

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

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

TestAmerica Job ID: 240-108385-1

Client Project/Site: Ford LTP Livonia MI - E203631

For:

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

Attn: Kristoffer Hinskey



Authorized for release by:
2/25/2019 4:03:46 PM

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

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



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Definitions/Glossary

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

TestAmerica Job ID: 240-108385-1

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

TestAmerica Job ID: 240-108385-1

Job ID: 240-108385-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-108385-1

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

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

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

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

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

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

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

RECEIPT

The sample was received on 2/22/2019 8:45 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.9° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Sample MW-145S-022019 (240-108385-1) was analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The sample was analyzed on 02/22/2019.

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

VOLATILE ORGANIC COMPOUNDS (GCMS SIM)

Sample MW-145S-022019 (240-108385-1) was analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The sample was analyzed on 02/22/2019.

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

TestAmerica Job ID: 240-108385-1

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

Protocol References:

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

Laboratory References:

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



Sample Summary

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

TestAmerica Job ID: 240-108385-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-108385-1	MW-145S-022019	Water	02/20/19 14:30	02/22/19 08:45

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

Detection Summary

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

TestAmerica Job ID: 240-108385-1

Client Sample ID: MW-145S-022019

Lab Sample ID: 240-108385-1

No Detections.

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- 4
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- 7
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- 10
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- 12
- 13
- 14

This Detection Summary does not include radiochemical test results.

TestAmerica Canton

Client Sample Results

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

TestAmerica Job ID: 240-108385-1

Client Sample ID: MW-145S-022019

Lab Sample ID: 240-108385-1

Date Collected: 02/20/19 14:30

Matrix: Water

Date Received: 02/22/19 08:45

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			02/22/19 13:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	86		63 - 125					02/22/19 13:16	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			02/22/19 20:12	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			02/22/19 20:12	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			02/22/19 20:12	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/22/19 20:12	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			02/22/19 20:12	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			02/22/19 20:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	112		70 - 121					02/22/19 20:12	1
4-Bromofluorobenzene (Surr)	92		59 - 120					02/22/19 20:12	1
Toluene-d8 (Surr)	99		70 - 123					02/22/19 20:12	1
Dibromofluoromethane (Surr)	93		75 - 128					02/22/19 20:12	1

Surrogate Summary

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

TestAmerica Job ID: 240-108385-1

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

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA (70-121)	BFB (59-120)	TOL (70-123)	DBFM (75-128)
240-108383-E-1 MS	Matrix Spike	101	109	104	87
240-108383-F-1 MSD	Matrix Spike Duplicate	100	108	102	84
240-108385-1	MW-145S-022019	112	92	99	93
LCS 240-369108/4	Lab Control Sample	98	109	105	86
MB 240-369108/7	Method Blank	111	94	98	92

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)
240-108274-C-1 MS	Matrix Spike	90
240-108274-C-1 MSD	Matrix Spike Duplicate	91
240-108385-1	MW-145S-022019	86
LCS 240-369083/4	Lab Control Sample	89
MB 240-369083/5	Method Blank	87

Surrogate Legend

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

QC Sample Results

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

TestAmerica Job ID: 240-108385-1

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

Lab Sample ID: MB 240-369108/7

Matrix: Water

Analysis Batch: 369108

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			02/22/19 15:01	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			02/22/19 15:01	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			02/22/19 15:01	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/22/19 15:01	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			02/22/19 15:01	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			02/22/19 15:01	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	111		70 - 121		02/22/19 15:01	1
4-Bromofluorobenzene (Surr)	94		59 - 120		02/22/19 15:01	1
Toluene-d8 (Surr)	98		70 - 123		02/22/19 15:01	1
Dibromofluoromethane (Surr)	92		75 - 128		02/22/19 15:01	1

Lab Sample ID: LCS 240-369108/4

Matrix: Water

Analysis Batch: 369108

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	10.6		ug/L		106	65 - 139
cis-1,2-Dichloroethene	10.0	10.3		ug/L		103	76 - 128
Tetrachloroethene	10.0	9.09		ug/L		91	74 - 130
trans-1,2-Dichloroethene	10.0	10.5		ug/L		105	78 - 133
Trichloroethene	10.0	8.98		ug/L		90	76 - 125
Vinyl chloride	10.0	13.0		ug/L		130	58 - 143

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	98		70 - 121
4-Bromofluorobenzene (Surr)	109		59 - 120
Toluene-d8 (Surr)	105		70 - 123
Dibromofluoromethane (Surr)	86		75 - 128

