

## ANALYTICAL REPORT

Eurofins TestAmerica, Canton  
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North Canton, OH 44720  
Tel: (330)497-9396

Laboratory Job ID: 240-121002-1

Client Project/Site: Ford LTP Livonia MI - E203631

**For:**

ARCADIS U.S., Inc.  
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Suite 500  
Novi, Michigan 48377

Attn: Kristoffer Hinskey



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Authorized for release by:  
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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: 240-121002-1

## 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: 240-121002-1

**Job ID: 240-121002-1**

**Laboratory: Eurofins TestAmerica, Canton**

**Narrative**

## CASE NARRATIVE

**Client: ARCADIS U.S., Inc.**

**Project: Ford LTP Livonia MI - E203631**

**Report Number: 240-121002-1**

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 10/24/2019 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.0° C.

### **VOLATILE ORGANIC COMPOUNDS (GCMS)**

Samples SUMP-12070BOSTONPOST-01\_102219 (240-121002-1) and TRIP BLANK (240-121002-2) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 10/31/2019.

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-12070BOSTONPOST-01\_102219 (240-121002-1) was analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The sample was analyzed on 10/30/2019.

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: 240-121002-1

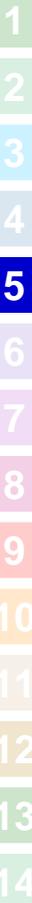
Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
8260B SIM	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
5030B	Purge and Trap	SW846	TAL CAN

**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: 240-121002-1

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-121002-1	SUMP-12070BOSTONPOST-01_102219	Water	10/22/19 08:31	10/24/19 09:00	
240-121002-2	TRIP BLANK	Water	10/22/19 00:00	10/24/19 09:00	

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- 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: 240-121002-1

**Client Sample ID: SUMP-12070BOSTONPOST-01\_102219**

**Lab Sample ID: 240-121002-1**

No Detections.

**Client Sample ID: TRIP BLANK**

**Lab Sample ID: 240-121002-2**

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: 240-121002-1

**Client Sample ID: SUMP-12070BOSTONPOST-01\_102219**

**Lab Sample ID: 240-121002-1**

Date Collected: 10/22/19 08:31

Matrix: Water

Date Received: 10/24/19 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			10/30/19 18:31	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		63 - 125		10/30/19 18:31	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/31/19 16:33	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			10/31/19 16:33	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			10/31/19 16:33	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/31/19 16:33	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			10/31/19 16:33	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			10/31/19 16:33	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		75 - 130		10/31/19 16:33	1
4-Bromofluorobenzene (Surr)	75		47 - 134		10/31/19 16:33	1
Toluene-d8 (Surr)	89		69 - 122		10/31/19 16:33	1
Dibromofluoromethane (Surr)	97		78 - 129		10/31/19 16:33	1

# Client Sample Results

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

Job ID: 240-121002-1

**Client Sample ID: TRIP BLANK**

**Lab Sample ID: 240-121002-2**

**Date Collected: 10/22/19 00:00**

**Matrix: Water**

**Date Received: 10/24/19 09:00**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/31/19 16:55	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			10/31/19 16:55	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			10/31/19 16:55	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/31/19 16:55	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			10/31/19 16:55	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			10/31/19 16:55	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		75 - 130		10/31/19 16:55	1
4-Bromofluorobenzene (Surr)	72		47 - 134		10/31/19 16:55	1
Toluene-d8 (Surr)	88		69 - 122		10/31/19 16:55	1
Dibromofluoromethane (Surr)	99		78 - 129		10/31/19 16:55	1

# Surrogate Summary

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

Job ID: 240-121002-1

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

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DCA (75-130)	BFB (47-134)	TOL (69-122)	DBFM (78-129)
240-121002-1	SUMP-12070BOSTONPOST-01	100	75	89	97
240-121002-2	TRIP BLANK	107	72	88	99
240-121184-E-12 MSD	Matrix Spike Duplicate	86	86	86	88
240-121184-F-12 MS	Matrix Spike	92	91	92	92
LCS 240-408500/4	Lab Control Sample	89	98	98	90
LCSD 240-408500/8	Lab Control Sample Dup	90	103	98	92
MB 240-408500/6	Method Blank	105	77	92	100

#### Surrogate Legend

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

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

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA
		(63-125)
240-121002-1	SUMP-12070BOSTONPOST-01	106
240-121002-1 MS	SUMP-12070BOSTONPOST-01 _102219	106
240-121002-1 MSD	SUMP-12070BOSTONPOST-01 _102219	110
LCS 240-408286/4	Lab Control Sample	101
MB 240-408286/5	Method Blank	102

#### 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: 240-121002-1

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

**Lab Sample ID: MB 240-408500/6**  
**Matrix: Water**  
**Analysis Batch: 408500**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/31/19 12:56	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			10/31/19 12:56	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			10/31/19 12:56	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/31/19 12:56	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			10/31/19 12:56	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			10/31/19 12:56	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	105		75 - 130		10/31/19 12:56	1
4-Bromofluorobenzene (Surr)	77		47 - 134		10/31/19 12:56	1
Toluene-d8 (Surr)	92		69 - 122		10/31/19 12:56	1
Dibromofluoromethane (Surr)	100		78 - 129		10/31/19 12:56	1

**Lab Sample ID: LCS 240-408500/4**  
**Matrix: Water**  
**Analysis Batch: 408500**

**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	73 - 129
cis-1,2-Dichloroethene	10.0	9.23		ug/L		92	75 - 124
Tetrachloroethene	10.0	9.01		ug/L		90	70 - 125
trans-1,2-Dichloroethene	10.0	9.32		ug/L		93	74 - 130
Trichloroethene	10.0	9.44		ug/L		94	71 - 121
Vinyl chloride	10.0	10.3		ug/L		103	61 - 134

