/19 11:06	1
Toluene-d8 (Surr)	101		70 - 123		08/01/19 11:06	1
Dibromofluoromethane (Surr)	107		75 - 128		08/01/19 11:06	1

Lab Sample ID: LCS 240-393939/4
Matrix: Water
Analysis Batch: 393939

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	12.0		ug/L		120	65 - 139
cis-1,2-Dichloroethene	10.0	10.6		ug/L		106	76 - 128
Tetrachloroethene	10.0	9.79		ug/L		98	74 - 130
trans-1,2-Dichloroethene	10.0	10.9		ug/L		109	78 - 133
Trichloroethene	10.0	9.95		ug/L		99	76 - 125
Vinyl chloride	10.0	9.85		ug/L		99	58 - 143

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	102		70 - 121
4-Bromofluorobenzene (Surr)	104		59 - 120
Toluene-d8 (Surr)	104		70 - 123
Dibromofluoromethane (Surr)	102		75 - 128

Lab Sample ID: 240-116521-B-8 MS
Matrix: Water
Analysis Batch: 393939

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
1,1-Dichloroethene	10	U	100	89.0		ug/L		89	53 - 140
cis-1,2-Dichloroethene	8.2	J	100	107		ug/L		99	64 - 130
Tetrachloroethene	10	U	100	72.3		ug/L		72	51 - 136
trans-1,2-Dichloroethene	10	U	100	96.0		ug/L		96	68 - 133
Trichloroethene	10	U	100	81.8		ug/L		82	55 - 131
Vinyl chloride	10	U	100	79.9		ug/L		80	43 - 154

Surrogate	MS %Recovery	MS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	101		70 - 121
4-Bromofluorobenzene (Surr)	100		59 - 120
Toluene-d8 (Surr)	100		70 - 123

Eurofins TestAmerica, Canton

QC Sample Results

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

Job ID: 240-116449-1

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

Lab Sample ID: 240-116521-B-8 MS
Matrix: Water
Analysis Batch: 393939

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

Surrogate	MS %Recovery	MS Qualifier	Limits
Dibromofluoromethane (Surr)	105		75 - 128

Lab Sample ID: 240-116521-B-8 MSD
Matrix: Water
Analysis Batch: 393939

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
1,1-Dichloroethene	10	U	100	100		ug/L		100	53 - 140	12	35
cis-1,2-Dichloroethene	8.2	J	100	103		ug/L		95	64 - 130	3	21
Tetrachloroethene	10	U	100	88.4		ug/L		88	51 - 136	20	23
trans-1,2-Dichloroethene	10	U	100	93.6		ug/L		94	68 - 133	2	24
Trichloroethene	10	U	100	89.3		ug/L		89	55 - 131	9	23
Vinyl chloride	10	U	100	80.8		ug/L		81	43 - 154	1	29

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	99		70 - 121
4-Bromofluorobenzene (Surr)	93		59 - 120
Toluene-d8 (Surr)	98		70 - 123
Dibromofluoromethane (Surr)	95		75 - 128

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

Lab Sample ID: MB 240-393526/5
Matrix: Water
Analysis Batch: 393526

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			07/30/19 12:18	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		63 - 125		07/30/19 12:18	1

Lab Sample ID: LCS 240-393526/4
Matrix: Water
Analysis Batch: 393526

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	11.1		ug/L		111	59 - 131

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	103		63 - 125

Lab Sample ID: 240-116376-C-3 MS
Matrix: Water
Analysis Batch: 393526

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	2.0	U	10.0	10.2		ug/L		102	52 - 129

Eurofins TestAmerica, Canton

QC Sample Results

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

Job ID: 240-116449-1

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

<i>Surrogate</i>	<i>MS</i> <i>%Recovery</i>	<i>MS</i> <i>Qualifier</i>	<i>Limits</i>
1,2-Dichloroethane-d4 (Surr)	110		63 - 125

Lab Sample ID: 240-116376-C-3 MSD
 Matrix: Water
 Analysis Batch: 393526

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

<i>Analyte</i>	<i>Sample</i> <i>Result</i>	<i>Sample</i> <i>Qualifier</i>	<i>Spike</i> <i>Added</i>	<i>MSD</i> <i>Result</i>	<i>MSD</i> <i>Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec.</i> <i>Limits</i>	<i>RPD</i>	<i>RPD</i> <i>Limit</i>
1,4-Dioxane	2.0	U	10.0	11.0		ug/L		110	52 - 129	8	13

<i>Surrogate</i>	<i>MSD</i> <i>%Recovery</i>	<i>MSD</i> <i>Qualifier</i>	<i>Limits</i>
1,2-Dichloroethane-d4 (Surr)	109		63 - 125

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QC Association Summary

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

Job ID: 240-116449-1

GC/MS VOA

Analysis Batch: 393526

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-116449-1	SUMP-34600BEACON-01_072419	Total/NA	Water	8260B SIM	
MB 240-393526/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-393526/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-116376-C-3 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-116376-C-3 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

Analysis Batch: 393939

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-116449-1	SUMP-34600BEACON-01_072419	Total/NA	Water	8260B	
240-116449-2	TRIP BLANK	Total/NA	Water	8260B	
MB 240-393939/6	Method Blank	Total/NA	Water	8260B	
LCS 240-393939/4	Lab Control Sample	Total/NA	Water	8260B	
240-116521-B-8 MS	Matrix Spike	Total/NA	Water	8260B	
240-116521-B-8 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Lab Chronicle

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

Job ID: 240-116449-1

Client Sample ID: SUMP-34600BEACON-01_072419

Lab Sample ID: 240-116449-1

Date Collected: 07/24/19 14:50

Matrix: Water

Date Received: 07/26/19 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	393939	08/01/19 13:42	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	393526	07/30/19 13:58	SAM	TAL CAN

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-116449-2

Date Collected: 07/24/19 00:00

Matrix: Water

Date Received: 07/26/19 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	393939	08/01/19 14:04	LEE	TAL CAN

Laboratory References:

