

## ANALYTICAL REPORT

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Laboratory Job ID: 240-113068-1  
Client Project/Site: Ford LTP Livonia MI - E203631

For:  
ARCADIS U.S., Inc.  
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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: 240-113068-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
X	Surrogate is outside control limits

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	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: 240-113068-1

**Job ID: 240-113068-1**

**Laboratory: Eurofins TestAmerica, Canton**

**Narrative**

## CASE NARRATIVE

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

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

**Report Number: 240-113068-1**

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 5/22/2019 9:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.2° C.

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

Samples MW-144S\_052019 (240-113068-1) and TRIP BLANK (240-113068-2) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 05/30/2019 and 06/03/2019.

4-Bromofluorobenzene (Surr) and Toluene-d8 (Surr) failed the surrogate recovery criteria low for TRIP BLANK (240-113068-2). Refer to the QC report for details.

Surrogate recovery for the following sample was outside of acceptance limits: TRIP BLANK (240-113068-2). There was insufficient sample to perform a re-extraction; therefore, the data have been reported.

There was an MS/MSD analyzed in batch 303730 but could not be reported because the associated sample needed reanalyzed in a different batch: TRIP BLANK (240-113068-2).

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

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

# Case Narrative

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

Job ID: 240-113068-1

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## Job ID: 240-113068-1 (Continued)

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### Laboratory: Eurofins TestAmerica, Canton (Continued)

Sample MW-144S\_052019 (240-113068-1) was analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The sample was analyzed on 05/29/2019.

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

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# Method Summary

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

Job ID: 240-113068-1

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: 240-113068-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-113068-1	MW-144S_052019	Water	05/20/19 11:41	05/22/19 09:45	
240-113068-2	TRIP BLANK	Water	05/20/19 00:00	05/22/19 09:45	

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- 12
- 13
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# Detection Summary

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

Job ID: 240-113068-1

**Client Sample ID: MW-144S\_052019**

**Lab Sample ID: 240-113068-1**

No Detections.

**Client Sample ID: TRIP BLANK**

**Lab Sample ID: 240-113068-2**

No Detections.

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- 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: 240-113068-1

**Client Sample ID: MW-144S\_052019**

**Lab Sample ID: 240-113068-1**

Date Collected: 05/20/19 11:41

Matrix: Water

Date Received: 05/22/19 09:45

**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			05/29/19 17:26	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	91		63 - 125					05/29/19 17:26	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			06/03/19 14:26	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			06/03/19 14:26	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			06/03/19 14:26	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			06/03/19 14:26	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			06/03/19 14:26	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			06/03/19 14:26	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	109		70 - 121					06/03/19 14:26	1
4-Bromofluorobenzene (Surr)	98		59 - 120					06/03/19 14:26	1
Toluene-d8 (Surr)	91		70 - 123					06/03/19 14:26	1
Dibromofluoromethane (Surr)	114		75 - 128					06/03/19 14:26	1

# Client Sample Results

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

Job ID: 240-113068-1

**Client Sample ID: TRIP BLANK**

**Lab Sample ID: 240-113068-2**

**Date Collected: 05/20/19 00:00**

**Matrix: Water**

**Date Received: 05/22/19 09:45**

**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			05/30/19 22:47	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/30/19 22:47	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/30/19 22:47	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/30/19 22:47	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/30/19 22:47	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/30/19 22:47	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		70 - 121		05/30/19 22:47	1
4-Bromofluorobenzene (Surr)	52	X	59 - 120		05/30/19 22:47	1
Toluene-d8 (Surr)	57	X	70 - 123		05/30/19 22:47	1
Dibromofluoromethane (Surr)	104		75 - 128		05/30/19 22:47	1

# Surrogate Summary

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

Job ID: 240-113068-1

## 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 (70-121)	BFB (59-120)	TOL (70-123)	DBFM (75-128)
240-113068-1	MW-144S_052019	109	98	91	114
240-113068-2	TRIP BLANK	106	52 X	57 X	104
240-113149-B-8 MS	Matrix Spike	103	100	90	103
240-113149-B-8 MSD	Matrix Spike Duplicate	97	97	94	100
LCS 240-383730/4	Lab Control Sample	117	107	96	118
LCS 240-384190/4	Lab Control Sample	105	97	92	118
MB 240-383730/6	Method Blank	119	69	77	112
MB 240-384190/6	Method Blank	100	107	94	111