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	89		75 - 130
4-Bromofluorobenzene (Surr)	98		47 - 134
Toluene-d8 (Surr)	98		69 - 122
Dibromofluoromethane (Surr)	90		78 - 129

**Lab Sample ID: LCSD 240-408500/8**  
**Matrix: Water**  
**Analysis Batch: 408500**

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethene	10.0	12.2		ug/L		122	73 - 129	2	35
cis-1,2-Dichloroethene	10.0	9.19		ug/L		92	75 - 124	0	35
Tetrachloroethene	10.0	9.05		ug/L		91	70 - 125	0	35
trans-1,2-Dichloroethene	10.0	9.25		ug/L		93	74 - 130	1	35
Trichloroethene	10.0	9.56		ug/L		96	71 - 121	1	35
Vinyl chloride	10.0	11.6		ug/L		116	61 - 134	12	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	90		75 - 130
4-Bromofluorobenzene (Surr)	103		47 - 134
Toluene-d8 (Surr)	98		69 - 122

Eurofins TestAmerica, Canton

# QC Sample Results

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

Job ID: 240-121002-1

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

**Lab Sample ID: LCSD 240-408500/8**  
**Matrix: Water**  
**Analysis Batch: 408500**

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

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
Dibromofluoromethane (Surr)	92		78 - 129

**Lab Sample ID: 240-121184-E-12 MSD**  
**Matrix: Water**  
**Analysis Batch: 408500**

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

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD
	Result	Qualifier	Added	Result	Qualifier				Limits		
1,1-Dichloroethene	1.0	U	10.0	11.3		ug/L		113	64 - 132	3	35
cis-1,2-Dichloroethene	1.6		10.0	9.80		ug/L		82	68 - 121	5	35
Tetrachloroethene	1.0	U	10.0	7.79		ug/L		78	52 - 129	3	35
trans-1,2-Dichloroethene	0.24	J	10.0	8.53		ug/L		83	69 - 126	5	35
Trichloroethene	23		10.0	29.6		ug/L		64	56 - 124	6	35
Vinyl chloride	1.0	U	10.0	10.4		ug/L		104	49 - 136	4	35

Surrogate	MSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	86		75 - 130
4-Bromofluorobenzene (Surr)	86		47 - 134
Toluene-d8 (Surr)	86		69 - 122
Dibromofluoromethane (Surr)	88		78 - 129

**Lab Sample ID: 240-121184-F-12 MS**  
**Matrix: Water**  
**Analysis Batch: 408500**

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

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				Limits
1,1-Dichloroethene	1.0	U	10.0	11.7		ug/L		117	64 - 132
cis-1,2-Dichloroethene	1.6		10.0	10.3		ug/L		87	68 - 121
Tetrachloroethene	1.0	U	10.0	8.05		ug/L		80	52 - 129
trans-1,2-Dichloroethene	0.24	J	10.0	8.96		ug/L		87	69 - 126
Trichloroethene	23		10.0	31.4		ug/L		81	56 - 124
Vinyl chloride	1.0	U	10.0	10.9		ug/L		109	49 - 136

Surrogate	MS		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	92		75 - 130
4-Bromofluorobenzene (Surr)	91		47 - 134
Toluene-d8 (Surr)	92		69 - 122
Dibromofluoromethane (Surr)	92		78 - 129

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

**Lab Sample ID: MB 240-408286/5**  
**Matrix: Water**  
**Analysis Batch: 408286**

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

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			10/30/19 11:50	1

Eurofins TestAmerica, Canton

# QC Sample Results

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

Job ID: 240-121002-1

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

**Lab Sample ID: MB 240-408286/5**  
**Matrix: Water**  
**Analysis Batch: 408286**

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

Surrogate	MB MB %Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	102		63 - 125		10/30/19 11:50	1

**Lab Sample ID: LCS 240-408286/4**  
**Matrix: Water**  
**Analysis Batch: 408286**

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

Analyte	Spike Added	LCS LCS Result Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	10.0	10.7	ug/L		107	59 - 131
Surrogate	LCS LCS %Recovery	Qualifier	Limits			
1,2-Dichloroethane-d4 (Surr)	101		63 - 125			

**Lab Sample ID: 240-121002-1 MS**  
**Matrix: Water**  
**Analysis Batch: 408286**

**Client Sample ID: SUMP-12070BOSTONPOST-01\_102219**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS MS Result Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	2.0	U	10.0	10.1	ug/L		101	52 - 129
Surrogate	MS MS %Recovery	Qualifier	Limits					
1,2-Dichloroethane-d4 (Surr)	106		63 - 125					

**Lab Sample ID: 240-121002-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 408286**

**Client Sample ID: SUMP-12070BOSTONPOST-01\_102219**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD MSD Result Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
1,4-Dioxane	2.0	U	10.0	10.7	ug/L		107	52 - 129	7	13
Surrogate	MSD MSD %Recovery	Qualifier	Limits							
1,2-Dichloroethane-d4 (Surr)	110		63 - 125							

# QC Association Summary

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

Job ID: 240-121002-1

## GC/MS VOA

### Analysis Batch: 408286

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-121002-1	SUMP-12070BOSTONPOST-01_102219	Total/NA	Water	8260B SIM	
MB 240-408286/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-408286/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-121002-1 MS	SUMP-12070BOSTONPOST-01_102219	Total/NA	Water	8260B SIM	
240-121002-1 MSD	SUMP-12070BOSTONPOST-01_102219	Total/NA	Water	8260B SIM	

### Analysis Batch: 408500

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-121002-1	SUMP-12070BOSTONPOST-01_102219	Total/NA	Water	8260B	
240-121002-2	TRIP BLANK	Total/NA	Water	8260B	
MB 240-408500/6	Method Blank	Total/NA	Water	8260B	
LCS 240-408500/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 240-408500/8	Lab Control Sample Dup	Total/NA	Water	8260B	
240-121184-E-12 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	
240-121184-F-12 MS	Matrix Spike	Total/NA	Water	8260B	

