

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

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

TestAmerica Job ID: 240-107780-1 Client Project/Site: Ford LTP Livonia MI - E203631

For:

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

Attn: Kristoffer Hinskey

Mole Del your

Authorized for release by: 2/8/2019 2:54:33 PM Michael DelMonico, Project Manager I (330)497-9396 michael.delmonico@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.

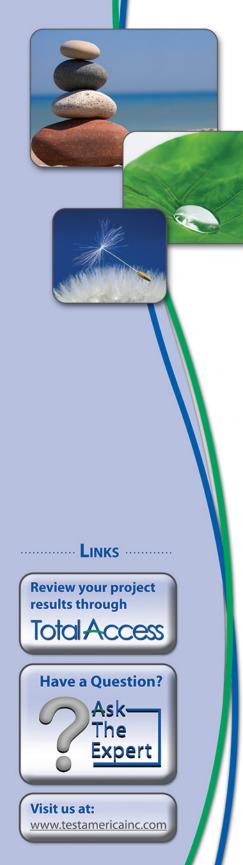


Table of Contents

Cover Page	1
Table of Contents	2
Definitions/Glossary	3
Case Narrative	4
Method Summary	6
Sample Summary	7
Detection Summary	8
Client Sample Results	9
Surrogate Summary	11
QC Sample Results	12
QC Association Summary	15
Lab Chronicle	16
Certification Summary	17
Chain of Custody	18

3

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description	
U	Indicates the analyte was analyzed for but not detected.	5
*	LCS or LCSD is outside acceptance limits.	J
х	Surrogate is outside control limits	
F1	MS and/or MSD Recovery is outside acceptance limits.	
		7

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.	
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis	
%R	Percent Recovery	
CFL	Contains Free Liquid	
CNF	Contains No Free Liquid	
DER	Duplicate Error Ratio (normalized absolute difference)	
Dil Fac	Dilution Factor	
DL	Detection Limit (DoD/DOE)	
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample	
DLC	Decision Level Concentration (Radiochemistry)	
EDL	Estimated Detection Limit (Dioxin)	
LOD	Limit of Detection (DoD/DOE)	
LOQ	Limit of Quantitation (DoD/DOE)	
MDA	Minimum Detectable Activity (Radiochemistry)	
MDC	Minimum Detectable Concentration (Radiochemistry)	
MDL	Method Detection Limit	
ML	Minimum Level (Dioxin)	
NC	Not Calculated	
ND	Not Detected at the reporting limit (or MDL or EDL if shown)	
PQL	Practical Quantitation Limit	
QC	Quality Control	
RER	Relative Error Ratio (Radiochemistry)	
RL	Reporting Limit or Requested Limit (Radiochemistry)	
RPD	Relative Percent Difference, a measure of the relative difference between two points	
TEF	Toxicity Equivalent Factor (Dioxin)	

TEQ Toxicity Equivalent Quotient (Dioxin)

Job ID: 240-107780-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-107780-1

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 2/7/2019 8:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.0° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples MW-111S_020419 (240-107780-1) and TRIP BLANK (240-107780-2) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 02/07/2019.

4-Bromofluorobenzene (Surr) failed the surrogate recovery criteria high for TRIP BLANK (240-107780-2), LCS 240-367159/4, 240-107782-E-1 MS and 240-107782-D-1 MSD. Refer to the QC report for details.

Vinyl chloride failed the recovery criteria high for LCS 240-367159/4. Refer to the QC report for details.

Surrogate recovery for the following samples were outside the upper control limit: TRIP BLANK (240-107780-2) and (LCS 240-367159/4). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

The laboratory control sample (LCS) for analytical batch 240-367159 recovered outside control limits for the following analyte: Vinyl chloride. This analyte was biased high in the LCS and was not detected in the associated samples; therefore, the data has been reported: MW-111S_020419 (240-107780-1), TRIP BLANK (240-107780-2) and (LCS 240-367159/4).

1 2 3 4 5 6 7 8 9 10 11

Job ID: 240-107780-1 (Continued)

Laboratory: TestAmerica Canton (Continued)

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

VOLATILE ORGANIC COMPOUNDS (GCMS SIM)

Sample MW-111S_020419 (240-107780-1) was analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The samples were analyzed on 02/07/2019.