Lab Sample ID: 240-108383-E-1 MS

Matrix: Water

Analysis Batch: 369108

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	1.0	U	10.0	10.5		ug/L		105	53 - 140
cis-1,2-Dichloroethene	1.0	U	10.0	10.4		ug/L		104	64 - 130
Tetrachloroethene	1.0	U	10.0	9.13		ug/L		91	51 - 136
trans-1,2-Dichloroethene	1.0	U	10.0	10.6		ug/L		106	68 - 133
Trichloroethene	1.0	U	10.0	8.67		ug/L		87	55 - 131
Vinyl chloride	1.0	U	10.0	13.3		ug/L		133	43 - 154

Surrogate	MS %Recovery	MS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	101		70 - 121
4-Bromofluorobenzene (Surr)	109		59 - 120
Toluene-d8 (Surr)	104		70 - 123

TestAmerica Canton

QC Sample Results

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

TestAmerica Job ID: 240-108385-1

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

Lab Sample ID: 240-108383-E-1 MS
Matrix: Water
Analysis Batch: 369108

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

Surrogate	MS %Recovery	MS Qualifier	Limits
Dibromofluoromethane (Surr)	87		75 - 128

Lab Sample ID: 240-108383-F-1 MSD
Matrix: Water
Analysis Batch: 369108

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	1.0	U	10.0	10.4		ug/L		104	53 - 140	1	35
cis-1,2-Dichloroethene	1.0	U	10.0	10.1		ug/L		101	64 - 130	3	21
Tetrachloroethene	1.0	U	10.0	8.85		ug/L		88	51 - 136	3	23
trans-1,2-Dichloroethene	1.0	U	10.0	10.2		ug/L		102	68 - 133	4	24
Trichloroethene	1.0	U	10.0	8.32		ug/L		83	55 - 131	4	23
Vinyl chloride	1.0	U	10.0	13.7		ug/L		137	43 - 154	3	29

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	100		70 - 121
4-Bromofluorobenzene (Surr)	108		59 - 120
Toluene-d8 (Surr)	102		70 - 123
Dibromofluoromethane (Surr)	84		75 - 128

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

Lab Sample ID: MB 240-369083/5
Matrix: Water
Analysis Batch: 369083

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			02/22/19 11:37	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	87		63 - 125		02/22/19 11:37	1

Lab Sample ID: LCS 240-369083/4
Matrix: Water
Analysis Batch: 369083

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	11.9		ug/L		119	59 - 131

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	89		63 - 125

QC Sample Results

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

TestAmerica Job ID: 240-108385-1

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

Lab Sample ID: 240-108274-C-1 MS

Matrix: Water

Analysis Batch: 369083

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	11.7		ug/L		117	52 - 129
MS MS									
Surrogate	%Recovery	Qualifier	Limits						
1,2-Dichloroethane-d4 (Surr)	90		63 - 125						

Lab Sample ID: 240-108274-C-1 MSD

Matrix: Water

Analysis Batch: 369083

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	11.4		ug/L		114	52 - 129	3	13
MSD MSD											
Surrogate	%Recovery	Qualifier	Limits								
1,2-Dichloroethane-d4 (Surr)	91		63 - 125								

QC Association Summary

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

TestAmerica Job ID: 240-108385-1

GC/MS VOA

Analysis Batch: 369083

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-108385-1	MW-145S-022019	Total/NA	Water	8260B SIM	
MB 240-369083/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-369083/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-108274-C-1 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-108274-C-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

Analysis Batch: 369108

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-108385-1	MW-145S-022019	Total/NA	Water	8260B	
MB 240-369108/7	Method Blank	Total/NA	Water	8260B	
LCS 240-369108/4	Lab Control Sample	Total/NA	Water	8260B	
240-108383-E-1 MS	Matrix Spike	Total/NA	Water	8260B	
240-108383-F-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Lab Chronicle

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

TestAmerica Job ID: 240-108385-1

Client Sample ID: MW-145S-022019

Lab Sample ID: 240-108385-1

Date Collected: 02/20/19 14:30

Matrix: Water

Date Received: 02/22/19 08:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	369108	02/22/19 20:12	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	369083	02/22/19 13:16	SAM	TAL CAN

Laboratory References:

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

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Accreditation/Certification Summary

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

TestAmerica Job ID: 240-108385-1

Laboratory: TestAmerica Canton

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

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	2927	02-23-19 *
Connecticut	State Program	1	PH-0590	12-31-19
Florida	NELAP	4	E87225	06-30-19
Illinois	NELAP	5	200004	07-31-19
Kansas	NELAP	7	E-10336	04-30-19
Kentucky (UST)	State Program	4	58	02-23-19 *
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	03-31-19 *
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.