# Lab Chronicle

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

Job ID: 240-121002-1

**Client Sample ID: SUMP-12070BOSTONPOST-01\_102219**

**Lab Sample ID: 240-121002-1**

**Date Collected: 10/22/19 08:31**

**Matrix: Water**

**Date Received: 10/24/19 09:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	408500	10/31/19 16:33	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	408286	10/30/19 18:31	SAM	TAL CAN

**Client Sample ID: TRIP BLANK**

**Lab Sample ID: 240-121002-2**

**Date Collected: 10/22/19 00:00**

**Matrix: Water**

**Date Received: 10/24/19 09:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	408500	10/31/19 16:55	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: 240-121002-1

## Laboratory: Eurofins TestAmerica, Canton

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

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-20
Connecticut	State	PH-0590	12-31-19
Florida	NELAP	E87225	06-30-20
Georgia	State	4062	02-23-20
Illinois	NELAP	004498	07-31-20
Iowa	State	421	06-01-20
Kansas	NELAP	E-10336	04-30-20
Kentucky (UST)	State	112225	02-23-20
Kentucky (WW)	State	KY98016	12-31-19
Minnesota	NELAP	OH00048	12-31-19
Minnesota (Petrofund)	State Program	3506	07-31-21
New Jersey	NELAP	OH001	06-30-20
New York	NELAP	10975	03-31-20
Ohio VAP	State	CL0024	06-05-21
Oregon	NELAP	4062	02-23-20
Pennsylvania	NELAP	68-00340	08-31-20
Texas	NELAP	T104704517-18-10	08-31-20
USDA	US Federal Programs	P330-16-00404	12-28-19
Virginia	NELAP	010101	09-14-20
Washington	State	C971	01-12-20
West Virginia DEP	State	210	12-31-19





**Eurofins TestAmerica Canton Sample Receipt Form/Narrative**  
**Canton Facility**

Login # : 121002

Client Accadis Site Name \_\_\_\_\_  
 Cooler Received on 10-24-19 Opened on 10-24-19  
 FedEx: 1<sup>st</sup>  Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other \_\_\_\_\_

Cooler unpacked by:  
Adem Garrett

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

TestAmerica Cooler # 1A Foam Box  Client Cooler  Box  Other \_\_\_\_\_  
 Packing material used:  Bubble Wrap  Foam  Plastic Bag  None  Other \_\_\_\_\_  
 COOLANT:  Wet Ice  Blue Ice  Dry Ice  Water  None

1. Cooler temperature upon receipt  See Multiple Cooler Form  
 IR GUN# IR-10 (CF +0.7 °C) Observed Cooler Temp. 4.3 °C Corrected Cooler Temp. 5.0 °C  
 IR GUN #IR-11 (CF +0.9°C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1  Yes  No  
 -Were the seals on the outside of the cooler(s) signed & dated?  Yes  No  NA  
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?  Yes  No  NA  
 -Were tamper/custody seals intact and uncompromised?  Yes  No  NA
3. Shippers' packing slip attached to the cooler(s)?  Yes  No
4. Did custody papers accompany the sample(s)?  Yes  No
5. Were the custody papers relinquished & signed in the appropriate place?  Yes  No
6. Was/were the person(s) who collected the samples clearly identified on the COC?  Yes  No
7. Did all bottles arrive in good condition (Unbroken)?  Yes  No
8. Could all bottle labels be reconciled with the COC?  Yes  No
9. Were correct bottle(s) used for the test(s) indicated?  Yes  No
10. Sufficient quantity received to perform indicated analyses?  Yes  No
11. Are these work share samples?  Yes  No  
 If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt?  Yes  No  NA pH Strip Lot# HC991818
13. Were VOAs on the COC?  Yes  No
14. Were air bubbles >6 mm in any VOA vials?  Yes  No  NA  
 Larger than this. 
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # \_\_\_\_\_  Yes  No
16. Was a LL Hg or Me Hg trip blank present? \_\_\_\_\_  Yes  No

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

Contacted PM \_\_\_\_\_ Date \_\_\_\_\_ by \_\_\_\_\_ via Verbal Voice Mail Other \_\_\_\_\_

Concerning \_\_\_\_\_

**17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES** Samples processed by: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**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: \_\_\_\_\_

# DATA VERIFICATION REPORT



November 07, 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: MI001454.0003 ? 30016344 - VI sampling  
Event Specific Scope of Work References: Sample COC  
Laboratory: TestAmerica - North Canton  
Laboratory submittal: 121002-1  
Sample date: 2019-10-22  
Report received by CADENA: 2019-11-07  
Initial Data Verification completed by CADENA: 2019-11-07  
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, LCS/LCD RPD, MS/MSD Recovery, MS/MSD RPD, 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:** 121002-1

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
2401210021	SUMP-12070BOSTONPOST-01_102219	10/22/2019	8:31:00	X	X	
2401210022	TRIP BLANK	10/22/2019	12:00:00	X		

# Analytical Results Summary

## Reportable Results Only

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton

Laboratory Submittal: 121002-1

Sample Name: SUMP-12070BOSTONPOST-01\_102219 TRIP BLANK  
Lab Sample ID: 2401210021 2401210022  
Sample Date: 10/22/2019 10/22/2019

Analyte	Cas No.	Result	Report	Units	Valid	Result	Report	Units	Valid	
			Limit		Qualifier		Limit		Qualifier	
<b>GC/MS VOC</b>										
<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 #240-121002-1

CADENA Verification Report: 2019-11-07

Analyses Performed By:

TestAmerica  
Canton, Ohio

Report #34725R

Review Level: Tier III

Project: MI001454.0004.00002 (30016346)



## DATA REVIEW

### SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 240-121002-1 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
240-121002-1	SUMP-12070BOSTONPOST-01_102219	240-121002-1	Water	10/22/2019		X	X	
	TRIP BLANK	240-121002-2	Water	10/22/2019		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**

No compounds were detected in the samples within this SDG.