TAL CAN = Eurofins 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

Job ID: 240-116449-1

Laboratory: Eurofins 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		2927	02-23-20
California	State Program	9	2927	02-23-20
Connecticut	State Program	1	PH-0590	12-31-19
Florida	NELAP	4	E87225	06-30-20
Florida	NELAP		E87225	06-30-20
Illinois	NELAP	5	200004	07-31-20
Iowa	State Program	7	421	06-01-21
Kansas	NELAP	7	E-10336	04-30-20
Kansas	NELAP		E-10336	04-30-20
Kentucky (UST)	State Program	4	58	02-23-20
Kentucky (WW)	State Program	4	98016	12-31-19
Minnesota	NELAP	5	039-999-348	12-31-19 *
Minnesota (Petrofund)	State Program	1	3506	07-31-21
New Jersey	NELAP	2	OH001	06-30-20
New Jersey	NELAP		OH001	06-30-20
New York	NELAP	2	10975	03-31-20
New York	NELAP		10975	03-31-20
Ohio VAP	State Program	5	CL0024	06-05-21
Oregon	NELAP	10	4062	02-23-20
Oregon	NELAP		4062	02-23-20
Pennsylvania	NELAP	3	68-00340	08-31-19 *
Pennsylvania	NELAP		68-00340	08-31-19
Texas	NELAP	6	T104704517-18-10	08-31-19 *
Texas	NELAP		T104704517-18-10	08-31-19
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-19 *
Virginia	NELAP		010101	09-14-19
Washington	State		C971	01-12-20
Washington	State Program	10	C971	01-12-20 *
West Virginia DEP	State		210	12-31-19
West Virginia DEP	State Program	3	210	12-31-19

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

TestAmerica Laboratory location: N.Canton — 4101 Shuffel Street NW/ North Canton, OH 44720 / 330-497-9396

3.0 | 3.1

Client Contact Company Name: Arcadis Address: 28550 Cabot Drive, Suite 500 City/State/Zip: Novi, MI, 48377 Phone: 248-994-2240 Project Name: Ford LTP Project Number: MI001454.0003 PO # MI001454.0003		Regulatory program: <input type="checkbox"/> DW <input type="checkbox"/> NPDES <input type="checkbox"/> RCRA <input type="checkbox"/> Other	
Client Project Manager: Kris Hinskey Telephone: 248-994-2240 Email: kristoffer.hinskey@arcadis.com		Lab Contact: Mike DelMonico Telephone: 330-497-9396	
Method of Shipment/Carrier: Shipping/Tracking No:		Analysis Turnaround Time TAT if different from below <input type="checkbox"/> 3 weeks <input type="checkbox"/> 2 weeks <input checked="" type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day	
Sample Identification Samp-34608-Benson-01-072419 T.C.P. Blank		Analyses 1,4-Dioxane 8260B SIM Vinyl Chloride 8260B TCE 8260B PCE 8260B Trans-1,2-DCE 8260B cis-1,2-DCE 8260B 1,1-DCE 8260B Composite=C/Grab=C Filtered Sample (Y/N) Containers & Preservatives ZnOH NaOH HCl HNO3 H2SO4 Air Aqueous Sediment Solid Other:	
Sample Date: 7-24-19 1450 Sample Time: 7:24 AM		1,4-Dioxane 8260B SIM: X Vinyl Chloride 8260B: X TCE 8260B: X PCE 8260B: X Trans-1,2-DCE 8260B: X cis-1,2-DCE 8260B: X 1,1-DCE 8260B: X Composite=C/Grab=C: X Filtered Sample (Y/N): X Containers & Preservatives: X ZnOH: X NaOH: X HCl: X HNO3: X H2SO4: X Air: X Aqueous: X Sediment: X Solid: X Other: X	
Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Irritable <input type="checkbox"/> Inert <input type="checkbox"/> Unknown		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	
Special Instructions/QC Requirements & Comments: Submit all results through Cadena at jim.tomalia@cadenalab.com. Cadena #E203E31 Level IV Reporting.			
Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]		Date/Time: 7-24-19 @ 1700 Date/Time: 7-25-19 1040 Date/Time: 7-25-19 1510	
Company: Arcadis Company: Arcadis Company: EIA		Company: Arcadis Company: EIA Company: TA	
Received by: [Signature] Received by: [Signature] Received in Laboratory by: [Signature]		Date/Time: 7-24-19 @ 1700 Date/Time: 7-25-19 1040 Date/Time: 7/26/19 830	



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Eurofins TestAmerica Canton Sample Receipt Form/Narrative		Login # : <u>116449</u>
Canton Facility		
Client <u>Arceadis</u>	Site Name _____	Cooler unpacked by: <u>[Signature]</u>
Cooler Received on <u>7/26/16</u>	Opened on <u>7/26/16</u>	
FedEx: 1 st <input checked="" type="checkbox"/> Grd <input checked="" type="checkbox"/> Exp <input type="checkbox"/> UPS <input type="checkbox"/> FAS <input type="checkbox"/> Clipper	Client Drop Off <input type="checkbox"/> TestAmerica Courier	Other <input type="checkbox"/>
Receipt After-hours: Drop-off Date/Time		Storage Location
TestAmerica Cooler # <u>74</u>	Foam Box <input type="checkbox"/>	Client Cooler <input type="checkbox"/>
	Box <input type="checkbox"/>	Other <input type="checkbox"/>
Packing material used: <u>Bubble Wrap</u>	Foam <input type="checkbox"/>	<u>Plastic Bag</u>
	None <input type="checkbox"/>	Other <input type="checkbox"/>
COOLANT: <u>Wet Ice</u>	Blue Ice <input type="checkbox"/>	Dry Ice <input type="checkbox"/>
	Water <input type="checkbox"/>	None <input type="checkbox"/>
1. Cooler temperature upon receipt	<input type="checkbox"/> See Multiple Cooler Form	
IR GUN# IR-8 (CF +0.1 °C)	Observed Cooler Temp. <u>3.6</u> °C	Corrected Cooler Temp. <u>3.1</u> °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 <u>1</u>	<input checked="" type="radio"/> Yes <input type="radio"/> No	
-Were the seals on the outside of the cooler(s) signed & dated?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> NA	
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
-Were tamper/custody seals intact and uncompromised?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> NA	
3. Shippers' packing slip attached to the cooler(s)?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
4. Did custody papers accompany the sample(s)?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
5. Were the custody papers relinquished & signed in the appropriate place?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
6. Was/were the person(s) who collected the samples clearly identified on the COC?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
7. Did all bottles arrive in good condition (Unbroken)?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
8. Could all bottle labels be reconciled with the COC?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
9. Were correct bottle(s) used for the test(s) indicated?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
10. Sufficient quantity received to perform indicated analyses?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
11. Are these work share samples?	<input checked="" type="radio"/> Yes <input type="radio"/> 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?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> NA pH Strip Lot# <u>HC984738</u>	
13. Were VOAs on the COC?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
14. Were air bubbles >6 mm in any VOA vials? <input checked="" type="radio"/> Larger than this.	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> NA	
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # <u>N/A</u>	<input checked="" type="radio"/> Yes <input type="radio"/> No	
16. Was a LL Hg or Me Hg trip blank present?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Contacted PM _____	Date _____	by _____ via Verbal Voice Mail Other _____
Concerning _____		
17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES		Samples processed by: <u>PC</u>
_____ _____ _____ _____		
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): _____		
VOA Sample Preservation - Date/Time VOAs Frozen: _____		