TestAmerica Michigan
 10448 Citation Drive
 Suite 200
 Brighton, MI 48116
 Phone: 810.229.2763 Fax: 412.963.2470

MICHIGAN
 190

Chain of Custody Record
 221714

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.
 TAL-8210 (0719)

Regulatory Program: DW NPDES RCRA Other:

Client Contact: **ARCADIS**
 Company Name: **ARCADIS**
 Address: **28550 CABOT DR, STE #500**
 City/State/Zip: **NOVI, MI 48377**
 Phone: _____
 Fax: _____
 Project Name: **FORD LTP**
 Site: **LIVONIA**
 PO # **MI 001454.0003**

Project Manager: **KRIS HINSKEY**
 Tel/Fax: _____
 Analysis Turnaround Time
 CALENDAR DAYS WORKING DAYS
 TAT if different from Below
 2 weeks
 1 week
 2 days
 1 day **24-HR**

Site Contact: _____
 Lab Contact: _____
 Date: _____
 Carrier: _____

Company Name: **ARCADIS**
 Address: **28550 CABOT DR, STE #500**
 City/State/Zip: **NOVI, MI 48377**
 Phone: _____
 Fax: _____
 Project Name: **FORD LTP**
 Site: **LIVONIA**
 PO # **MI 001454.0003**

COB No: _____ of _____ COCs
 Sampler: **K. KOBOSKI**
 For Lab Use Only:
 Walk-in Client:
 Lab Sampling:
 Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes:
KW-1455-022019	2/20/19	1430	G	GW	6			



Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other
 Possible Hazard Identification: _____
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
 Non-Hazard Flammable Skin Irritant Poison B Unknown
 Return to Client Disposal by Lab Archive for _____ Months

Special Instructions/QC Requirements & Comments:
*** SUBMIT ALL RESULTS THROUGH CADENA (JIM.TOMALIA@CADENA.COM) CADENA# : E203631**
LEVEL IV REPORTING

Relinquished by:	Relinquished by:	Relinquished by:	Custody Seal No.:	Company:	Date/Time:
<i>Jim Tomalia</i>	<i>ARCADIS</i>	<i>NOVI COLD STORAGE</i>	<i>ARCADIS</i>	<i>ARCADIS</i>	<i>2/20/19 1300</i>
<i>Caitlin O'Neill</i>	<i>ARCADIS</i>	<i>TESTAMERICA</i>	<i>ARCADIS</i>	<i>TESTAMERICA</i>	<i>2/21/19 1300</i>
<i>Jim Tomalia</i>	<i>ARCADIS</i>	<i>TESTAMERICA</i>	<i>ARCADIS</i>	<i>TA</i>	<i>2-22-19 0845</i>

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TestAmerica Canton Sample Receipt Form/Narrative
Canton Facility

Login # : 108385

Client Arcadis Site Name _____ Cooler unpacked by: Ryan Cribley
 Cooler Received on 2-22-18 Opened on 2-22-18 855
 FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

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

TestAmerica Cooler # TA Foam Box _____ Client Cooler _____ Box _____ Other _____
 Packing material used: Bubble Wrap Foam Plastic Bag None _____ Other _____
 COOLANT: Wet Ice Blue Ice _____ Dry Ice _____ Water _____ None _____

1. Cooler temperature upon receipt See Multiple Cooler Form
 IR GUN# IR-8 (CF -0.2 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
 IR GUN #36 (CF +0°C) Observed Cooler Temp. 1.9 °C Corrected Cooler Temp. 1.9 °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# HC854592
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 # 57160 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): _____



February 25, 2019

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

CADENA project ID: E203631
Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater
Project number: MI001454.0002/3/4.00002/2B/3B
Client project scope reference: Sample COC only was used to define project analytical requirements.
Laboratory: TestAmerica - North Canton
Laboratory submittal: 108385-1
Sample date: 2019-02-20
Report received by CADENA: 2019-02-25
Initial Data Verification completed by CADENA: 2019-02-25

There were no significant QC anomalies or exceptions to report.

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

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

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

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

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

CADENA 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: 108385-1

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
2401083851	MW-145S-022019	2/20/2019	2:30:00	X	X	

Analytical Results Summary

Reportable Results Only

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton

Laboratory Submittal: 108385-1

Sample Name: MW-145S-022019

Lab Sample ID: 2401083851

Sample Date: 2/20/2019

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

Ford Motor Company – Livonia Transmission Project

DATA REVIEW

Livonia, Michigan

Volatile Organic Compounds (VOC) Analysis

SDG #240-108385-1

CADENA Verification Report: 2019-02-25

Analyses Performed By:

TestAmerica
Canton, Ohio

Report #31925R

Review Level: Tier II/Plus

Project: MI001454.0003.00002



DATA REVIEW

SUMMARY

This data quality assessment/verification summarizes the confirmation of detected compounds (if applicable), review of the verification/Tier II validation review performed by CADENA Inc. and review of level II laboratory data package completeness for Sample Delivery Group (SDG) # 240-108385-1 for samples collected in association with the Ford – Livonia, Michigan site. Only detected compound confirmations and omitted deviations from the CADENA verification/Tier II report are documented in this report. The Tier II/Plus validation is performed in the instance when a sample location has a detection of Vinyl Chloride at a concentration of 5 ppb or less. The detection and the concentration are reviewed and verified based on the instrument calibration and laboratory raw data. Only analytical data associated with constituents of concern were reviewed for this verification. 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	VOC (SIM)	MISC
240-108385-1	MW-145S-022019	240-108385-1	Water	2/20/2019		X	X	

Notes:

VOC = volatile organic compound

SIM = selective ion monitoring

MISC = miscellaneous

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. 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.