### **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	
<b>GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)</b>					
<b>Tier II Validation</b>					
Holding times/Preservation		X		X	
<b>Tier III Validation</b>					
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: November 12, 2019

PEER REVIEW: Joseph C. Houser

DATE: November 12, 2019



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



**NO CORRECTIONS/QUALIFIERS ADDED  
TO SAMPLE ANALYSIS DATA SHEETS**



**Chain of Custody Record**

TestAmerica Laboratory location: N Canton — 4101 Shuffel Street NW/ North Canton, OH 44720 / 330-4979396

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<b>Client Contact</b> 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		<b>Regulatory program:</b> <input type="checkbox"/> DW <input type="checkbox"/> NPDES <input type="checkbox"/> RCRA <input type="checkbox"/> Other	
<b>Client Project Manager:</b> Kris Hinskey Telephone: 248-994-2240 Email: krstoffer.hinskey@arcadis.com		<b>Site Contact:</b> Mike DellMontico Telephone: 330-497-9396	
<b>Method of Shipment/Carrier:</b> Shipping/Tracking No:		<b>Analyses</b> 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-G Filtered Sample (Y / N)	
<b>Sample Date</b> 10/23/19 Trip blank		<b>Matrix</b> Aqueous Solid Other:	
<b>Sample Time</b> 8:51		<b>Containers &amp; Preservatives</b> H2SO4 HNO3 HCl NaOH ZnAc Unpres Other:	
<b>Sample Identification</b> 240-121002 Chain of Custody 		<b>Containers</b> 6 CONTAINERS Trip blank	
<b>Special Instructions/QC Requirements &amp; Comments:</b> Submit all results through Cadena at jim.tomasi@cadenalabs.com, Cadena #E203531 Level IV Reporting.			
<b>Relinquished by:</b> SHANTELL HINSEY		<b>Received by:</b> Novi Cold Storage	
<b>Relinquished by:</b> Novi Cold Storage		<b>Received by:</b> Holly Hanson	
<b>Relinquished by:</b> Holly Hanson		<b>Received in Laboratory by:</b> A. Gassner	
Company: ARCADIS Date/Time: 10/23/19 10:30		Company: ARCADIS Date/Time: 10/23/19 10:30	
Company: ARCADIS Date/Time: 10/23/19 11:20		Company: ETAL-MI Date/Time: 10/23/19 11:20	
Company: ETAL-MI Date/Time: 10/23/19 16:26		Company: EJA Date/Time: 10-24-19 09:00	



# Client Sample Results

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

Job ID: 240-121002-1

**Client Sample ID: SUMP-12070BOSTONPOST-01\_102219**

**Lab Sample ID: 240-121002-1**

Date Collected: 10/22/19 08:31

Matrix: Water

Date Received: 10/24/19 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			10/30/19 18:31	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		63 - 125		10/30/19 18:31	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/31/19 16:33	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			10/31/19 16:33	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			10/31/19 16:33	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/31/19 16:33	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			10/31/19 16:33	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			10/31/19 16:33	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		75 - 130		10/31/19 16:33	1
4-Bromofluorobenzene (Surr)	75		47 - 134		10/31/19 16:33	1
Toluene-d8 (Surr)	89		69 - 122		10/31/19 16:33	1
Dibromofluoromethane (Surr)	97		78 - 129		10/31/19 16:33	1

# Client Sample Results

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

Job ID: 240-121002-1

**Client Sample ID: TRIP BLANK**

**Lab Sample ID: 240-121002-2**

**Date Collected: 10/22/19 00:00**

**Matrix: Water**

**Date Received: 10/24/19 09:00**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/31/19 16:55	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			10/31/19 16:55	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			10/31/19 16:55	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/31/19 16:55	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			10/31/19 16:55	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			10/31/19 16:55	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		75 - 130		10/31/19 16:55	1
4-Bromofluorobenzene (Surr)	72		47 - 134		10/31/19 16:55	1
Toluene-d8 (Surr)	88		69 - 122		10/31/19 16:55	1
Dibromofluoromethane (Surr)	99		78 - 129		10/31/19 16:55	1

10/30/2019  
Mr. Jim Tomalia  
Arcadis U.S., Inc.  
28550 Cabot Dr.  
Suite 500  
Novi MI 48377

Project Name: Ford LTP  
Project #:  
Workorder #: 1910581

Dear Mr. Jim Tomalia

The following report includes the data for the above referenced project for sample(s) received on 10/24/2019 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 #: 1910581**

Work Order Summary

<b>CLIENT:</b>	Mr. Jim Tomalia Arcadis U.S., Inc. 28550 Cabot Dr. Suite 500 Novi, MI 48377	<b>BILL TO:</b>	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
<b>PHONE:</b>	517-819-0356	<b>P.O. #</b>	30016344.0002B
<b>FAX:</b>		<b>PROJECT #</b>	Ford LTP
<b>DATE RECEIVED:</b>	10/24/2019	<b>CONTACT:</b>	Ausha Scott
<b>DATE COMPLETED:</b>	10/30/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	SSMP-12070BOSTONPOST-01_102219	TO-15	6.3 "Hg	16.1 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: 10/30/19

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: 10/18/2019, Expiration date: 10/17/2020.