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DATA VERIFICATION REPORT



August 05, 2019

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
Event Specific Scope of Work References: Sample COC
Laboratory: TestAmerica - North Canton
Laboratory submittal: 116449-1
Sample date: 2019-07-24
Report received by CADENA: 2019-08-05
Initial Data Verification completed by CADENA: 2019-08-05
Number of Samples:2
Sample Matrices:Water
Test Categories:GCMS VOC

Please see attached criteria report or sample result/qualified analytical result summary for qualifier flags assigned to sample data.

There were no significant QC anomalies or exceptions to report.

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.

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 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: 116449-1

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
2401164491	SUMP-34600BEACON-01_072419	7/24/2019	2:50:00	X	X	
2401164492	TRIP BLANK	7/24/2019	12:00:00	X		

Analytical Results Summary

Reportable Results Only

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton

Laboratory Submittal: 116449-1

Sample Name: SUMP-34600BEACON-01_072419 TRIP BLANK
Lab Sample ID: 2401164491 2401164492
Sample Date: 7/24/2019 7/24/2019

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

Ford Motor Company – Livonia Transmission Project

DATA REVIEW

Livonia, Michigan

Volatile Organic Compounds (VOC) Analysis

SDG #240-116449-1

CADENA Verification Report: 2019-08-05

Analyses Performed By:

TestAmerica
Canton, Ohio

Report #33933R

Review Level: Tier III

Project: MI001454.0004.00002 (30016346)



DATA REVIEW

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 240-116449-1 for samples collected in association with the Ford – Livonia, Michigan site. The review was conducted as a Tier III validation in addition to a verification/Tier II validation review performed by CADENA Inc. and included review of level IV laboratory data package completeness. Only elements of a Tier III validation effort (Tier III includes a detailed review of laboratory raw data to check for errors in calculation, calibration review, internal standard review and compound identification) and omitted deviations from the CADENA verification/Tier II report are documented in this report. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						VOC (Full Scan)	VOC (SIM)	MISC
240-116449-1	SUMP-34600BEACON-01_072419	240-116449-1	Water	7/24/2019		X	X	
	TRIP BLANK	240-116449-2	Water	7/24/2019		X		

DATA REVIEW

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

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

DATA REVIEW

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8260B and 8260B SIM. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999.

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

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

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but was not detected above the level of the reported sample quantitation limit.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The compound was quantitated above the calibration range.
 - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
 - J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
 - UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
 - R The sample results are rejected.

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

DATA REVIEW

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

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

Method	Matrix	Holding Time	Preservation
SW-846 8260B	Water	14 days from collection to analysis	Cool to < 6 °C; pH < 2 with HCl

All samples were analyzed within the specified holding time criteria.

2. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

3. Calibration

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

3.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (20%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

All compounds associated with the initial calibrations were within the specified control limits.

3.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits.

4. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard compounds associated with the VOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

5. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

DATA REVIEW

All detected compounds met the specified criteria.

6. System Performance and Overall Assessment

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

DATA REVIEW

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: 8260B/8260B-SIM	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times/Preservation		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Andrew Korycinski

SIGNATURE:



DATE: August 28, 2019

PEER REVIEW: Joseph C. Houser

DATE: August 28, 2019



**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



TestAmerica Laboratory location: N.Canton — 4101 Shuffel Street NW/ North Canton, OH 44720 / 330-497-9396

3.0 | 3.1

Client Contact Company Name: Arcadis Address: 28550 Cabot Drive, Suite 500 City/State/Zip: Novi, MI, 48377 Phone: 248-994-2240 Project Name: Ford LTP Project Number: MI001454.0003 PO # MI001454.0003		Regulatory program: <input type="checkbox"/> DW <input type="checkbox"/> NPDES <input type="checkbox"/> RCRA <input type="checkbox"/> Other	
Client Project Manager: Kris Hinskey Telephone: 248-994-2240 Email: kristoffer.hinskey@arcadis.com		Lab Contact: Mike DelMonico Telephone: 330-497-9396	
Method of Shipment/Carrier: Shipping/Tracking No:		Analyses Walk-in client Lab sampling Job/SDG No:	
Sample Identification Sample Date: 7-24-19 1450 Sample Time: 7:24 AM Sample: T.C.P. Blank		Filtered Sample (Y/N) <input checked="" type="checkbox"/> Y Composite=C/Grab=C <input checked="" type="checkbox"/> C 1,1-DCE 8260B <input checked="" type="checkbox"/> X cis-1,2-DCE 8260B <input checked="" type="checkbox"/> X Trans-1,2-DCE 8260B <input checked="" type="checkbox"/> X PCE 8260B <input checked="" type="checkbox"/> X TCE 8260B <input checked="" type="checkbox"/> X Vinyl Chloride 8260B <input checked="" type="checkbox"/> X 1,4-Dioxane 8260B SIM <input checked="" type="checkbox"/> X Sample Specific Notes / Special Instructions: 6 VOA containers	
Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Irritable <input type="checkbox"/> Inflammable <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown		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	
Special Instructions/QC Requirements & Comments: Submit all results through Cadena at jim.tomalia@cadenalab.com. Cadena #E203E31 Level IV Reporting.			
Relinquished by: [Signature] Date/Time: 7-24-19 @ 1700 Company: Arcadis	Received by: [Signature] Date/Time: 7-25-19 1040 Company: Arcadis	Relinquished by: [Signature] Date/Time: 7-25-19 1510 Company: EIA	Received by: [Signature] Date/Time: 7-26-19 830 Company: EIA