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

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

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: 240-107780-1

Lab Sample ID	Client Sample ID	Matrix	Collected Received
240-107780-1	MW-111S 020419	Water	<u>02/04/19 14:15</u> 02/07/19 08:50
240-107780-2	_ TRIP BLANK	Water	02/04/19 00:00 02/07/19 08:50

TestAmerica Canton

Detection Summary

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

Lab Sample ID: 240-107780-1

Lab Sample ID: 240-107780-2

Client Sample ID: MW-111S_020419

No Detections.

Client Sample ID: TRIP BLANK

No Detections.

TestAmerica Job ID: 240-107780-1

Client Sample ID: MW-111S_020419 Date Collected: 02/04/19 14:15

Date Received: 02/07/19 08:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			02/07/19 17:51	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	83		63 - 125					02/07/19 17:51	1
Method: 8260B - Volatile O	rganic Compo	unds (GC/	MS)						
Analyte	-	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/07/19 17:49	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			02/07/19 17:49	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			02/07/19 17:49	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/07/19 17:49	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			02/07/19 17:49	1
Vinyl chloride	1.0	U *	1.0	0.20	ug/L			02/07/19 17:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	102		70 - 121					02/07/19 17:49	1
4-Bromofluorobenzene (Surr)	116		59 - 120					02/07/19 17:49	1
Toluene-d8 (Surr)	88		70 - 123					02/07/19 17:49	1
Dibromofluoromethane (Surr)	99		75 - 128					02/07/19 17:49	1

Client Sample Results

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

Client Sample ID: TRIP BLANK

Date Collected: 02/04/19 00:00 Date Received: 02/07/19 08:50

Lab Sample ID: 240-107780-2 Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/07/19 16:57	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			02/07/19 16:57	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			02/07/19 16:57	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/07/19 16:57	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			02/07/19 16:57	1
Vinyl chloride	1.0	U *	1.0	0.20	ug/L			02/07/19 16:57	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		70 - 121					02/07/19 16:57	1
4-Bromofluorobenzene (Surr)	122	X	59 - 120					02/07/19 16:57	1
Toluene-d8 (Surr)	99		70 - 123					02/07/19 16:57	1
Dibromofluoromethane (Surr)	101		75 - 128					02/07/19 16:57	

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

			Pe	ercent Surro	ogate Recovery (A	cceptance Limits)
		DCA	BFB	TOL	DBFM	
Lab Sample ID	Client Sample ID	(70-121)	(59-120)	(70-123)	(75-128)	
240-107780-1	MW-111S_020419	102	116	88	99	
240-107780-2	TRIP BLANK	106	122 X	99	101	
240-107782-D-1 MSD	Matrix Spike Duplicate	110	134 X	101	101	
240-107782-E-1 MS	Matrix Spike	111	129 X	103	101	
LCS 240-367159/4	Lab Control Sample	99	123 X	98	93	
MB 240-367159/6	Method Blank	103	115	96	97	
Surrogate Legend						
DCA = 1,2-Dichloroet	nane-d4 (Surr)					
BFB = 4-Bromofluorol	penzene (Surr)					
TOL = Toluene-d8 (Se	urr)					
DBFM = Dibromofluor	omethane (Surr)					

Matrix: Water			Prep Type: Total/NA	
Γ			Percent Surrogate Recovery (Acceptance Limits)	
		DCA		
Lab Sample ID	Client Sample ID	(63-125)		
240-107762-C-1 MS	Matrix Spike	87		
240-107762-C-1 MSD	Matrix Spike Duplicate	87		
240-107780-1	MW-111S_020419	83		
LCS 240-367162/4	Lab Control Sample	83		
MB 240-367162/5	Method Blank	85		
Surrogate Legend				

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

TestAmerica Canton

RL

1.0

1.0

1.0

1.0

1.0

1.0

Limits

70 - 121

59 - 120

70 - 123

75 - 128

MDL Unit

0.19 ug/L

0.16 ug/L

0.15 ug/L

0.19 ug/L

0.10 ug/L

0.20 ug/L

D

Prepared

Prepared

Lab Sample ID: MB 240-367159/6

Matrix: Water

1,1-Dichloroethene

Tetrachloroethene

Trichloroethene

Vinyl chloride

Surrogate

Toluene-d8 (Surr)

cis-1,2-Dichloroethene

trans-1,2-Dichloroethene

1,2-Dichloroethane-d4 (Surr)