Eurofins Air Toxics, LLC 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, LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

(916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

**LABORATORY NARRATIVE**  
**EPA Method TO-15**  
**Arcadis U.S., Inc.**  
**Workorder# 1910581**

One 1 Liter Summa Canister (100% Certified) sample was received on October 24, 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

<b>Client ID:</b>	SSMP-12070BOSTONPOST-01_102219	<b>Date/Time Analyzed:</b>	10/26/19 11:19 PM
<b>Lab ID:</b>	1910581-01A	<b>Dilution Factor:</b>	2.65
<b>Date/Time Collected:</b>	10/22/19 08:08 AM	<b>Instrument/Filename:</b>	msd3.i / 3102622
<b>Media:</b>	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	1.2	2.6	5.2	Not Detected
1,4-Dioxane	123-91-1	1.0	6.0	19	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.83	2.6	5.2	Not Detected
Tetrachloroethene	127-18-4	1.3	4.5	9.0	12
trans-1,2-Dichloroethene	156-60-5	1.1	2.6	5.2	Not Detected
Trichloroethene	79-01-6	0.91	3.6	7.1	Not Detected
Vinyl Chloride	75-01-4	0.57	1.7	3.4	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	97
4-Bromofluorobenzene	460-00-4	70-130	103
Toluene-d8	2037-26-5	70-130	96

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

<b>Client ID:</b>	Lab Blank	<b>Date/Time Analyzed:</b>	10/26/19 10:44 AM
<b>Lab ID:</b>	1910581-02A	<b>Dilution Factor:</b>	1.00
<b>Date/Time Collected:</b>	NA - Not Applicable	<b>Instrument/Filename:</b>	msd3.i / 3102605c
<b>Media:</b>	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.46	0.99	2.0	Not Detected
1,4-Dioxane	123-91-1	0.38	2.2	7.2	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.31	0.99	2.0	Not Detected
Tetrachloroethene	127-18-4	0.50	1.7	3.4	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.42	0.99	2.0	Not Detected
Trichloroethene	79-01-6	0.34	1.3	2.7	Not Detected
Vinyl Chloride	75-01-4	0.21	0.64	1.3	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	93
4-Bromofluorobenzene	460-00-4	70-130	101
Toluene-d8	2037-26-5	70-130	100

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

<b>Client ID:</b>	CCV	<b>Date/Time Analyzed:</b>	10/26/19 09:11 AM
<b>Lab ID:</b>	1910581-03A	<b>Dilution Factor:</b>	1.00
<b>Date/Time Collected:</b>	NA - Not Applicable	<b>Instrument/Filename:</b>	msd3.i / 3102602
<b>Media:</b>	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	94
1,4-Dioxane	123-91-1	100
cis-1,2-Dichloroethene	156-59-2	104
Tetrachloroethene	127-18-4	105
trans-1,2-Dichloroethene	156-60-5	102
Trichloroethene	79-01-6	101
Vinyl Chloride	75-01-4	84

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	102
Toluene-d8	2037-26-5	70-130	101

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

<b>Client ID:</b>	LCS	<b>Date/Time Analyzed:</b>	10/26/19 09:37 AM
<b>Lab ID:</b>	1910581-04A	<b>Dilution Factor:</b>	1.00
<b>Date/Time Collected:</b>	NA - Not Applicable	<b>Instrument/Filename:</b>	msd3.i / 3102603
<b>Media:</b>	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	96
1,4-Dioxane	123-91-1	100
cis-1,2-Dichloroethene	156-59-2	107
Tetrachloroethene	127-18-4	102
trans-1,2-Dichloroethene	156-60-5	87
Trichloroethene	79-01-6	96
Vinyl Chloride	75-01-4	85

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	92
4-Bromofluorobenzene	460-00-4	70-130	100
Toluene-d8	2037-26-5	70-130	100

\* % Recovery is calculated using unrounded analytical results.

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

<b>Client ID:</b>	LCSD	<b>Date/Time Analyzed:</b>	10/26/19 10:01 AM
<b>Lab ID:</b>	1910581-04AA	<b>Dilution Factor:</b>	1.00
<b>Date/Time Collected:</b>	NA - Not Applicable	<b>Instrument/Filename:</b>	msd3.i / 3102604
<b>Media:</b>	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	96
1,4-Dioxane	123-91-1	98
cis-1,2-Dichloroethene	156-59-2	106
Tetrachloroethene	127-18-4	100
trans-1,2-Dichloroethene	156-60-5	87
Trichloroethene	79-01-6	94
Vinyl Chloride	75-01-4	87

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

\* % Recovery is calculated using unrounded analytical results.



October 30, 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: 30016344.0002B  
Client project scope reference: Sample COC only was used to define project analytical requirements.  
Laboratory: Eurofins Air Toxics - Folsom  
Laboratory submittal: 1910581  
Sample date: 2019-10-22  
Report received by CADENA: 2019-10-30  
Initial Data Verification completed: 2019-10-30  
1 Air sample was analyzed for TO-15 parameters.

No data qualifications or sample integrity issues were observed.

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 #1910581

CADENA Verification Report: 2019-10-30

Analyses Performed By:  
Eurofins Air Toxics  
Folsom, California

Report #34815R  
Review Level: Tier III  
Project: 30016344.00007

---

## DATA REVIEW

### SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 1910581 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
1910581	SSMP-12070BOSTONPOST-01_102219	1910581-01A	Air	10/22/2019		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	
<b>GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)</b>					
<b>Tier II Validation</b>					
Canister return pressure (<-2"Hg)		X		X	
<b>Tier III Validation</b>					
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: November 19, 2019