Client Sample Results

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

Job ID: 240-116449-1

Client Sample ID: SUMP-34600BEACON-01_072419

Lab Sample ID: 240-116449-1

Date Collected: 07/24/19 14:50

Matrix: Water

Date Received: 07/26/19 08:30

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	-		07/30/19 13:58	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		63 - 125		07/30/19 13:58	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	-		08/01/19 13:42	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L	-		08/01/19 13:42	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L	-		08/01/19 13:42	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L	-		08/01/19 13:42	1
Trichloroethene	1.0	U	1.0	0.10	ug/L	-		08/01/19 13:42	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L	-		08/01/19 13:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	101		70 - 121		08/01/19 13:42	1
4-Bromofluorobenzene (Surr)	103		59 - 120		08/01/19 13:42	1
Toluene-d8 (Surr)	93		70 - 123		08/01/19 13:42	1
Dibromofluoromethane (Surr)	92		75 - 128		08/01/19 13:42	1

Client Sample Results

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

Job ID: 240-116449-1

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-116449-2

Date Collected: 07/24/19 00:00

Matrix: Water

Date Received: 07/26/19 08:30

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			08/01/19 14:04	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/01/19 14:04	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/01/19 14:04	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/01/19 14:04	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/01/19 14:04	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/01/19 14:04	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	101		70 - 121		08/01/19 14:04	1
4-Bromofluorobenzene (Surr)	101		59 - 120		08/01/19 14:04	1
Toluene-d8 (Surr)	101		70 - 123		08/01/19 14:04	1
Dibromofluoromethane (Surr)	99		75 - 128		08/01/19 14:04	1

8/5/2019

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

Project Name: Ford LTP
Project #: MI001454.0003 / 30016344
Workorder #: 1907644

Dear Mr. Jim Tomalia

The following report includes the data for the above referenced project for sample(s) received on 7/29/2019 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 #: 1907644

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. #	MI001454.0004.0001B
FAX:		PROJECT #	MI001454.0003 / 30016344 Ford LTP
DATE RECEIVED:	07/29/2019	CONTACT:	Ausha Scott
DATE COMPLETED:	08/05/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	AA-34600BEACON-01_072419	Modified TO-15	6.0 "Hg	5 psi
02A	IAG-34600BEACON-01_072419	Modified TO-15	7.5 "Hg	5 psi
03A	IAF-34600BEACON-02_072419	Modified TO-15	7.5 "Hg	5 psi
04A	DUP-34600BEACON-01_072419	Modified TO-15	8.5 "Hg	5 psi
05A	IAB-34600BEACON-03_072419	Modified TO-15	6.0 "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: 08/05/19

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# 1907644

Five 6 Liter Summa Canister (100% Cert Ambient) samples were received on July 29, 2019. 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

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 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:	AA-34600BEACON-01_072419	Date/Time Analyzed:	8/1/19 04:49 PM
Lab ID:	1907644-01A	Dilution Factor:	1.68
Date/Time Collected:	7/24/19 02:24 PM	Instrument/Filename:	msd20.i / 20080113
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.60	0.67	Not Detected
1,4-Dioxane	123-91-1	0.49	0.54	0.60	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.60	0.67	Not Detected
Tetrachloroethene	127-18-4	0.71	1.0	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.37	0.60	0.67	Not Detected
Trichloroethene	79-01-6	0.44	0.81	0.90	Not Detected
Vinyl Chloride	75-01-4	0.14	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	106
4-Bromofluorobenzene	460-00-4	70-130	98
Toluene-d8	2037-26-5	70-130	98

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

Client ID:	IAG-34600BEACON-01_072419	Date/Time Analyzed:	8/1/19 05:28 PM
Lab ID:	1907644-02A	Dilution Factor:	1.79
Date/Time Collected:	7/24/19 03:50 PM	Instrument/Filename:	msd20.i / 20080114
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.17	0.64	0.71	Not Detected
1,4-Dioxane	123-91-1	0.52	0.58	0.64	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.38	0.64	0.71	Not Detected
Tetrachloroethene	127-18-4	0.75	1.1	1.2	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.40	0.64	0.71	Not Detected
Trichloroethene	79-01-6	0.47	0.86	0.96	Not Detected
Vinyl Chloride	75-01-4	0.15	0.41	0.46	Not Detected

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	100
Toluene-d8	2037-26-5	70-130	96

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

Client ID:	IAF-34600BEACON-02_072419	Date/Time Analyzed:	8/1/19 06:08 PM
Lab ID:	1907644-03A	Dilution Factor:	1.79
Date/Time Collected:	7/24/19 03:48 PM	Instrument/Filename:	msd20.i / 20080115
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.17	0.64	0.71	Not Detected
1,4-Dioxane	123-91-1	0.52	0.58	0.64	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.38	0.64	0.71	Not Detected
Tetrachloroethene	127-18-4	0.75	1.1	1.2	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.40	0.64	0.71	Not Detected
Trichloroethene	79-01-6	0.47	0.86	0.96	Not Detected
Vinyl Chloride	75-01-4	0.15	0.41	0.46	Not Detected