4-Bromofluorobenzene (Surr)

Dibromofluoromethane (Surr)

Analyte

Analysis Batch: 367159

Analyzed

02/07/19 16:32

02/07/19 16:32

02/07/19 16:32

02/07/19 16:32

02/07/19 16:32

02/07/19 16:32

Analyzed

02/07/19 16:32

02/07/19 16:32

02/07/19 16:32

02/07/19 16:32

Prep Type: Total/NA

Client Sample ID: Lab Control Sample

Client Sample ID: Matrix Spike Duplicate

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

Dil Fac

1

1

1

1

1

1

1

1

1

1

Dil Fac

10

Lab Sample ID: LCS 240-367159/4 **Matrix: Water** Analysis Batch: 367159

	Spike	LCS LCS			%Rec.	
Analyte	Added	Result Qualifie	er Unit	D %Rec	Limits	
1,1-Dichloroethene	10.0	12.5	ug/L	125	65 - 139	
cis-1,2-Dichloroethene	10.0	12.1	ug/L	121	76 - 128	
Tetrachloroethene	10.0	8.14	ug/L	81	74 - 130	
trans-1,2-Dichloroethene	10.0	13.0	ug/L	130	78 - 133	
Trichloroethene	10.0	8.93	ug/L	89	76 - 125	
Vinyl chloride	10.0	15.0 *	ug/L	150	58 - 143	

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

134 X

101

Lab Sample ID: 240-107782-D-1 MSD **Matrix: Water** Analysis Batch: 367159

4-Bromofluorobenzene (Surr)

Toluene-d8 (Surr)

Analysis Datch. 307 135											
	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
1,1-Dichloroethene	1.0	U	10.0	13.0		ug/L		130	53 - 140	11	35
cis-1,2-Dichloroethene	1.0	U	10.0	12.5		ug/L		125	64 - 130	3	21
Tetrachloroethene	1.0	U	10.0	7.72		ug/L		77	51 - 136	0	23
trans-1,2-Dichloroethene	1.0	U	10.0	12.2		ug/L		122	68 - 133	3	24
Trichloroethene	1.0	U	10.0	8.62		ug/L		86	55 - 131	0	23
Vinyl chloride	1.0	U * F1	10.0	17.5	F1	ug/L		175	43 - 154	10	29
	MSD	MSD									
Surrogate	%Recovery	Qualifier	Limits								
1,2-Dichloroethane-d4 (Surr)	110		70 - 121								

TestAmerica	Canton
1000 11101100	ouncon

Prep Type: Total/NA

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

MB MB

1.0 U

1.0 U

1.0 U

1.0 U

1.0 U

1.0 U

MB MB

%Recovery Qualifier

103

115

96

97

Result Qualifier

59 - 120

70 - 123

Lab Sample ID: 240-107782-D-1 MSD

Lab Sample ID: 240-107782-E-1 MS

Matrix: Water

Matrix: Water

Surrogate

Analysis Batch: 367159

Dibromofluoromethane (Surr)

Analysis Batch: 367159

Prep Type: Total/NA

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA %Rec.

Client Sample ID: Matrix Spike

10

	oumpio	opino						/0110001
Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits
1.0	U	10.0	11.6		ug/L		116	53 - 140
1.0	U	10.0	12.1		ug/L		121	64 - 130
1.0	U	10.0	7.72		ug/L		77	51 - 136
1.0	U	10.0	12.6		ug/L		126	68 - 133
1.0	U	10.0	8.60		ug/L		86	55 - 131
1.0	U * F1	10.0	15.8	F1	ug/L		158	43 - 154
MS	MS							
%Recovery	Qualifier	Limits						
111		70 - 121						
129	X	59 - 120						
103		70 - 123						
101		75 - 128						
	1.0 1.0 1.0 1.0 1.0 1.0 MS %Recovery 111 129 103	129 X 103	1.0 U 10.0 1.0 U*F1 10.0 MS MS %Recovery Qualifier Limits 111 70-121 70-121 129 X 59-120 103 70-123 103	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				