PEER REVIEW: Andrew Korycinski

DATE: November 20, 2019



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



**NO CORRECTIONS/QUALIFIERS ADDED  
TO SAMPLE ANALYSIS DATA SHEETS**



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

<b>Client ID:</b>	SSMP-12070BOSTONPOST-01_102219	<b>Date/Time Analyzed:</b>	10/26/19 11:19 PM
<b>Lab ID:</b>	1910581-01A	<b>Dilution Factor:</b>	2.65
<b>Date/Time Collected:</b>	10/22/19 08:08 AM	<b>Instrument/Filename:</b>	msd3.i / 3102622
<b>Media:</b>	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	1.2	2.6	5.2	Not Detected
1,4-Dioxane	123-91-1	1.0	6.0	19	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.83	2.6	5.2	Not Detected
Tetrachloroethene	127-18-4	1.3	4.5	9.0	12
trans-1,2-Dichloroethene	156-60-5	1.1	2.6	5.2	Not Detected
Trichloroethene	79-01-6	0.91	3.6	7.1	Not Detected
Vinyl Chloride	75-01-4	0.57	1.7	3.4	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	97
4-Bromofluorobenzene	460-00-4	70-130	103
Toluene-d8	2037-26-5	70-130	96



10/30/2019  
Mr. Jim Tomalia  
Arcadis U.S., Inc.  
28550 Cabot Dr.  
Suite 500  
Novi MI 48377

Project Name: Ford LTP  
Project #:  
Workorder #: 1910583

Dear Mr. Jim Tomalia

The following report includes the data for the above referenced project for sample(s) received on 10/24/2019 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 #: 1910583**

Work Order Summary

<b>CLIENT:</b>	Mr. Jim Tomalia Arcadis U.S., Inc. 28550 Cabot Dr. Suite 500 Novi, MI 48377	<b>BILL TO:</b>	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
<b>PHONE:</b>	517-819-0356	<b>P.O. #</b>	30016344.0002B
<b>FAX:</b>		<b>PROJECT #</b>	Ford LTP
<b>DATE RECEIVED:</b>	10/24/2019	<b>CONTACT:</b>	Ausha Scott
<b>DATE COMPLETED:</b>	10/30/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	AA-12070BOSTONPOST-01_102219	Modified TO-15	5.3 "Hg	5.2 psi
02A	IAB-12070BOSTONPOST-02_102219	Modified TO-15	5.9 "Hg	5.2 psi
03A	IAF-12070BOSTONPOST-04_102219	Modified TO-15	5.3 "Hg	5.1 psi
04A	IAG-12070BOSTONPOST-01_102219	Modified TO-15	6.1 "Hg	5 psi
05A	Lab Blank	Modified TO-15	NA	NA
06A	CCV	Modified TO-15	NA	NA
07A	LCS	Modified TO-15	NA	NA
07AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:   
 Technical Director

DATE: 10/30/19

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: 10/18/2019, Expiration date: 10/17/2020.

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

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**LABORATORY NARRATIVE**  
**Modified TO-15**  
**Arcadis U.S., Inc.**  
**Workorder# 1910583**

Four 6 Liter Summa Canister (100% Cert Ambient) samples were received on October 24, 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

<b>Client ID:</b>	AA-12070BOSTONPOST-01_102219	<b>Date/Time Analyzed:</b>	10/28/19 01:49 PM
<b>Lab ID:</b>	1910583-01A	<b>Dilution Factor:</b>	1.64
<b>Date/Time Collected:</b>	10/22/19 07:36 AM	<b>Instrument/Filename:</b>	msd22.i / 22102807
<b>Media:</b>	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	0.20	0.26	0.65	Not Detected
1,4-Dioxane	123-91-1	0.11	0.24	0.59	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.067	0.26	0.65	Not Detected
Tetrachloroethene	127-18-4	0.25	0.44	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.11	0.26	0.65	Not Detected
Trichloroethene	79-01-6	0.091	0.35	0.88	0.094 J
Vinyl Chloride	75-01-4	0.058	0.17	0.42	Not Detected

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	99
4-Bromofluorobenzene	460-00-4	70-130	99
Toluene-d8	2037-26-5	70-130	97

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

<b>Client ID:</b>	IAB-12070BOSTONPOST-02_102219	<b>Date/Time Analyzed:</b>	10/28/19 03:10 PM
<b>Lab ID:</b>	1910583-02A	<b>Dilution Factor:</b>	1.69
<b>Date/Time Collected:</b>	10/22/19 08:18 AM	<b>Instrument/Filename:</b>	msd22.i / 22102808
<b>Media:</b>	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	0.20	0.27	0.67	Not Detected
1,4-Dioxane	123-91-1	0.11	0.24	0.61	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.069	0.27	0.67	Not Detected
Tetrachloroethene	127-18-4	0.26	0.46	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.11	0.27	0.67	Not Detected
Trichloroethene	79-01-6	0.094	0.36	0.91	0.14 J
Vinyl Chloride	75-01-4	0.060	0.17	0.43	Not Detected

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	98
4-Bromofluorobenzene	460-00-4	70-130	102
Toluene-d8	2037-26-5	70-130	100

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

<b>Client ID:</b>	IAF-12070BOSTONPOST-04_102219	<b>Date/Time Analyzed:</b>	10/28/19 03:46 PM
<b>Lab ID:</b>	1910583-03A	<b>Dilution Factor:</b>	1.64
<b>Date/Time Collected:</b>	10/22/19 08:13 AM	<b>Instrument/Filename:</b>	msd22.i / 22102809
<b>Media:</b>	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	0.20	0.26	0.65	Not Detected
1,4-Dioxane	123-91-1	0.11	0.24	0.59	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.067	0.26	0.65	Not Detected
Tetrachloroethene	127-18-4	0.25	0.44	1.1	0.35 J
trans-1,2-Dichloroethene	156-60-5	0.11	0.26	0.65	Not Detected
Trichloroethene	79-01-6	0.091	0.35	0.88	0.15 J
Vinyl Chloride	75-01-4	0.058	0.17	0.42	Not Detected

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	100
4-Bromofluorobenzene	460-00-4	70-130	106
Toluene-d8	2037-26-5	70-130	100