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	99

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

Client ID:	DUP-34600BEACON-01_072419	Date/Time Analyzed:	8/1/19 06:47 PM
Lab ID:	1907644-04A	Dilution Factor:	1.87
Date/Time Collected:	7/24/19 12:00 AM	Instrument/Filename:	msd20.i / 20080116
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.18	0.67	0.74	Not Detected
1,4-Dioxane	123-91-1	0.54	0.61	0.67	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.40	0.67	0.74	Not Detected
Tetrachloroethene	127-18-4	0.79	1.1	1.3	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.42	0.67	0.74	Not Detected
Trichloroethene	79-01-6	0.49	0.90	1.0	Not Detected
Vinyl Chloride	75-01-4	0.15	0.43	0.48	Not Detected

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	102
Toluene-d8	2037-26-5	70-130	97

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

Client ID:	IAB-34600BEACON-03_072419	Date/Time Analyzed:	8/1/19 07:27 PM
Lab ID:	1907644-05A	Dilution Factor:	1.68
Date/Time Collected:	7/24/19 03:36 PM	Instrument/Filename:	msd20.i / 20080117
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.60	0.67	Not Detected
1,4-Dioxane	123-91-1	0.49	0.54	0.60	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.60	0.67	Not Detected
Tetrachloroethene	127-18-4	0.71	1.0	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.37	0.60	0.67	Not Detected
Trichloroethene	79-01-6	0.44	0.81	0.90	Not Detected
Vinyl Chloride	75-01-4	0.14	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	110
4-Bromofluorobenzene	460-00-4	70-130	106
Toluene-d8	2037-26-5	70-130	96

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

Client ID:	Lab Blank	Date/Time Analyzed:	8/1/19 12:05 PM
Lab ID:	1907644-06A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20080107a
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	0.095	0.36	0.40	Not Detected
1,4-Dioxane	123-91-1	0.29	0.32	0.36	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.21	0.36	0.40	Not Detected
Tetrachloroethene	127-18-4	0.42	0.61	0.68	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.22	0.36	0.40	Not Detected
Trichloroethene	79-01-6	0.26	0.48	0.54	Not Detected
Vinyl Chloride	75-01-4	0.082	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	100
4-Bromofluorobenzene	460-00-4	70-130	98
Toluene-d8	2037-26-5	70-130	100

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

Client ID:	CCV	Date/Time Analyzed:	8/1/19 07:00 AM
Lab ID:	1907644-07A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20080102
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	90
1,4-Dioxane	123-91-1	100
cis-1,2-Dichloroethene	156-59-2	92
Tetrachloroethene	127-18-4	101
trans-1,2-Dichloroethene	156-60-5	92
Trichloroethene	79-01-6	97
Vinyl Chloride	75-01-4	92

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	101

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

Client ID:	LCS	Date/Time Analyzed:	8/1/19 09:19 AM
Lab ID:	1907644-08A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20080104
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	92
1,4-Dioxane	123-91-1	105
cis-1,2-Dichloroethene	156-59-2	86
Tetrachloroethene	127-18-4	98
trans-1,2-Dichloroethene	156-60-5	101
Trichloroethene	79-01-6	93
Vinyl Chloride	75-01-4	94

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	95
4-Bromofluorobenzene	460-00-4	70-130	97
Toluene-d8	2037-26-5	70-130	100

* % Recovery is calculated using unrounded analytical results.

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

Client ID:	LCSD	Date/Time Analyzed:	8/1/19 10:08 AM
Lab ID:	1907644-08AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20080105
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	89
1,4-Dioxane	123-91-1	102
cis-1,2-Dichloroethene	156-59-2	85
Tetrachloroethene	127-18-4	97
trans-1,2-Dichloroethene	156-60-5	101
Trichloroethene	79-01-6	93
Vinyl Chloride	75-01-4	92

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	98
4-Bromofluorobenzene	460-00-4	70-130	96
Toluene-d8	2037-26-5	70-130	101

* % Recovery is calculated using unrounded analytical results.



August 05, 2019

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: 1907644
Sample date: 2019-07-24
Report received by CADENA: 2019-08-05
Initial Data Verification completed by CADENA: 2019-08-05

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.

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 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.

Ford Motor Company – Livonia Transmission Project

DATA REVIEW

Livonia, Michigan

Volatile Organic Compounds (VOC) TO-15 Analysis

SDG #1907644

CADENA Verification Report: 2019-08-05

Analyses Performed By:
Eurofins Air Toxics
Folsom, California

Report #33937R
Review Level: Tier III
Project: MI001454.0004.00002 (30016346)

DATA REVIEW

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 1907644 for samples collected in association with the Ford – Livonia, Michigan site. The review was conducted as a Tier III validation in addition to a verification/Tier II validation review performed by CADENA Inc. and included review of level IV laboratory data package completeness. Only elements of a Tier III validation effort (Tier III includes a detailed review of laboratory raw data to check for errors in calculation, calibration review, internal standard review and compound identification) and omitted deviations from the CADENA verification/Tier II report are documented in this report. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						TO-15 (Full Scan)	TO-15 (SIM)	MISC
1907644	AA-34600BEACON-01_072419	1907644-01A	Air	7/24/2019		X		
	IAG-34600BEACON-01_072419	1907644-02A	Air	7/24/2019		X		
	IAF-34600BEACON-02_072419	1907644-03A	Air	7/24/2019		X		
	DUP-34600BEACON-01_072419	1907644-04A	Air	7/24/2019	IAB-34600BEACON-03_072419	X		
	IAB-34600BEACON-03_072419	1907644-05A	Air	7/24/2019		X		

DATA REVIEW

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

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

DATA REVIEW

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Method TO-15 (Full Scan). Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999.

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

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

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but was not detected above the level of the reported sample quantitation limit.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The compound was quantitated above the calibration range.
 - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
 - J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
 - UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
 - R The sample results are rejected.

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

DATA REVIEW

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

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

Method	Matrix	Holding Time	Preservation	Return Canister Pressure
USEPA TO-15	Air	30 days from collection to analysis (Canister)	Ambient Temperature	< -2" Hg

All samples were analyzed within the specified holding time and canister return pressure / vacuum criteria.

2. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

3. Calibration

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

3.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (30%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

All compounds associated with the initial calibrations were within the specified control limits.

3.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (30%) and RRF value greater than control limit (0.05).

All compounds associated with the continuing calibrations were within the specified control limits.