1.1 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 (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

1.2 Continuing Calibration

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

Calibration criteria are only reviewed when detections of vinyl chloride were present in samples. No compounds were detected in the samples within this SDG; therefore, calibration criteria was not evaluated.

2. Compound Identification

Compounds are identified on the GC/MS by using the analyte's relative retention time, ion spectra, and concentration.

No compounds were detected in the samples within this SDG.

3. System Performance and Overall Assessment

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

DATA REVIEW

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: 8260B/8260B-SIM	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II+ Validation					
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

Notes:

RT retention time

VERIFICATION/VALIDATION PERFORMED BY: Andrew Korycinski

SIGNATURE:



DATE: March 1, 2019

PEER REVIEW: Dennis Capria

DATE: March 4, 2019



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



TestAmerica Michigan
10448 Citation Drive
Suite 200
Brighton, MI 48116
Phone: 810.229.2763 Fax: 412.963.2470

MICHIGAN
190

Chain of Custody Record

221714

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: DW NPDES RCRA Other:

Client Contact		Project Manager: KRIS HINSKEY		Site Contact: KRIS HINSKEY		Date: _____	
Company Name: ARCADIS		Tel/Fax: _____		Lab Contact: _____		Carrier: _____	
Address: 28550 CABOT DR, STE #500		Analysis Turnaround Time		Perform MS / MSD (Y / N)		COC No: _____	
City/State/Zip: NOVI, MI 48377		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> TAT if different from Below <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input checked="" type="checkbox"/> 1 day		Filtered Sample (Y / N)		Sampler: K. KOBOSKI	
Phone: _____		WORKING DAYS		Matrix		For Lab Use Only:	
Fax: _____		Sample Type (C=Comp, G=Grab)		# of Cont.		Walk-in Client:	
Project Name: FORD LTP		Sample Date		Sample Time		Lab Sampling:	
Site: LIVONIA		2/20/19		1430		Job / SDG No.:	
PO # MI 001454.0003		2/20/19		1430		Sample Specific Notes:	
Sample Identification		GW		6		240-108385 Chain of Custody	
kw-145s-022019		G		GW		Barcode	
Sample Date		Sample Time		Matrix		240-108385 Chain of Custody	
2/20/19		1430		GW		240-108385 Chain of Custody	
Sample Type		Sample Date		Sample Time		Sample Specific Notes:	
G		2/20/19		1430		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	
Sample Date		Sample Time		Matrix		<input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months	
2/20/19		1430		GW		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	
Sample Type		Sample Date		Sample Time		Special Instructions/QC Requirements & Comments:	
G		2/20/19		1430		<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown LEVEL IV REPORTING	
Sample Date		Sample Time		Matrix		<input checked="" type="checkbox"/> SUBMIT ALL RESULTS THROUGH CADENA (JIM.TOMALIA@CADENA.COM) CADENA# : E203631	
2/20/19		1430		GW		Custody Seal No.: _____	
Sample Type		Sample Date		Sample Time		Relinquished by: _____	
G		2/20/19		1430		Relinquished by: Jim Tomalia	
Sample Date		Sample Time		Matrix		Relinquished by: _____	
2/20/19		1430		GW		Relinquished by: Caitlin O'Neill	
Sample Type		Sample Date		Sample Time		Relinquished by: _____	
G		2/20/19		1430		Relinquished by: Jim Tomalia	
Sample Date		Sample Time		Matrix		Received by: _____	
2/20/19		1430		GW		Received by: NOVI COLD STORAGE	
Sample Type		Sample Date		Sample Time		Received by: _____	
G		2/20/19		1430		Received by: TESTAMERICA	
Sample Date		Sample Time		Matrix		Received by: _____	
2/20/19		1430		GW		Received by: TA	
Sample Type		Sample Date		Sample Time		Cooler Temp. (°C): Obs'd: _____	
G		2/20/19		1430		Cooler Temp. (°C): Cor'd: _____	
Sample Date		Sample Time		Matrix		Company: ARCADIS	
2/20/19		1430		GW		Company: ARCADIS	
Sample Type		Sample Date		Sample Time		Company: TESTAMERICA	
G		2/20/19		1430		Company: TESTAMERICA	
Sample Date		Sample Time		Matrix		Company: TA	
2/20/19		1430		GW		Company: TA	
Sample Type		Sample Date		Sample Time		Therm ID No.: _____	
G		2/20/19		1430		Therm ID No.: _____	
Sample Date		Sample Time		Matrix		Date/Time: 2/20/19 1800	
2/20/19		1430		GW		Date/Time: 2/20/19 1800	
Sample Type		Sample Date		Sample Time		Date/Time: 2/21/19 1300	
G		2/20/19		1430		Date/Time: 2/21/19 1300	
Sample Date		Sample Time		Matrix		Date/Time: 2-22-19 0845	
2/20/19		1430		GW		Date/Time: 2-22-19 0845	