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

<b>Client ID:</b>	IAG-12070BOSTONPOST-01_102219	<b>Date/Time Analyzed:</b>	10/28/19 04:22 PM
<b>Lab ID:</b>	1910583-04A	<b>Dilution Factor:</b>	1.68
<b>Date/Time Collected:</b>	10/22/19 08:53 AM	<b>Instrument/Filename:</b>	msd22.i / 22102810
<b>Media:</b>	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	0.20	0.27	0.67	Not Detected
1,4-Dioxane	123-91-1	0.11	0.24	0.60	0.25 J
cis-1,2-Dichloroethene	156-59-2	0.068	0.27	0.67	Not Detected
Tetrachloroethene	127-18-4	0.26	0.46	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.11	0.27	0.67	Not Detected
Trichloroethene	79-01-6	0.093	0.36	0.90	0.12 J
Vinyl Chloride	75-01-4	0.060	0.17	0.43	Not Detected

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	104
4-Bromofluorobenzene	460-00-4	70-130	99
Toluene-d8	2037-26-5	70-130	119

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

<b>Client ID:</b>	Lab Blank	<b>Date/Time Analyzed:</b>	10/28/19 12:26 PM
<b>Lab ID:</b>	1910583-05A	<b>Dilution Factor:</b>	1.00
<b>Date/Time Collected:</b>	NA - Not Applicable	<b>Instrument/Filename:</b>	msd22.i / 22102806a
<b>Media:</b>	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.12	0.16	0.40	Not Detected
1,4-Dioxane	123-91-1	0.068	0.14	0.36	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.041	0.16	0.40	Not Detected
Tetrachloroethene	127-18-4	0.15	0.27	0.68	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.066	0.16	0.40	Not Detected
Trichloroethene	79-01-6	0.055	0.21	0.54	Not Detected
Vinyl Chloride	75-01-4	0.036	0.10	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	98
4-Bromofluorobenzene	460-00-4	70-130	96
Toluene-d8	2037-26-5	70-130	99

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

<b>Client ID:</b>	CCV	<b>Date/Time Analyzed:</b>	10/28/19 08:48 AM
<b>Lab ID:</b>	1910583-06A	<b>Dilution Factor:</b>	1.00
<b>Date/Time Collected:</b>	NA - Not Applicable	<b>Instrument/Filename:</b>	msd22.i / 22102802
<b>Media:</b>	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	80
1,4-Dioxane	123-91-1	104
cis-1,2-Dichloroethene	156-59-2	87
Tetrachloroethene	127-18-4	107
trans-1,2-Dichloroethene	156-60-5	93
Trichloroethene	79-01-6	108
Vinyl Chloride	75-01-4	85

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	88
4-Bromofluorobenzene	460-00-4	70-130	101
Toluene-d8	2037-26-5	70-130	114

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

<b>Client ID:</b>	LCS	<b>Date/Time Analyzed:</b>	10/28/19 09:51 AM
<b>Lab ID:</b>	1910583-07A	<b>Dilution Factor:</b>	1.00
<b>Date/Time Collected:</b>	NA - Not Applicable	<b>Instrument/Filename:</b>	msd22.i / 22102803
<b>Media:</b>	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	84
1,4-Dioxane	123-91-1	105
cis-1,2-Dichloroethene	156-59-2	80
Tetrachloroethene	127-18-4	102
trans-1,2-Dichloroethene	156-60-5	102
Trichloroethene	79-01-6	105
Vinyl Chloride	75-01-4	91

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	99
Toluene-d8	2037-26-5	70-130	109

\* % Recovery is calculated using unrounded analytical results.

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

<b>Client ID:</b>	LCSD	<b>Date/Time Analyzed:</b>	10/28/19 10:34 AM
<b>Lab ID:</b>	1910583-07AA	<b>Dilution Factor:</b>	1.00
<b>Date/Time Collected:</b>	NA - Not Applicable	<b>Instrument/Filename:</b>	msd22.i / 22102804
<b>Media:</b>	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	83
1,4-Dioxane	123-91-1	105
cis-1,2-Dichloroethene	156-59-2	79
Tetrachloroethene	127-18-4	98
trans-1,2-Dichloroethene	156-60-5	101
Trichloroethene	79-01-6	103
Vinyl Chloride	75-01-4	90

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	99
Toluene-d8	2037-26-5	70-130	108

\* % Recovery is calculated using unrounded analytical results.



October 30, 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: 30016344.0002B  
Client project scope reference: Sample COC only was used to define project analytical requirements.  
Laboratory: Eurofins Air Toxics - Folsom  
Laboratory submittal: 1910583  
Sample date: 2019-10-22  
Report received by CADENA: 2019-10-30  
Initial Data Verification completed: 2019-10-30  
4 Air samples were analyzed for TO-15 parameters.

No data qualifications or sample integrity issues were observed.

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 #1910583

CADENA Verification Report: 2019-10-30

Analyses Performed By:  
Eurofins Air Toxics  
Folsom, California

Report #34816R  
Review Level: Tier III  
Project: 30016344.00007



## DATA REVIEW

### SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 1910583 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
1910583	AA-12070BOSTONPOST-01_102219	1910583-01A	Air	10/22/2019		X		
	IAB-12070BOSTONPOST-02_102219	1910583-02A	Air	10/22/2019		X		
	IAF-12070BOSTONPOST-04_102219	1910583-03A	Air	10/22/2019		X		
	IAG-12070BOSTONPOST-01_102219	1910583-04A	Air	10/22/2019		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	
<b>GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)</b>					
<b>Tier II Validation</b>					
Canister return pressure (<-2"Hg)		X		X	
<b>Tier III Validation</b>					
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: November 19, 2019