Limits

75 - 128

Spike

MS MS

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

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

MSD MSD

Sample Sample

%Recovery Qualifier

101

Lab Sample ID: MB 240-3 Matrix: Water	0/102/5							lien		ple ID: Method Prep Type: To	
Analysis Batch: 367162											
	M										
Analyte	Resu	It Qualifier	RL	M	IDL Unit		D	Pre	pared	Analyzed	Dil Fac
1,4-Dioxane	2.	0 U	2.0	0	.86 ug/L					02/07/19 12:34	1
	M	B MB									
Surrogate	%Recover	y Qualifier	Limits					Pre	pared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)		5	63 - 125							02/07/19 12:34	1
Lab Sample ID: LCS 240-3	367162/4					CI	ont S	am		: Lab Control S	ample
•	507 102/4						ent S	am	pie in		
Matrix: Water										Prep Type: To)tai/NA
Analysis Batch: 367162											
Analysis Batch: 367162			Spike	LCS	LCS					%Rec.	
Analysis Batch: 367162 Analyte			Spike Added	-	LCS Qualifier	Unit	I	D 9	%Rec	%Rec. Limits	
			•	-		Unit ug/L	[D 9	% Rec		
		 .s	Added	Result			<u> </u>	<u>D</u>		Limits	
Analyte	LCS LC %Recovery Q		Added	Result			I	D 9		Limits	

1,2-Dichloroethane-d4 (Surr) 83 63 - 125

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

Lab Sample ID: 240-1077 Matrix: Water	62-C-1 MS						CI	ient Sa	mple ID: I Prep Typ			4
Analysis Batch: 367162	Sample	Sample	Spike	MS	MS				%Rec.			5
Analyte	•	Qualifier	Added	-	Qualifier	Unit	D	%Rec	Limits			
1,4-Dioxane	2.0	U -	10.0	12.0		ug/L		120	52 - 129			
	MS	MS										
Surrogate	%Recovery	Qualifier	Limits									
			63 - 125									Q
1,2-Dichloroethane-d4 (Surr) Lab Sample ID: 240-1077	87 62-C-1 MSD		03 - 125			Client	Samp	le ID: N	latrix Spil	ke Dup	licate	
Lab Sample ID: 240-1077 Matrix: Water			63 - 725			Client	Samp	le ID: N	latrix Spil Prep Typ			9
Lab Sample ID: 240-1077	62-C-1 MSD	Sample	Spike	MSD	MSD	Client	Samp	le ID: N				9 10
Lab Sample ID: 240-1077 Matrix: Water	62-C-1 MSD Sample	Sample Qualifier		-	MSD Qualifier	Client S	Samp D	le ID: N %Rec	Prep Typ		al/NA	9 1(
Lab Sample ID: 240-1077 Matrix: Water Analysis Batch: 367162	62-C-1 MSD Sample	Qualifier	Spike	-	-				Prep Typ %Rec.	pe: Tot	al/NA RPD	9 1(1
Lab Sample ID: 240-1077 Matrix: Water Analysis Batch: 367162 Analyte	62-C-1 MSD Sample Result 2.0	Qualifier	Spike Added	Result	-	Unit		%Rec	Prep Typ %Rec. Limits	pe: Tot	al/NA RPD Limit	9 1 1 1
Lab Sample ID: 240-1077 Matrix: Water Analysis Batch: 367162 Analyte	62-C-1 MSD Sample Result 2.0	Qualifier U MSD	Spike Added	Result	-	Unit		%Rec	Prep Typ %Rec. Limits	pe: Tot	al/NA RPD Limit	9 10 11

QC Association Summary

Client: ARCADIS U.S., Inc. Project/Site: Ford LTP Livonia MI - E203631 TestAmerica Job ID: 240-107780-1