Client Sample Results

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

TestAmerica Job ID: 240-108385-1

Client Sample ID: MW-145S-022019

Lab Sample ID: 240-108385-1

Date Collected: 02/20/19 14:30

Matrix: Water

Date Received: 02/22/19 08:45

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			02/22/19 13:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	86		63 - 125					02/22/19 13:16	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			02/22/19 20:12	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			02/22/19 20:12	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			02/22/19 20:12	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/22/19 20:12	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			02/22/19 20:12	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			02/22/19 20:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	112		70 - 121					02/22/19 20:12	1
4-Bromofluorobenzene (Surr)	92		59 - 120					02/22/19 20:12	1
Toluene-d8 (Surr)	99		70 - 123					02/22/19 20:12	1
Dibromofluoromethane (Surr)	93		75 - 128					02/22/19 20:12	1

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

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

TestAmerica Job ID: 240-108388-1

Client Project/Site: Ford LTP Livonia MI - E203631

For:

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

Attn: Kristoffer Hinskey



Authorized for release by:
2/25/2019 4:12:43 PM

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

LINKS

Review your project
results through
TotalAccess

Have a Question?



Visit us at:
www.testamericainc.com

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

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



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Definitions/Glossary

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

TestAmerica Job ID: 240-108388-1

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

TestAmerica Job ID: 240-108388-1

Job ID: 240-108388-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-108388-1

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

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

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

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

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

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

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

RECEIPT

The samples were received on 2/22/2019 8:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.9° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples DUP-01 (240-108388-1) and TRIP BLANK (240-108388-2) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The sample was analyzed on 02/22/2019.

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

VOLATILE ORGANIC COMPOUNDS (GCMS SIM)

Sample DUP-01 (240-108388-1) was analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The sample was analyzed on 02/22/2019.

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

TestAmerica Job ID: 240-108388-1

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

Protocol References:

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

Laboratory References:

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

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

Sample Summary

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

TestAmerica Job ID: 240-108388-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-108388-1	DUP-01	Water	02/20/19 00:00	02/22/19 08:45
240-108388-2	TRIP BLANK	Water	02/20/19 00:00	02/22/19 08:45

- 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

TestAmerica Job ID: 240-108388-1

Client Sample ID: DUP-01

Lab Sample ID: 240-108388-1

No Detections.

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-108388-2

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.

TestAmerica Canton

Client Sample Results

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

TestAmerica Job ID: 240-108388-1

Client Sample ID: DUP-01

Date Collected: 02/20/19 00:00

Date Received: 02/22/19 08:45

Lab Sample ID: 240-108388-1

Matrix: Water

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			02/22/19 14:31	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	89		63 - 125					02/22/19 14:31	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			02/22/19 17:13	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			02/22/19 17:13	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			02/22/19 17:13	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/22/19 17:13	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			02/22/19 17:13	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			02/22/19 17:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	114		70 - 121					02/22/19 17:13	1
4-Bromofluorobenzene (Surr)	92		59 - 120					02/22/19 17:13	1
Toluene-d8 (Surr)	98		70 - 123					02/22/19 17:13	1
Dibromofluoromethane (Surr)	94		75 - 128					02/22/19 17:13	1

Client Sample Results

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

TestAmerica Job ID: 240-108388-1

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-108388-2

Date Collected: 02/20/19 00:00

Matrix: Water

Date Received: 02/22/19 08:45

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			02/22/19 18:01	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			02/22/19 18:01	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			02/22/19 18:01	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/22/19 18:01	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			02/22/19 18:01	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			02/22/19 18:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	114		70 - 121		02/22/19 18:01	1
4-Bromofluorobenzene (Surr)	91		59 - 120		02/22/19 18:01	1
Toluene-d8 (Surr)	97		70 - 123		02/22/19 18:01	1
Dibromofluoromethane (Surr)	94		75 - 128		02/22/19 18:01	1

Surrogate Summary

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

TestAmerica Job ID: 240-108388-1

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

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA (70-121)	BFB (59-120)	TOL (70-123)	DBFM (75-128)
240-108383-E-1 MS	Matrix Spike	101	109	104	87
240-108383-F-1 MSD	Matrix Spike Duplicate	100	108	102	84
240-108388-1	DUP-01	114	92	98	94
240-108388-2	TRIP BLANK	114	91	97	94
LCS 240-369108/4	Lab Control Sample	98	109	105	86
MB 240-369108/7	Method Blank	111	94	98	92