#### 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)
240-113065-C-1 MS	Matrix Spike	89
240-113065-C-1 MSD	Matrix Spike Duplicate	91
240-113068-1	MW-144S_052019	91
LCS 240-383493/4	Lab Control Sample	88
MB 240-383493/5	Method Blank	86

#### 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: 240-113068-1

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

**Lab Sample ID: MB 240-383730/6**  
**Matrix: Water**  
**Analysis Batch: 383730**

**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			05/30/19 15:24	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/30/19 15:24	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/30/19 15:24	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/30/19 15:24	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/30/19 15:24	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/30/19 15:24	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	119		70 - 121		05/30/19 15:24	1
4-Bromofluorobenzene (Surr)	69		59 - 120		05/30/19 15:24	1
Toluene-d8 (Surr)	77		70 - 123		05/30/19 15:24	1
Dibromofluoromethane (Surr)	112		75 - 128		05/30/19 15:24	1

**Lab Sample ID: LCS 240-383730/4**  
**Matrix: Water**  
**Analysis Batch: 383730**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	10.0	10.1		ug/L		101	65 - 139
cis-1,2-Dichloroethene	10.0	9.74		ug/L		97	76 - 128
Tetrachloroethene	10.0	12.2		ug/L		122	74 - 130
trans-1,2-Dichloroethene	10.0	10.0		ug/L		100	78 - 133
Trichloroethene	10.0	10.9		ug/L		109	76 - 125
Vinyl chloride	10.0	9.20		ug/L		92	58 - 143

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	117		70 - 121
4-Bromofluorobenzene (Surr)	107		59 - 120
Toluene-d8 (Surr)	96		70 - 123
Dibromofluoromethane (Surr)	118		75 - 128

**Lab Sample ID: MB 240-384190/6**  
**Matrix: Water**  
**Analysis Batch: 384190**

**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			06/03/19 14:02	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			06/03/19 14:02	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			06/03/19 14:02	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			06/03/19 14:02	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			06/03/19 14:02	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			06/03/19 14:02	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		70 - 121		06/03/19 14:02	1
4-Bromofluorobenzene (Surr)	107		59 - 120		06/03/19 14:02	1
Toluene-d8 (Surr)	94		70 - 123		06/03/19 14:02	1

Eurofins TestAmerica, Canton

# QC Sample Results

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

Job ID: 240-113068-1

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

**Lab Sample ID: MB 240-384190/6**  
**Matrix: Water**  
**Analysis Batch: 384190**

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

Surrogate	MB MB	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)		111		75 - 128		06/03/19 14:02	1

**Lab Sample ID: LCS 240-384190/4**  
**Matrix: Water**  
**Analysis Batch: 384190**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	10.0	10.3		ug/L		103	65 - 139
cis-1,2-Dichloroethene	10.0	10.1		ug/L		101	76 - 128
Tetrachloroethene	10.0	10.4		ug/L		104	74 - 130
trans-1,2-Dichloroethene	10.0	10.8		ug/L		108	78 - 133
Trichloroethene	10.0	11.3		ug/L		113	76 - 125
Vinyl chloride	10.0	10.4		ug/L		104	58 - 143

Surrogate	LCS LCS	%Recovery	Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)		105		70 - 121
4-Bromofluorobenzene (Surr)		97		59 - 120
Toluene-d8 (Surr)		92		70 - 123
Dibromofluoromethane (Surr)		118		75 - 128

**Lab Sample ID: 240-113149-B-8 MS**  
**Matrix: Water**  
**Analysis Batch: 384190**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	25	U	250	237		ug/L		95	53 - 140
cis-1,2-Dichloroethene	490		250	735		ug/L		98	64 - 130
Tetrachloroethene	25	U	250	254		ug/L		102	51 - 136
trans-1,2-Dichloroethene	25	U	250	263		ug/L		105	68 - 133
Trichloroethene	25	U	250	258		ug/L		103	55 - 131
Vinyl chloride	34		250	305		ug/L		108	43 - 154