GC/MS VOA

Analysis Batch: 367159

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-107780-1	MW-111S_020419	Total/NA	Water	8260B	
240-107780-2	TRIP BLANK	Total/NA	Water	8260B	
MB 240-367159/6	Method Blank	Total/NA	Water	8260B	
LCS 240-367159/4	Lab Control Sample	Total/NA	Water	8260B	
240-107782-D-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	
240-107782-E-1 MS	Matrix Spike	Total/NA	Water	8260B	
analysis Datch. 307 i	62				
nalysis Batch: 3671	02				
Lab Sample ID	Client Sample ID	Ргер Туре	Matrix	Method	Prep Batch
Lab Sample ID		Prep Type Total/NA	Matrix Water	Method 8260B SIM	Prep Batch
	Client Sample ID				Prep Batch
Lab Sample ID 240-107780-1	Client Sample ID MW-111S_020419	Total/NA	Water	8260B SIM	Prep Batcl
Lab Sample ID 240-107780-1 MB 240-367162/5	Client Sample ID MW-111S_020419 Method Blank	Total/NA Total/NA	Water Water	8260B SIM 8260B SIM	Prep Batcl

Client Sample ID: MW-111S 020419

Lab Sample ID: 240-107780-2

Lab Sample ID: 240-107780-1 Matrix: Water

Matrix: Water

Date Collecte Date Receive									Matrix: Water
Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab	
Total/NA	Analysis	8260B		1	367159	02/07/19 17:49	LRW	TAL CAN	
Total/NA	Analysis	8260B SIM		1	367162	02/07/19 17:51	SAM	TAL CAN	

Lab Chronicle

Client Sample ID: TRIP BLANK Date Collected: 02/04/19 00:00 Date Received: 02/07/19 08:50

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	367159	02/07/19 16:57	LRW	TAL CAN

Laboratory References:

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

Client: ARCADIS U.S., Inc. Project/Site: Ford LTP Livonia MI - E203631 TestAmerica Job ID: 240-107780-1

Laboratory: TestAmerica Canton

		ot all accreditations/certific	ations 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	02-23-19 *	
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.

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2/8/2019

	Sample Receipt Form/Nar	rative		Login # :	67780
Canton Facility					
Client Arcadis	Si	te Name	L at	- 20	Ref unpacked by:
Cooler Received on	17/19 0	pened on 27	19		
FedEx: 1st Grd Exp	UPS FAS Clipper Cli		estAmerica Co	urier Other	1
Receipt After-hours: D			Storage Loca		
TestAmerica Cooler #		Client Cooler	the second s	er	
	sed: Bubble Wrap Foam			er	
COOLANT:		y Ice Water	None		And the second sec
1. Cooler temperature			See Multiple Co	oler Form	
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the second s	the outside of the cooler(s) s		Qualities	Yes No. N	JA
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and the first of the second second second second second	lip attached to the cooler(s)?	onnised		Tes No	121
	accompany the sample(s)?			(Yes) No	
	apers relinquished & signed in	the appropriate r	lace?	Yes No	Tests that are not
	n(s) who collected the sample				checked for pH by Receiving:
	e in good condition (Unbroker		d on die coc.	(Yes)No	Receiving:
	els be reconciled with the CO			Yes No	VOAs
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11. Are these work shar		analyses:		Yes No	
	-16 have been checked at the	originating labora	tory	restree	
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13. Were VOAs on the		on receipt.		(Yes) No	
		🖕 Larger tha	n this.	Yes No?N	JA
	nk present in the cooler(s)? T			Nes No	
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Contacted PM	Date	by	via Ve	rbal Voice Ma	1 Other
Concerning					
17. CHAIN OF CUST	ODY & SAMPLE DISCRE	PANCIES		Sa	imples processed by:
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		and the second second			and the second
18. SAMPLE CONDI					
	wei			d holding time	had expired.
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Sample(s)		were received	l with bubble >	6 mm in diame	ter. (Notify PM)
19. SAMPLE PRESE	RVATION				
Sample(s)			W	vere further pre	served in the laboratory.
Time preserved:	Preservative(s) added	/Lot number(s):			

Q



February 08, 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: 107780-1 Sample date: 2019-02-04 Report received by CADENA: 2019-02-08 Initial Data Verification completed by CADENA: 2019-02-08

The following minor QC exceptions or missing information were noted:

GCMS VOC sample -002(trip blank), the LCS, and non-client MS/MSD SURROGATE recoveries were outliers biased high for at least 1 surrogate and the associated LCS was high for VINYL CHLORIDE. 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 recovery outliers or RPD outliers were not determined using a client sample so qualification was not required based on these sample-specific QC outliers.