4. Internal Standard Performance

Internal standard performance criteria ensure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the VOC exhibit area counts that are not greater than 140% or less than 60% of the area counts of the associated continuing calibration standard.

DATA REVIEW

All internal standard responses were within control limits.

5. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

6. Field Duplicate Sample Analysis

The field duplicate analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 35% for air matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are not greater than five times the RL, a control limit of one times the RL is applied to the difference between the duplicate sample results.

Results (in $\mu\text{g}/\text{m}^3$) for the field duplicate samples are summarized in the following table.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
IAB-34600BEACON-03_072419/ DUP-34600BEACON-01_072419	All compounds	U	U	AC

Notes:

AC Acceptable

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

7. System Performance and Overall Assessment

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

DATA REVIEW

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: TO-15 (Full Scan)	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Canister return pressure (<-2"Hg)		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Field Duplicate Sample RPD		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%RSD Relative standard deviation

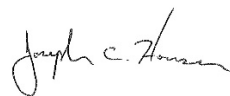
%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Joseph C. Houser

SIGNATURE:



DATE: August 28, 2019

PEER REVIEW: Andrew Korycinski

DATE: August 29, 2019



**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



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

Client ID:	AA-34600BEACON-01_072419	Date/Time Analyzed:	8/1/19 04:49 PM
Lab ID:	1907644-01A	Dilution Factor:	1.68
Date/Time Collected:	7/24/19 02:24 PM	Instrument/Filename:	msd20.i / 20080113
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.60	0.67	Not Detected
1,4-Dioxane	123-91-1	0.49	0.54	0.60	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.60	0.67	Not Detected
Tetrachloroethene	127-18-4	0.71	1.0	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.37	0.60	0.67	Not Detected
Trichloroethene	79-01-6	0.44	0.81	0.90	Not Detected
Vinyl Chloride	75-01-4	0.14	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	106
4-Bromofluorobenzene	460-00-4	70-130	98
Toluene-d8	2037-26-5	70-130	98

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

Client ID:	IAG-34600BEACON-01_072419	Date/Time Analyzed:	8/1/19 05:28 PM
Lab ID:	1907644-02A	Dilution Factor:	1.79
Date/Time Collected:	7/24/19 03:50 PM	Instrument/Filename:	msd20.i / 20080114
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.17	0.64	0.71	Not Detected
1,4-Dioxane	123-91-1	0.52	0.58	0.64	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.38	0.64	0.71	Not Detected
Tetrachloroethene	127-18-4	0.75	1.1	1.2	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.40	0.64	0.71	Not Detected
Trichloroethene	79-01-6	0.47	0.86	0.96	Not Detected
Vinyl Chloride	75-01-4	0.15	0.41	0.46	Not Detected

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	100
Toluene-d8	2037-26-5	70-130	96

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

Client ID:	IAF-34600BEACON-02_072419	Date/Time Analyzed:	8/1/19 06:08 PM
Lab ID:	1907644-03A	Dilution Factor:	1.79
Date/Time Collected:	7/24/19 03:48 PM	Instrument/Filename:	msd20.i / 20080115
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.17	0.64	0.71	Not Detected
1,4-Dioxane	123-91-1	0.52	0.58	0.64	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.38	0.64	0.71	Not Detected
Tetrachloroethene	127-18-4	0.75	1.1	1.2	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.40	0.64	0.71	Not Detected
Trichloroethene	79-01-6	0.47	0.86	0.96	Not Detected
Vinyl Chloride	75-01-4	0.15	0.41	0.46	Not Detected

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	99

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

Client ID:	DUP-34600BEACON-01_072419	Date/Time Analyzed:	8/1/19 06:47 PM
Lab ID:	1907644-04A	Dilution Factor:	1.87
Date/Time Collected:	7/24/19 12:00 AM	Instrument/Filename:	msd20.i / 20080116
Media:	6 Liter Summa Canister (100% Cert Ambier		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.18	0.67	0.74	Not Detected
1,4-Dioxane	123-91-1	0.54	0.61	0.67	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.40	0.67	0.74	Not Detected
Tetrachloroethene	127-18-4	0.79	1.1	1.3	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.42	0.67	0.74	Not Detected
Trichloroethene	79-01-6	0.49	0.90	1.0	Not Detected
Vinyl Chloride	75-01-4	0.15	0.43	0.48	Not Detected

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	102
Toluene-d8	2037-26-5	70-130	97

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

Client ID:	IAB-34600BEACON-03_072419	Date/Time Analyzed:	8/1/19 07:27 PM
Lab ID:	1907644-05A	Dilution Factor:	1.68
Date/Time Collected:	7/24/19 03:36 PM	Instrument/Filename:	msd20.i / 20080117
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.60	0.67	Not Detected
1,4-Dioxane	123-91-1	0.49	0.54	0.60	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.60	0.67	Not Detected
Tetrachloroethene	127-18-4	0.71	1.0	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.37	0.60	0.67	Not Detected
Trichloroethene	79-01-6	0.44	0.81	0.90	Not Detected
Vinyl Chloride	75-01-4	0.14	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	110
4-Bromofluorobenzene	460-00-4	70-130	106
Toluene-d8	2037-26-5	70-130	96

Analysis Request /Canister Chain of Custody

For Laboratory Use Only

1907644

PID: _____ Workorder #: _____

180 Blue Ravine Rd. Suite B, Folsom, CA 95630
 Phone (800) 985-5955; Fax (916) 351-8279

Click links below to view:

[Canister Sampling Guide](#)

[Helium Shroud Video](#)

Client:	Ford	PID:	NA	Special Instructions/Notes: Report ONLY: 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, 1,4-Dioxane, PCE, TCE and VC. Submit results through Cadena at jim.tomalia@cadena.com. Cadena #E203631. Level IV Reporting	Turnaround Time (Rush surcharges may apply) 5 Day Turnaround Time	
Project Name:	Ford LTP		MI001454.0003 /		Canister Vacuum/Pressure	Requested Analytes
Project Manager:	Kris Hinskey	P.O.#	30016344			
Sampler:	Iarina Samp, Emma Witherspoon					
Site Name:	34600 BEACON					