Surrogate	MS MS	%Recovery	Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)		103		70 - 121
4-Bromofluorobenzene (Surr)		100		59 - 120
Toluene-d8 (Surr)		90		70 - 123
Dibromofluoromethane (Surr)		103		75 - 128

**Lab Sample ID: 240-113149-B-8 MSD**  
**Matrix: Water**  
**Analysis Batch: 384190**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethene	25	U	250	248		ug/L		99	53 - 140	4	35
cis-1,2-Dichloroethene	490		250	710		ug/L		88	64 - 130	3	21
Tetrachloroethene	25	U	250	261		ug/L		104	51 - 136	3	23
trans-1,2-Dichloroethene	25	U	250	258		ug/L		103	68 - 133	2	24
Trichloroethene	25	U	250	268		ug/L		107	55 - 131	4	23

Eurofins TestAmerica, Canton

# QC Sample Results

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

Job ID: 240-113068-1

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

**Lab Sample ID: 240-113149-B-8 MSD**  
**Matrix: Water**  
**Analysis Batch: 384190**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Vinyl chloride	34		250	297		ug/L		105	43 - 154	3	29
<b>Surrogate</b>	<b>%Recovery</b>	<b>MSD Qualifier</b>	<b>MSD Limits</b>								
1,2-Dichloroethane-d4 (Surr)	97		70 - 121								
4-Bromofluorobenzene (Surr)	97		59 - 120								
Toluene-d8 (Surr)	94		70 - 123								
Dibromofluoromethane (Surr)	100		75 - 128								

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

**Lab Sample ID: MB 240-383493/5**  
**Matrix: Water**  
**Analysis Batch: 383493**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/29/19 11:59	1	
<b>Surrogate</b>	<b>%Recovery</b>	<b>MB Qualifier</b>	<b>MB Limits</b>							
1,2-Dichloroethane-d4 (Surr)	86		63 - 125							
				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>				
				05/29/19 11:59		1				

**Lab Sample ID: LCS 240-383493/4**  
**Matrix: Water**  
**Analysis Batch: 383493**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	10.0	11.6		ug/L		116	59 - 131
<b>Surrogate</b>	<b>%Recovery</b>	<b>LCS Qualifier</b>	<b>LCS Limits</b>				
1,2-Dichloroethane-d4 (Surr)	88		63 - 125				

**Lab Sample ID: 240-113065-C-1 MS**  
**Matrix: Water**  
**Analysis Batch: 383493**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	2.0	U	10.0	11.8		ug/L		118	52 - 129
<b>Surrogate</b>	<b>%Recovery</b>	<b>MS Qualifier</b>	<b>MS Limits</b>						
1,2-Dichloroethane-d4 (Surr)	89		63 - 125						

**Lab Sample ID: 240-113065-C-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 383493**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,4-Dioxane	2.0	U	10.0	11.8		ug/L		118	52 - 129	0	13

Eurofins TestAmerica, Canton

# QC Sample Results

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

Job ID: 240-113068-1

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

Lab Sample ID: 240-113065-C-1 MSD  
Matrix: Water  
Analysis Batch: 383493

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

<i>Surrogate</i>	<i>MSD</i> <i>%Recovery</i>	<i>MSD</i> <i>Qualifier</i>	<i>Limits</i>
1,2-Dichloroethane-d4 (Surr)	91		63 - 125

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

# QC Association Summary

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

Job ID: 240-113068-1

## GC/MS VOA

### Analysis Batch: 383493

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-113068-1	MW-144S_052019	Total/NA	Water	8260B SIM	
MB 240-383493/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-383493/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-113065-C-1 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-113065-C-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

### Analysis Batch: 383730

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-113068-2	TRIP BLANK	Total/NA	Water	8260B	
MB 240-383730/6	Method Blank	Total/NA	Water	8260B	
LCS 240-383730/4	Lab Control Sample	Total/NA	Water	8260B	

### Analysis Batch: 384190

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-113068-1	MW-144S_052019	Total/NA	Water	8260B	
MB 240-384190/6	Method Blank	Total/NA	Water	8260B	
LCS 240-384190/4	Lab Control Sample	Total/NA	Water	8260B	
240-113149-B-8 MS	Matrix Spike	Total/NA	Water	8260B	
240-113149-B-8 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	