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 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 <u>http://clms.cadenaco.com/index.cfm</u>.

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

#### **CADENA Valid Qualifiers**

Valid Qualifiers	Description
<	Less than the reported concentration.
>	Greater than the reported concentration.
В	The analyte / compound was detected in the associated blank. For Organic methods the sample concentration was greater than the RDL and less than 5x (or 10x for common lab contaminates) the blank concentration and is considered non-detect at the reported concentration. For Inorganic methods the sample concentration was greater than the RDL and less than 10x the blank concentration and is considered non-detect at the reported concentration.
Е	The analyte / Compound reported exceeds the calibration range and is considered estimated.
EMPC	Estimated Minimum Potential Contamination - Dioxin/Furan analyses only.
J	Indicates an estimated value. This flag is used either when estimating a concentration for a tentatively identified compound or when the data indicates the presence of an analyte / compound but the result is less than the sample Quantitation limit, but greater than zero. The flag is also used in data validation to indicate a reported value should be considered estimated due to associated quality assurance deficiencies.
J-	The result is an estimated quantity, but the result may be biased low.
JB	NON-DETECT AT THE CONCENTRATION REPORTED AND ESTIMATED
JH	The sample result is considered estimated and is potentially biased high.
JL	The sample result is considered estimated and is potentially biased low.
JUB	NON-DETECT AT THE REPORTING LIMIT AND ESTIMATED
NJ	Tentatively identified compound with approximated concentration.
R	Indicates the value is considered to be unusable. (Note: The analyte / compound may or may not be present.)
TNTC	Too Numerous to Count - Asbestos and Microbiological Results.
U	Indicates that the analyte / compound was analyzed for, but not detected.
UB	The analyte / compound was detected in the associated blank. For Organic methods the sample concentration was less than the RDL and less than $5x$ (or $10x$ for common lab contaminates) the blank concentration and is considered non-detect at the RDL. For Inorganic methods the sample concentration was less than the RDL and less than $10x$ the blank concentration and is considered non-detect at the RDL.
UJ	The analyte / compound was not detected above the reported sample Quantitation limit. However, the Quantitation limit is considered to be approximate due to associated quality assurance results and may or may not represent the actual limit of Quantitation to accurately and precisely report the analyte in the sample.

#### SAMPLING AND ANALYSIS SUMMARY

#### CADENA Project ID: E203631 Laboratory: TestAmerica-North Canton Laboratory Submittal: 107780-1

		Collection Date	Collection Time	Volatile Organics	8260B with Single	
Lab Sample ID	Sample ID	(mm/yy/dd)	(hh:mm:ss)	by GCMS	Ion Monitoring	Comment
2401077801	MW-1115_020419	2/4/2019	2:15:00	х	х	
2401077802	TRIP BLANK	2/4/2019	12:00:00	х		

## Analytical Results Summary

**Reportable Results Only** 

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton Laboratory Submittal: 107780-1

		Sample Name: Lab Sample ID: Sample Date:	MW-112 2401077 2/4/201	7801	19		TRIP BLA 2401077 2/4/201	7802		
				Report		Valid		Report		Valid
	Analyte	Cas No.	Result	Limit	Units	Qualifier	Result	Limit	Units	Qualifier
GC/MS VOC										
<u>OSW-826</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-826</u>	<u>OBBSim</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 #240-107780-1 CADENA Verification Report: 2019-02-08

Analyses Performed By: TestAmerica Canton, Ohio

Report #31923R Review Level: Tier II/Plus Project: MI001454.0003.00002

#### 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) # 240-107780-1 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:

				Sample	Parent	Analysis		
SDG	Sample ID	Lab ID	Matrix	Collection Date	Sample	voc	VOC (SIM)	MISC
0.40.407700.4	MW-111S_020419	240-107780-1	Water	2/4/2019		Х	х	
240-107780-1	TRIP BLANK	240-107780-2	Water	2/4/2019		Х		

Notes:

VOC = volatile organic compound SIM = selective ion monitoring MISC = miscellaneous