Lab ID	Sample Identification	Can #	Flow Controller #	Start Sampling Information		Stop Sampling Information		Initial (in Hg)	Final (in Hg)	Lab Use Only		TO-15 (See Special Instructions/Notes)	Do Not Analyze
				Date	Time	Date	Time			Receipt	Final (psig) Gas: N ₂ / He		
01A	AA-34600BEACON-01_072419	6L0565	24088	7/23/2019	15:33	7/24/2019	14:24	-28.5	-4.5			X	
02A	IAG-34600BEACON-01_072419	6L1891	40395	7/23/2019	15:44	7/24/2019	15:50	-29	-7			X	
03A	IAF-34600BEACON-02_072419	6L2396	40413	7/23/2019	15:48	7/24/2019	15:48	-29	-7.5			X	
04A	DUP-34600BEACON-01_072419	6L1750	30819	7/23/2019	--	7/24/2019	--	-29	-8.5			X	
05A	IAB-34600BEACON-03_072419	6L2010	22462	7/23/2019	15:51	7/24/2019	15:36	-29	-6			X	
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Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
<i>[Signature]</i>	7/25/19	1600	<i>[Signature]</i>	7/29/19	0935
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time

Lab Use Only

Shipper Name: *FedEx* Custody Seals Intact? Yes No None *GCOP*

Sample Transportation Notice: Relinquishing signature on this document indicates that samples are shipped in compliance with all applicable local, State, Federal, and international laws, regulations, and ordinances of any kind. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Eurofins Air Toxics against any claim, demand, or action, of any kind, related to the collection, handling, of shipping of samples. D.O.T Hotline (800) 467-4922

8/5/2019

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

Project Name: Ford LTP
Project #: MI001454.0003 / 30016344
Workorder #: 1907641

Dear Mr. Jim Tomalia

The following report includes the data for the above referenced project for sample(s) received on 7/29/2019 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 #: 1907641

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. #	MI001454.0004.0001B
FAX:		PROJECT #	MI001454.0003 / 30016344 Ford LTP
DATE RECEIVED:	07/29/2019	CONTACT:	Ausha Scott
DATE COMPLETED:	08/05/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	SSMP-34600BEACON-01_072419	TO-15	4.3 "Hg	15.7 psi
02A	Lab Blank	TO-15	NA	NA
03A	CCV	TO-15	NA	NA
04A	LCS	TO-15	NA	NA
04AA	LCSD	TO-15	NA	NA

CERTIFIED BY: 

 Technical Director

DATE: 08/05/19

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP – CA009332019-11, VA NELAP - 460197, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.

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
EPA Method TO-15
Arcadis U.S., Inc.
Workorder# 1907641

One 1 Liter Summa Canister (100% Certified) sample was received on July 29, 2019. 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 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-34600BEACON-01_072419	Date/Time Analyzed:	8/1/19 07:19 AM
Lab ID:	1907641-01A	Dilution Factor:	2.41
Date/Time Collected:	7/24/19 03:24 PM	Instrument/Filename:	msda.i / a073124
Media:	1 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	1.4	3.8	4.8	Not Detected
1,4-Dioxane	123-91-1	2.5	13	17	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.96	3.8	4.8	Not Detected
Tetrachloroethene	127-18-4	0.98	6.5	8.2	Not Detected
trans-1,2-Dichloroethene	156-60-5	1.8	3.8	4.8	Not Detected
Trichloroethene	79-01-6	0.65	5.2	6.5	Not Detected
Vinyl Chloride	75-01-4	0.62	2.5	3.1	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	86
4-Bromofluorobenzene	460-00-4	70-130	100
Toluene-d8	2037-26-5	70-130	100

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

Client ID:	Lab Blank	Date/Time Analyzed:	7/31/19 12:34 PM
Lab ID:	1907641-02A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msda.i / a073105a
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	0.59	1.6	2.0	Not Detected
1,4-Dioxane	123-91-1	1.0	5.4	7.2	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.40	1.6	2.0	Not Detected
Tetrachloroethene	127-18-4	0.41	2.7	3.4	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.75	1.6	2.0	Not Detected
Trichloroethene	79-01-6	0.27	2.1	2.7	Not Detected
Vinyl Chloride	75-01-4	0.26	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	89
4-Bromofluorobenzene	460-00-4	70-130	102
Toluene-d8	2037-26-5	70-130	96

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

Client ID:	CCV	Date/Time Analyzed:	7/31/19 11:18 AM
Lab ID:	1907641-03A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msda.i / a073102
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	94
1,4-Dioxane	123-91-1	87
cis-1,2-Dichloroethene	156-59-2	89
Tetrachloroethene	127-18-4	101
trans-1,2-Dichloroethene	156-60-5	86
Trichloroethene	79-01-6	93
Vinyl Chloride	75-01-4	89

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	104
Toluene-d8	2037-26-5	70-130	99

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

Client ID:	LCS	Date/Time Analyzed:	7/31/19 11:43 AM
Lab ID:	1907641-04A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msda.i / a073103
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	97
1,4-Dioxane	123-91-1	89
cis-1,2-Dichloroethene	156-59-2	102
Tetrachloroethene	127-18-4	104
trans-1,2-Dichloroethene	156-60-5	79
Trichloroethene	79-01-6	97
Vinyl Chloride	75-01-4	92

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	103
Toluene-d8	2037-26-5	70-130	98

* % Recovery is calculated using unrounded analytical results.

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

Client ID:	LCSD	Date/Time Analyzed:	7/31/19 12:08 PM
Lab ID:	1907641-04AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msda.i / a073104
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	97
1,4-Dioxane	123-91-1	93
cis-1,2-Dichloroethene	156-59-2	102
Tetrachloroethene	127-18-4	104
trans-1,2-Dichloroethene	156-60-5	79
Trichloroethene	79-01-6	96
Vinyl Chloride	75-01-4	92

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	103
Toluene-d8	2037-26-5	70-130	97

* % Recovery is calculated using unrounded analytical results.



August 05, 2019

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: 1907641
Sample date: 2019-07-24
Report received by CADENA: 2019-08-05
Initial Data Verification completed by CADENA: 2019-08-05

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.