# Lab Chronicle

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

Job ID: 240-113068-1

**Client Sample ID: MW-144S\_052019**

**Lab Sample ID: 240-113068-1**

**Date Collected: 05/20/19 11:41**

**Matrix: Water**

**Date Received: 05/22/19 09:45**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	384190	06/03/19 14:26	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	383493	05/29/19 17:26	SAM	TAL CAN

**Client Sample ID: TRIP BLANK**

**Lab Sample ID: 240-113068-2**

**Date Collected: 05/20/19 00:00**

**Matrix: Water**

**Date Received: 05/22/19 09:45**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	383730	05/30/19 22:47	LRW	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: 240-113068-1

## Laboratory: Eurofins TestAmerica, Canton

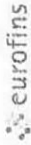
All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	2927	02-23-20
Connecticut	State Program	1	PH-0590	12-31-19
Florida	NELAP	4	E87225	06-30-19 *
Illinois	NELAP	5	200004	07-31-19 *
Iowa	State Program	7	421	06-01-21
Kansas	NELAP	7	E-10336	04-30-20
Kentucky (UST)	State Program	4	58	02-23-20
Kentucky (WW)	State Program	4	98016	12-31-19
Minnesota	NELAP	5	039-999-348	12-31-19 *
Minnesota (Petrofund)	State Program	1	3506	07-31-19 *
Nevada	State Program	9	OH00048	07-31-19
New Jersey	NELAP	2	OH001	06-30-19 *
New York	NELAP	2	10975	03-31-20
Ohio VAP	State Program	5	CL0024	09-06-19 *
Oregon	NELAP	10	4062	02-23-20
Pennsylvania	NELAP	3	68-00340	08-31-19 *
Texas	NELAP	6	T104704517-18-10	08-31-19 *
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-19 *
Washington	State Program	10	C971	01-12-20 *
West Virginia DEP	State Program	3	210	12-31-19

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

**MICHIGAN Chain of Custody Record**  
**190**

1.4 K1.2



Environmental Testing  
 TestAmerica

<b>Client Information</b> Company: ARCADIS U.S. Inc. Address: 28550 Cabot Drive Suite 500 City: Novi State, Zip: MI, 48377 Phone: MI001318.0002.00002 Email: Caitlin.ONeill@arcadis.com Project Name: Ford LTP Livonia MI - E203631 Site:		Lab PM: DelMonico, Michael E-Mail: michael.delmonico@testamentinc.com Phone: S. J. Hines 248-662-7233		Carrier Tracking No(s): COC No: 240-60548-25803.8 Page: 6 of 13 Job #: 10FA	
<b>Analysis Requested</b> Due Date Requested: TAT Requested (days): 10 Field Filtered Sample (Yes or No): Perform MS/MSD (Yes or No): 8260B - VOCs (Short List): 8260B, 8260B SIM		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AgNO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)			
<b>Sample Identification</b> MW-1445-052019 TRIP BLANK		Sample Date: 5-26-19 Sample Time: 1141 Sample Type (C=Comp, G=grab): G Matrix (Water, Solid, Gaseous, etc.): Water	Preservation Code: A Total Number of Containers: 6	Special Instructions/Note: 240-113068 Chain of Custody	
<b>Possible Hazard Identification</b> <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, Other (specify)					
<b>Empty Kit Relinquished by:</b> Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]					
<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b> <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/OC Requirements:					
<b>Company</b> Date/Time: 5-26-19 / 1830 Date/Time: 5/21/19 1000 Date/Time: 5-21-19 1500		<b>Company</b> Date/Time: 5-26-19 / 1830 Date/Time: 5-21-19 1000 Date/Time: 5-21-19 945		<b>Company</b> Date/Time: 5-26-19 / 1830 Date/Time: 5-21-19 1000 Date/Time: 5-21-19 945	
Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]		Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]		Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]	
Custody Seal No.: <input type="checkbox"/> Yes <input type="checkbox"/> No		Cooler Temperature(s) °C and Other Remarks:			