#### ANALYTICAL DATA PACKAGE DOCUMENTATION

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

			orted	Performance Acceptable		Not
Items Reviewed		No	Yes	No	Yes	Required
1. Sample receipt condi	lion		Х		Х	
2. Requested analyses	and sample results		Х		Х	
3. Master tracking list			Х		Х	
4. Methods of analysis			Х		Х	
5. Reporting limits			Х		Х	
6. Sample collection dat	е		Х		Х	
7. Laboratory sample re	ceived date		Х		Х	
8. Sample preservation	verification (as applicable)		Х		Х	
9. Sample preparation/e	xtraction/analysis dates		Х		Х	
10. Fully executed Chain	of-Custody (COC) form		Х		Х	
11. Narrative summary of problems provided	Quality Assurance or sample		х		Х	
12. Data Package Compl	eteness and Compliance		Х		Х	

#### **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 VALIDATION CHECKLIST FOR VOCs

VOCs: 8260B/8260B-SIM	Re	ported		rmance eptable	Not
	No	Yes	No	Yes	Required
GAS CHROMATOGRAPHY/MASS SPECTROMETR	RY (GC/N	IS)			
Tier II+ Validation					
Compound identification and quantitation					
A. Reconstructed ion chromatograms	Х				Х
B. Quantitation Reports	Х				Х
C. RT of sample compounds within the established RT windows	Х				Х

Notes:

RT retention time

#### VERIFICATION/VALIDATION PERFORMED BY: Andrew Korycinski

SIGNATURE:

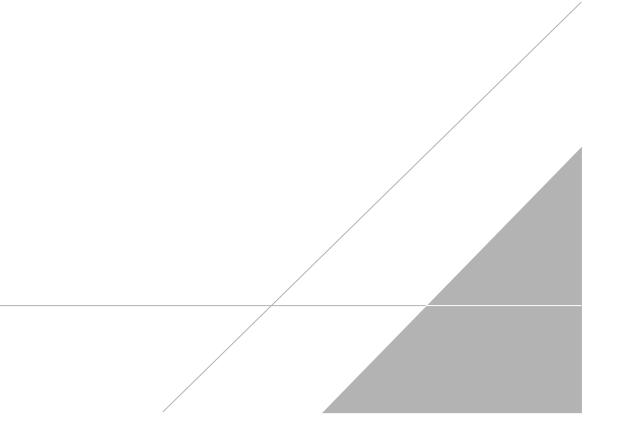
a Kajt

DATE: March 1, 2019

PEER REVIEW: Dennis Capria

DATE: March 4, 2019

# CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS



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2/8/2019

Lab Sample ID: 240-107780-1

#### Client Sample ID: MW-111S_020419 Date Collected: 02/04/19 14:15

#### Date Received: 02/07/19 08:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			02/07/19 17:51	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	83		63 - 125					02/07/19 17:51	1
Method: 8260B - Volatile O	rganic Compo	unds (GC/	MS)						
Analyte	· · ·	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/07/19 17:49	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			02/07/19 17:49	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			02/07/19 17:49	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/07/19 17:49	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			02/07/19 17:49	1
Vinyl chloride	1.0	U ‡	1.0	0.20	ug/L			02/07/19 17:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	102		70 - 121					02/07/19 17:49	1
4-Bromofluorobenzene (Surr)	116		59 - 120					02/07/19 17:49	1
Toluene-d8 (Surr)	88		70 - 123					02/07/19 17:49	1
Dibromofluoromethane (Surr)	99		75 - 128					02/07/19 17:49	1

#### **Client Sample Results**

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

#### **Client Sample ID: TRIP BLANK**

Date Collected: 02/04/19 00:00 Date Received: 02/07/19 08:50

TestAmerica Job ID: 240-107780-1

#### Lab Sample ID: 240-107780-2 Matrix: Water

ter 4 Fac 5

8

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/07/19 16:57	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			02/07/19 16:57	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			02/07/19 16:57	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			02/07/19 16:57	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			02/07/19 16:57	1
Vinyl chloride	1.0	U <del> </del>	1.0	0.20	ug/L			02/07/19 16:57	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		70 - 121			-		02/07/19 16:57	1
4-Bromofluorobenzene (Surr)	122	X	59 - 120					02/07/19 16:57	1
Toluene-d8 (Surr)	99		70 - 123					02/07/19 16:57	1
Dibromofluoromethane (Surr)	101		75 - 128					02/07/19 16:57	

TestAmerica Canton