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)
240-108274-C-1 MS	Matrix Spike	90
240-108274-C-1 MSD	Matrix Spike Duplicate	91
240-108388-1	DUP-01	89
LCS 240-369083/4	Lab Control Sample	89
MB 240-369083/5	Method Blank	87

Surrogate Legend

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

QC Sample Results

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

TestAmerica Job ID: 240-108388-1

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

Lab Sample ID: MB 240-369108/7

Matrix: Water

Analysis Batch: 369108

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			02/22/19 15:01	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			02/22/19 15:01	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			02/22/19 15:01	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/22/19 15:01	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			02/22/19 15:01	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			02/22/19 15:01	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	111		70 - 121		02/22/19 15:01	1
4-Bromofluorobenzene (Surr)	94		59 - 120		02/22/19 15:01	1
Toluene-d8 (Surr)	98		70 - 123		02/22/19 15:01	1
Dibromofluoromethane (Surr)	92		75 - 128		02/22/19 15:01	1

Lab Sample ID: LCS 240-369108/4

Matrix: Water

Analysis Batch: 369108

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	10.6		ug/L		106	65 - 139
cis-1,2-Dichloroethene	10.0	10.3		ug/L		103	76 - 128
Tetrachloroethene	10.0	9.09		ug/L		91	74 - 130
trans-1,2-Dichloroethene	10.0	10.5		ug/L		105	78 - 133
Trichloroethene	10.0	8.98		ug/L		90	76 - 125
Vinyl chloride	10.0	13.0		ug/L		130	58 - 143

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	98		70 - 121
4-Bromofluorobenzene (Surr)	109		59 - 120
Toluene-d8 (Surr)	105		70 - 123
Dibromofluoromethane (Surr)	86		75 - 128

Lab Sample ID: 240-108383-E-1 MS

Matrix: Water

Analysis Batch: 369108

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	1.0	U	10.0	10.5		ug/L		105	53 - 140
cis-1,2-Dichloroethene	1.0	U	10.0	10.4		ug/L		104	64 - 130
Tetrachloroethene	1.0	U	10.0	9.13		ug/L		91	51 - 136
trans-1,2-Dichloroethene	1.0	U	10.0	10.6		ug/L		106	68 - 133
Trichloroethene	1.0	U	10.0	8.67		ug/L		87	55 - 131
Vinyl chloride	1.0	U	10.0	13.3		ug/L		133	43 - 154

Surrogate	MS %Recovery	MS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	101		70 - 121
4-Bromofluorobenzene (Surr)	109		59 - 120
Toluene-d8 (Surr)	104		70 - 123

TestAmerica Canton

QC Sample Results

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

TestAmerica Job ID: 240-108388-1

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

Lab Sample ID: 240-108383-E-1 MS
Matrix: Water
Analysis Batch: 369108

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

Surrogate	MS MS		Limits
	%Recovery	Qualifier	
Dibromofluoromethane (Surr)	87		75 - 128

Lab Sample ID: 240-108383-F-1 MSD
Matrix: Water
Analysis Batch: 369108

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD MSD		Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
				Result	Qualifier						
1,1-Dichloroethene	1.0	U	10.0	10.4		ug/L		104	53 - 140	1	35
cis-1,2-Dichloroethene	1.0	U	10.0	10.1		ug/L		101	64 - 130	3	21
Tetrachloroethene	1.0	U	10.0	8.85		ug/L		88	51 - 136	3	23
trans-1,2-Dichloroethene	1.0	U	10.0	10.2		ug/L		102	68 - 133	4	24
Trichloroethene	1.0	U	10.0	8.32		ug/L		83	55 - 131	4	23
Vinyl chloride	1.0	U	10.0	13.7		ug/L		137	43 - 154	3	29

Surrogate	MSD MSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	100		70 - 121
4-Bromofluorobenzene (Surr)	108		59 - 120
Toluene-d8 (Surr)	102		70 - 123
Dibromofluoromethane (Surr)	84		75 - 128

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

Lab Sample ID: MB 240-369083/5
Matrix: Water
Analysis Batch: 369083

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

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			02/22/19 11:37	1

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1,2-Dichloroethane-d4 (Surr)	87		63 - 125		02/22/19 11:37	1

Lab Sample ID: LCS 240-369083/4
Matrix: Water
Analysis Batch: 369083

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

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
1,4-Dioxane	10.0	11.9		ug/L		119	59 - 131

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	89		63 - 125

TestAmerica Canton

QC Sample Results

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

TestAmerica Job ID: 240-108388-1

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

Lab Sample ID: 240-108274-C-1 MS

Matrix: Water

Analysis Batch: 369083

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	11.7		ug/L		117	52 - 129
MS MS									
Surrogate	%Recovery	Qualifier	Limits						
1,2-Dichloroethane-d4 (Surr)	90		63 - 125						