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

Login # : 113068

Client Arcadis Site Name \_\_\_\_\_

Cooler unpacked by: \_\_\_\_\_

Cooler Received on 5-22-19 Opened on 5-22-19


FedEx: 1<sup>st</sup> Grd  UPS  FAS  Clipper  Client Drop Off  TestAmerica Courier  Other

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

TestAmerica Cooler # 74 Foam Box  Client Cooler  Box  Other \_\_\_\_\_

Packing material used: Bubble Wrap  Foam  Plastic Bag  None  Other \_\_\_\_\_

COOLANT: Wet Ice  Blue Ice  Dry Ice  Water  None

1. Cooler temperature upon receipt  See Multiple Cooler Form  
 IR GUN# IR-8 (CF -0.2 °C) Observed Cooler Temp. 1.4 °C Corrected Cooler Temp. 1.2 °C  
 IR GUN #36 (CF +0.7°C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes No  
 -Were the seals on the outside of the cooler(s) signed & dated? Yes No NA  
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes ~~No~~  
 -Were tamper/custody seals intact and uncompromised? Yes No NA
3. Shippers' packing slip attached to the cooler(s)? 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# HC984738  
 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: JR

**18. SAMPLE CONDITION**

Sample(s) \_\_\_\_\_ were received after the recommended holding time had expired.  
 Sample(s) \_\_\_\_\_ were received in a broken container.  
 Sample(s) \_\_\_\_\_ were received with bubble >6 mm in diameter. (Notify PM)

**19. SAMPLE PRESERVATION**

Sample(s) \_\_\_\_\_ were further preserved in the laboratory.  
 Time preserved: \_\_\_\_\_ Preservative(s) added/Lot number(s): \_\_\_\_\_  
 VOA Sample Preservation - Date/Time VOAs Frozen: \_\_\_\_\_

# DATA VERIFICATION REPORT



June 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: MI001454.0002/3/4.00002/2B/3B  
Event Specific Scope of Work References: Sample COC  
Laboratory: TestAmerica - North Canton  
Laboratory submittal: 113068-1  
Sample date: 2019-05-20  
Report received by CADENA: 2019-06-06  
Initial Data Verification completed by CADENA: 2019-06-07

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.**

The following minor QC exceptions or missing information were noted:

GCMS VOC trip blank SURROGATE recoveries were outliers biased high for at least 1 surrogate. Associated client sample results were non-detect so qualification was not required based on these high bias QC outliers.

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

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

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

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

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

CADENA 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.

## SAMPLING AND ANALYSIS SUMMARY

**CADENA Project ID:** E203631

**Laboratory:** TestAmerica-North Canton

**Laboratory Submittal:** 113068-1

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
2401130681	MW-144S_052019	5/20/2019	11:41:00	X	X	
2401130682	TRIP BLANK	5/20/2019	12:00:00	X		



# Analytical Results Summary

## Reportable Results Only

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton

Laboratory Submittal: 113068-1

Sample Name: MW-144S\_052019                      TRIP BLANK  
Lab Sample ID: 2401130681                      2401130682  
Sample Date: 5/20/2019                      5/20/2019

Analyte	Cas No.	Report		Units	Valid		Report		Valid	
		Result	Limit		Qualifier	Result	Limit	Units	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 # 240-113068-1

CADENA Verification Report: 2019-06-07

Analyses Performed By:  
TestAmerica  
Canton, Ohio

Report #33202R  
Review Level: Tier III  
Project: MI001454.0004.00002



## DATA REVIEW

### SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 240-113068-1 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
240-113068-1	MW-144S_052019	240-113068-1	Water	5/20/2019		X	X	
	TRIP BLANK	240-113068-2	Water	5/20/2019		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/8260B-SIM	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, with the exception of the compounds presented in the following table.

Sample Locations	Initial/Continuing	Compound	Criteria
MW-144S_052019	CCV %D	Trichloroethene	+21.9%
TRIP BLANK	CCV %D	Tetrachloroethene	+24.1%

## DATA REVIEW

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Continuing Calibration	%D >20% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D >20% (decrease in sensitivity)	Non-detect	UJ
		Detect	J
	%D >90% (increase/decrease in sensitivity)	Non-detect	R
		Detect	J

### 4. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

Sample locations associated with surrogates exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Surrogate	Recovery
TRIP BLANK	1,2-Dichloroethane-d4	AC
	4-Bromofluorobenzene	< LL but > 10%
	Dibromofluoromethane	< LL but > 10%
	Toluene-d8	AC

Notes:

LL = Lower control limit

AC = Acceptable

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

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

CADENA Inc. did not recognize these surrogate failures in their verification report; therefore, qualification was applied as described above.