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 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.

Ford Motor Company – Livonia Transmission Project

DATA REVIEW

Livonia, Michigan

Volatile Organic Compounds (VOC) TO-15 Analysis

SDG #1907641

CADENA Verification Report: 2019-08-05

Analyses Performed By:
Eurofins Air Toxics
Folsom, California

Report #33936R
Review Level: Tier III
Project: MI001454.0004.00002 (30016346)



DATA REVIEW

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 1907641 for samples collected in association with the Ford – Livonia, Michigan site. The review was conducted as a Tier III validation in addition to a verification/Tier II validation review performed by CADENA Inc. and included review of level IV laboratory data package completeness. Only elements of a Tier III validation effort (Tier III includes a detailed review of laboratory raw data to check for errors in calculation, calibration review, internal standard review and compound identification) and omitted deviations from the CADENA verification/Tier II report are documented in this report. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						TO-15 (Full Scan)	TO-15 (SIM)	MISC
1907641	SSMP-34600BEACON-01_072419	1907641-01A	Air	7/24/2019		X		

DATA REVIEW

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

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

DATA REVIEW

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Method TO-15 (Full Scan). Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999.

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

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

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but was not detected above the level of the reported sample quantitation limit.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The compound was quantitated above the calibration range.
 - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
 - J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
 - UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
 - R The sample results are rejected.

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

DATA REVIEW

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

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

Method	Matrix	Holding Time	Preservation	Return Canister Pressure
USEPA TO-15	Air	30 days from collection to analysis (Canister)	Ambient Temperature	< -2" Hg

All samples were analyzed within the specified holding time and canister return pressure / vacuum criteria.

2. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

3. Calibration

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

3.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (30%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

All compounds associated with the initial calibrations were within the specified control limits.

3.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (30%) and RRF value greater than control limit (0.05).

All compounds associated with the continuing calibrations were within the specified control limits.

4. Internal Standard Performance

Internal standard performance criteria ensure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the VOC exhibit area counts that are not greater than 140% or less than 60% of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

DATA REVIEW

5. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra. All identified compounds met the specified criteria.

6. Field Duplicate Sample Analysis

The field duplicate analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 35% for air matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are not greater than five times the RL, a control limit of one times the RL is applied to the difference between the duplicate sample results.

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

7. System Performance and Overall Assessment

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

DATA REVIEW

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: TO-15 (Full Scan)	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Canister return pressure (<-2"Hg)		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Field Duplicate Sample RPD					X
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%RSD Relative standard deviation

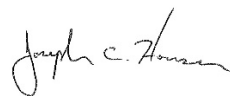
%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Joseph C. Houser

SIGNATURE:



DATE: August 28, 2019

PEER REVIEW: Andrew Korycinski

DATE: August 29, 2019



**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



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

Client ID:	SSMP-34600BEACON-01_072419	Date/Time Analyzed:	8/1/19 07:19 AM
Lab ID:	1907641-01A	Dilution Factor:	2.41
Date/Time Collected:	7/24/19 03:24 PM	Instrument/Filename:	msda.i / a073124
Media:	1 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	1.4	3.8	4.8	Not Detected
1,4-Dioxane	123-91-1	2.5	13	17	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.96	3.8	4.8	Not Detected
Tetrachloroethene	127-18-4	0.98	6.5	8.2	Not Detected
trans-1,2-Dichloroethene	156-60-5	1.8	3.8	4.8	Not Detected
Trichloroethene	79-01-6	0.65	5.2	6.5	Not Detected
Vinyl Chloride	75-01-4	0.62	2.5	3.1	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	86
4-Bromofluorobenzene	460-00-4	70-130	100
Toluene-d8	2037-26-5	70-130	100

Analysis Request / Canister Chain of Custody

For Laboratory Use Only
 PID: _____ Workorder #: 1907644

180 Blue Ravine Rd. Suite B, Folsom, CA 95630
 Phone (800) 985-5955; Fax (916) 821-8279

Click links below to view:
[Canister Sampling Guide](#)
[Helium Shroud Video](#)

Client: <u>Ford</u>	PID: <u>NA</u>	Special Instructions/Notes: Report ONLY: 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, 1,4-Dioxane, PCE, TCE and VC. Submit results through Cadena at jim.tomalia@cadena.com. Cadena #E203631. Level IV Reporting
Project Name: <u>Ford LTP</u>	MI001454.0003 /	
Project Manager: <u>Kris Hinskey</u>	P.O.# <u>30016344</u>	
Sampler: <u>Marina Samp, Hayden Ladd</u>		
Site Name: <u>34600 BEACON</u>		

Turnaround Time (Rush surcharges may apply)	
5 Day Turnaround Time	
Canister Vacuum/Pressure	Requested Analyses

Lab ID	Sample Identification	Can #	Flow Controller #	Start Sampling Information		Stop Sampling Information		Initial (in Hg)	Final (in Hg)	Lab Use Only		TO-15 (See Special Instructions/Notes)	Do Not Analyze
				Date	Time	Date	Time			Receipt	Final (psig) Gas: N ₂ / He		
<u>OIA</u>	SSMP-34600BEACON-01_072419	1L2934	23722	7/24/2019	15:09	7/24/2019	15:24	-29.5	-4.5			X	
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Relinquished by: (Signature/Affiliation) <u>[Signature]</u>	Date <u>7/25/19</u>	Time <u>1600</u>	Received by: (Signature/Affiliation) <u>[Signature]</u>	Date <u>7/29/19</u>	Time <u>0935</u>
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time

Lab Use Only	
Shipper Name: <u>Fed Ex</u>	Custody Seals Intact? <u>Yes</u> <input type="checkbox"/> No <input type="checkbox"/> None <input type="checkbox"/> <u>GOOD</u>

Sample Transportation Notice: Relinquishing signature on this document indicates that samples are shipped in compliance with all applicable local, State, Federal, and international laws, regulations, and ordinances of any kind. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Eurofins Air Toxics against any claim, demand, or action, of any kind, related to the collection, handling, of shipping of samples. D.O.T Hotline (800) 467-4922