Lab Sample ID: 240-108274-C-1 MSD

Matrix: Water

Analysis Batch: 369083

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	11.4		ug/L		114	52 - 129	3	13
MSD MSD											
Surrogate	%Recovery	Qualifier	Limits								
1,2-Dichloroethane-d4 (Surr)	91		63 - 125								

QC Association Summary

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

TestAmerica Job ID: 240-108388-1

GC/MS VOA

Analysis Batch: 369083

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-108388-1	DUP-01	Total/NA	Water	8260B SIM	
MB 240-369083/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-369083/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-108274-C-1 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-108274-C-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

Analysis Batch: 369108

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-108388-1	DUP-01	Total/NA	Water	8260B	
240-108388-2	TRIP BLANK	Total/NA	Water	8260B	
MB 240-369108/7	Method Blank	Total/NA	Water	8260B	
LCS 240-369108/4	Lab Control Sample	Total/NA	Water	8260B	
240-108383-E-1 MS	Matrix Spike	Total/NA	Water	8260B	
240-108383-F-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Lab Chronicle

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

TestAmerica Job ID: 240-108388-1

Client Sample ID: DUP-01

Date Collected: 02/20/19 00:00

Date Received: 02/22/19 08:45

Lab Sample ID: 240-108388-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	369108	02/22/19 17:13	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	369083	02/22/19 14:31	SAM	TAL CAN

Client Sample ID: TRIP BLANK

Date Collected: 02/20/19 00:00

Date Received: 02/22/19 08:45

Lab Sample ID: 240-108388-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	369108	02/22/19 18:01	LRW	TAL CAN

Laboratory References:

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

Accreditation/Certification Summary

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

TestAmerica Job ID: 240-108388-1

Laboratory: TestAmerica Canton

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

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	2927	02-23-19 *
Connecticut	State Program	1	PH-0590	12-31-19
Florida	NELAP	4	E87225	06-30-19
Illinois	NELAP	5	200004	07-31-19
Kansas	NELAP	7	E-10336	04-30-19
Kentucky (UST)	State Program	4	58	02-23-19 *
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	03-31-19 *
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.

TestAmerica Canton Sample Receipt Form/Narrative

Login # : 108388

Canton Facility

Client Arcadis Site Name Cooler unpacked by: Ryan Cribley
Cooler Received on 2-22-18 Opened on 2-22-18 855
FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

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

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

- 1. Cooler temperature upon receipt
IR GUN# IR-8 (CF -0.2 °C) Observed Cooler Temp. °C Corrected Cooler Temp. °C
IR GUN #36 (CF +0°C) Observed Cooler Temp. 1.9 °C Corrected Cooler Temp. 1.9 °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# HC854592
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 # 57160 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: RC

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):



February 25, 2019

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

CADENA project ID: E203631
Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater
Project number: MI001454.0002/3/4.00002/2B/3B
Client project scope reference: Sample COC only was used to define project analytical requirements.
Laboratory: TestAmerica - North Canton
Laboratory submittal: 108388-1
Sample date: 2019-02-20
Report received by CADENA: 2019-02-25
Initial Data Verification completed by CADENA: 2019-02-25

There were no significant QC anomalies or exceptions to report.

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

2 Water sample(s) were analyzed for GCMS VOC parameter(s).

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

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

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

CADENA 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: 108388-1

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
2401083881	DUP-01	2/20/2019	12:00:00	X	X	
2401083882	TRIP BLANK	2/20/2019	12:00:00	X		

Analytical Results Summary

Reportable Results Only

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton

Laboratory Submittal: 108388-1

Sample Name: DUP-01 TRIP BLANK
Lab Sample ID: 2401083881 2401083882
Sample Date: 2/20/2019 2/20/2019

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

Ford Motor Company – Livonia Transmission Project

DATA REVIEW

Livonia, Michigan

Volatile Organic Compounds (VOC) Analysis

SDG #240-108388-1

CADENA Verification Report: 2019-02-25

Analyses Performed By:

TestAmerica
Canton, Ohio

Report #31926R

Review Level: Tier II/Plus

Project: MI001454.0003.00002



DATA REVIEW

SUMMARY

This data quality assessment/verification summarizes the confirmation of detected compounds (if applicable), review of the verification/Tier II validation review performed by CADENA Inc. and review of level II laboratory data package completeness for Sample Delivery Group (SDG) # 240-108388-1 for samples collected in association with the Ford – Livonia, Michigan site. Only detected compound confirmations and omitted deviations from the CADENA verification/Tier II report are documented in this report. The Tier II/Plus validation is performed in the instance when a sample location has a detection of Vinyl Chloride at a concentration of 5 ppb or less. The detection and the concentration are reviewed and verified based on the instrument calibration and laboratory raw data. Only analytical data associated with constituents of concern were reviewed for this verification. 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	VOC (SIM)	MISC
240-108388-1	DUP-01	240-108388-1	Water	2/20/2019		X	X	
	TRIP BLANK	240-108388-2	Water	2/20/2019		X		

Notes:

VOC = volatile organic compound

SIM = selective ion monitoring

MISC = miscellaneous

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. 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.