## DATA REVIEW

### 5. 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.

### 6. 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.

### 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: 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: June 19, 2019

PEER REVIEW: Dennis Capria

DATE: June 26, 2019

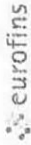


**CHAIN OF CUSTODY  
CORRECTED SAMPLE ANALYSIS DATA  
SHEETS**



**MICHIGAN Chain of Custody Record**  
**190**

1.4 K1.2



Environmental Testing  
 TestAmerica

<b>Client Information</b> Company: ARCADIS U.S. Inc. Address: 28550 Cabot Drive Suite 500 City: Novi State, Zip: MI, 48377 Phone: MI001318.0002.00002 Email: Caitlin.ONeill@arcadis.com Project Name: Ford LTP Livonia MI - E203631 Site:		Lab PM: DelMonico, Michael E-Mail: michael.delmonico@testamentinc.com Phone: S. J. Hines 248-662-7233		Carrier Tracking No(s): COC No: 240-60548-25803.8 Page: 6 of 13 Job #: 10FA	
<b>Analysis Requested</b> Due Date Requested: TAT Requested (days): 10 Field Filtered Sample (Yes or No): Perform MS/MSD (Yes or No): 8260B - VOCs (Short List): 8260B, 8260B SIM		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AgNO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)			
<b>Sample Identification</b> MW-1445-052019 TRIP BLANK		Sample Date: 5-26-19 Sample Time: 1141 Sample Type (C=Comp, G=grab): G Matrix (Water, Solid, Gaseous, etc.): Water	Preservation Code: A Total Number of Containers: 6	Special Instructions/Note: 240-113068 Chain of Custody	
<b>Possible Hazard Identification</b> <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, Other (specify)					
<b>Empty Kit Relinquished by:</b> Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]					
<b>Custody Seals Intact:</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
Date/Time: 5-26-19 / 1830 Date/Time: 5/21/19 1000 Date/Time: 5-21-19 1500		Date/Time: 5-26-19 / 1830 Date/Time: 5-21-19 1000 Date/Time: 5-21-19 945		Company: ARCADIS Company: ARCADIS Company: ETA Company: ETA	



# Client Sample Results

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

Job ID: 240-113068-1

**Client Sample ID: MW-144S\_052019**

**Lab Sample ID: 240-113068-1**

Date Collected: 05/20/19 11:41

Matrix: Water

Date Received: 05/22/19 09:45

**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			05/29/19 17:26	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	91		63 - 125		05/29/19 17:26	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			06/03/19 14:26	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			06/03/19 14:26	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			06/03/19 14:26	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			06/03/19 14:26	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			06/03/19 14:26	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			06/03/19 14:26	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	109		70 - 121		06/03/19 14:26	1
4-Bromofluorobenzene (Surr)	98		59 - 120		06/03/19 14:26	1
Toluene-d8 (Surr)	91		70 - 123		06/03/19 14:26	1
Dibromofluoromethane (Surr)	114		75 - 128		06/03/19 14:26	1

# Client Sample Results

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

Job ID: 240-113068-1

**Client Sample ID: TRIP BLANK**

**Lab Sample ID: 240-113068-2**

**Date Collected: 05/20/19 00:00**

**Matrix: Water**

**Date Received: 05/22/19 09:45**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U J	1.0	0.19	ug/L			05/30/19 22:47	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/30/19 22:47	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/30/19 22:47	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/30/19 22:47	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/30/19 22:47	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/30/19 22:47	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		70 - 121		05/30/19 22:47	1
4-Bromofluorobenzene (Surr)	52	X	59 - 120		05/30/19 22:47	1
Toluene-d8 (Surr)	57	X	70 - 123		05/30/19 22:47	1
Dibromofluoromethane (Surr)	104		75 - 128		05/30/19 22:47	1