PEER REVIEW: Andrew Korycinski

DATE: November 20, 2019



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



**NO CORRECTIONS/QUALIFIERS ADDED  
TO SAMPLE ANALYSIS DATA SHEETS**



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

<b>Client ID:</b>	AA-12070BOSTONPOST-01_102219	<b>Date/Time Analyzed:</b>	10/28/19 01:49 PM
<b>Lab ID:</b>	1910583-01A	<b>Dilution Factor:</b>	1.64
<b>Date/Time Collected:</b>	10/22/19 07:36 AM	<b>Instrument/Filename:</b>	msd22.i / 22102807
<b>Media:</b>	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	0.20	0.26	0.65	Not Detected
1,4-Dioxane	123-91-1	0.11	0.24	0.59	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.067	0.26	0.65	Not Detected
Tetrachloroethene	127-18-4	0.25	0.44	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.11	0.26	0.65	Not Detected
Trichloroethene	79-01-6	0.091	0.35	0.88	0.094 J
Vinyl Chloride	75-01-4	0.058	0.17	0.42	Not Detected

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	99
4-Bromofluorobenzene	460-00-4	70-130	99
Toluene-d8	2037-26-5	70-130	97

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

<b>Client ID:</b>	IAB-12070BOSTONPOST-02_102219	<b>Date/Time Analyzed:</b>	10/28/19 03:10 PM
<b>Lab ID:</b>	1910583-02A	<b>Dilution Factor:</b>	1.69
<b>Date/Time Collected:</b>	10/22/19 08:18 AM	<b>Instrument/Filename:</b>	msd22.i / 22102808
<b>Media:</b>	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	0.20	0.27	0.67	Not Detected
1,4-Dioxane	123-91-1	0.11	0.24	0.61	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.069	0.27	0.67	Not Detected
Tetrachloroethene	127-18-4	0.26	0.46	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.11	0.27	0.67	Not Detected
Trichloroethene	79-01-6	0.094	0.36	0.91	0.14 J
Vinyl Chloride	75-01-4	0.060	0.17	0.43	Not Detected

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	98
4-Bromofluorobenzene	460-00-4	70-130	102
Toluene-d8	2037-26-5	70-130	100

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

<b>Client ID:</b>	IAF-12070BOSTONPOST-04_102219	<b>Date/Time Analyzed:</b>	10/28/19 03:46 PM
<b>Lab ID:</b>	1910583-03A	<b>Dilution Factor:</b>	1.64
<b>Date/Time Collected:</b>	10/22/19 08:13 AM	<b>Instrument/Filename:</b>	msd22.i / 22102809
<b>Media:</b>	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	0.20	0.26	0.65	Not Detected
1,4-Dioxane	123-91-1	0.11	0.24	0.59	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.067	0.26	0.65	Not Detected
Tetrachloroethene	127-18-4	0.25	0.44	1.1	0.35 J
trans-1,2-Dichloroethene	156-60-5	0.11	0.26	0.65	Not Detected
Trichloroethene	79-01-6	0.091	0.35	0.88	0.15 J
Vinyl Chloride	75-01-4	0.058	0.17	0.42	Not Detected

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	100
4-Bromofluorobenzene	460-00-4	70-130	106
Toluene-d8	2037-26-5	70-130	100

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

<b>Client ID:</b>	IAG-12070BOSTONPOST-01_102219	<b>Date/Time Analyzed:</b>	10/28/19 04:22 PM
<b>Lab ID:</b>	1910583-04A	<b>Dilution Factor:</b>	1.68
<b>Date/Time Collected:</b>	10/22/19 08:53 AM	<b>Instrument/Filename:</b>	msd22.i / 22102810
<b>Media:</b>	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	0.20	0.27	0.67	Not Detected
1,4-Dioxane	123-91-1	0.11	0.24	0.60	0.25 J
cis-1,2-Dichloroethene	156-59-2	0.068	0.27	0.67	Not Detected
Tetrachloroethene	127-18-4	0.26	0.46	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.11	0.27	0.67	Not Detected
Trichloroethene	79-01-6	0.093	0.36	0.90	0.12 J
Vinyl Chloride	75-01-4	0.060	0.17	0.43	Not Detected

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	104
4-Bromofluorobenzene	460-00-4	70-130	99
Toluene-d8	2037-26-5	70-130	119

# Analysis Request /Canister Chain of Custody

For Laboratory Use Only

1910583

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: <u>Ford</u>	PID: <u>NA</u>	<b>Special Instructions/Notes:</b> 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	<b>Turnaround Time (Rush surcharges may apply)</b>		
Project Name: <u>Ford LTP</u>			5 Day Turnaround Time		
Project Manager: <u>Kris Hinskey</u>	P.O.# <u>30016344.0002B</u>		<b>Canister Vacuum/Pressure</b>	<b>Requested Analyses</b>	
Sampler: <u>Shantel Johnson, Xenia Chan</u>			<b>Lab Use Only</b>		
Site Name: <u>12070 BOSTON POST</u>					

Lab ID	Sample Identification	Can #	Flow Controller #	Start Sampling Information		Stop Sampling Information		Initial (in Hg)	Final (in Hg)	Receipt	Final (psig) Gas: N <sub>2</sub> / He	TO-15 (See Special Instructions/Notes)	Do Not Analyze
				Date	Time	Date	Time						
01A	AA-12070BOSTONPOST-01_102219	6L2108	22090	10/21/2019	9:00	10/22/2019	7:36	-29.5	-6			X	
03A	IAB-12070BOSTONPOST-02_102219	6L2425	22877	10/21/2019	8:47	10/22/2019	8:18	-29.5	-6			X	
03A	IAF-12070BOSTONPOST-04_102219	6L1683	20506	10/21/2019	8:56	10/22/2019	8:13	-29.5	-5.5			X	
04A	IAG-12070BOSTONPOST-01_102219	6L1050	22848	10/21/2019	8:52	10/22/2019	8:53	-29.5	-6.5			X	

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
	10/22/19	1430	CAD	10/24/19	0937
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time

Shipper Name: ACDGS      Custody Seals Intact?  Yes     No     None

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