1.1 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 (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

1.2 Continuing Calibration

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

Calibration criteria are only reviewed when detections of vinyl chloride were present in samples. No compounds were detected in the samples within this SDG; therefore, calibration criteria was not evaluated.

2. Compound Identification

Compounds are identified on the GC/MS by using the analyte's relative retention time, ion spectra, and concentration.

No compounds were detected in the samples within this SDG.

3. System Performance and Overall Assessment

Sample DUP-01 is a field duplicate of parent sample MW-145S-022019, which is reported in SDG 240-108385-1. No compounds were detected in either sample, therefore a field duplicate evaluation was not required.

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

DATA REVIEW

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: 8260B/8260B-SIM	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II+ Validation					
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

Notes:

RT retention time

VERIFICATION/VALIDATION PERFORMED BY: Andrew Korycinski

SIGNATURE:



DATE: March 1, 2019

PEER REVIEW: Dennis Capria

DATE: March 4, 2019



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



TestAmerica Michigan
 10448 Citations Drive
 Suite 200
 Brighton, MI 48116
 Phone: 810.229.2763 Fax: 412.963.2470

MICHIGAN
 190

Chain of Custody Record
 1.9/CI.9

221587

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.
 TAL-8210 (0713)

Regulatory Program: DW NPDES RCRA Other:

Client Contact Company Name: ARCADIS Address: 28550 CABOT DR, STE#500 City/State/Zip: NOVI MI 48377 Phone: _____ Fax: _____		Site Contact: Lab Contact: _____ Date: _____ Carrier: _____	
Project Manager: KRIS HINSKEY Tel/Fax: _____		COC No: 1 of 1 COCs	
Analysis Turnaround Time <input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below _____ <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input checked="" type="checkbox"/> 1 day 24-HR		For Lab Use Only: Sampler: K. KOBASHI Walk-in Client: _____ Lab Sampling: _____ Job / SDG No.: _____	
Project Name: FORD LTP Site: LIVONIA PO# MI001454.0003		Sample Specific Notes: TRIP BLANK	
Sample Identification DUP-01 TRIP BLANK		Sample Specific Notes: TRIP BLANK	
Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	# of Cont.
2/20/19	---	GW	6
---	---	---	1
Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other		Sample Specific Notes: TRIP BLANK	
Possible Hazard Identification: Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample. <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown			
Special Instructions/QC Requirements & Comments: * SUBMIT ALL RESULTS THROUGH CADENA (JIM.TOMALIA@CADENA.COM) CADENA #: E203631			
Relinquished by: Jim Tomalia		Received by: NOVI COLD STORAGE	
Relinquished by: Caroline O'Neill		Received by: ARCADIS	
Relinquished by: vw		Received by: TESTAMERICA	
Custody Seal No.: _____		Date/Time: 2/20/19 1800	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Date/Time: 2/21/19 1300	
Cooler Temp. (°C): _____		Date/Time: 2-22-19 0845	



Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return to Client Disposal by Lab Archive for _____ Months



Client Sample Results

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

TestAmerica Job ID: 240-108388-1

Client Sample ID: DUP-01

Date Collected: 02/20/19 00:00

Date Received: 02/22/19 08:45

Lab Sample ID: 240-108388-1

Matrix: Water

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			02/22/19 14:31	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	89		63 - 125					02/22/19 14:31	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			02/22/19 17:13	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			02/22/19 17:13	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			02/22/19 17:13	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/22/19 17:13	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			02/22/19 17:13	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			02/22/19 17:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	114		70 - 121					02/22/19 17:13	1
4-Bromofluorobenzene (Surr)	92		59 - 120					02/22/19 17:13	1
Toluene-d8 (Surr)	98		70 - 123					02/22/19 17:13	1
Dibromofluoromethane (Surr)	94		75 - 128					02/22/19 17:13	1

Client Sample Results

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

TestAmerica Job ID: 240-108388-1

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-108388-2

Date Collected: 02/20/19 00:00

Matrix: Water

Date Received: 02/22/19 08:45

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			02/22/19 18:01	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			02/22/19 18:01	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			02/22/19 18:01	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/22/19 18:01	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			02/22/19 18:01	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			02/22/19 18:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	114		70 - 121		02/22/19 18:01	1
4-Bromofluorobenzene (Surr)	91		59 - 120		02/22/19 18:01	1
Toluene-d8 (Surr)	97		70 - 123		02/22/19 18:01	1
Dibromofluoromethane (Surr)	94		75 - 128		02/22/19 18:01	1