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Environment Testing TestAmerica

ANALYTICAL REPORT

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

Laboratory Job ID: 240-116849-1

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: 8/12/2019 4:21:31 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.



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Definitions/Glossary

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

3

5

Qualifiers

GC/MS VOA	
Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

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: 240-116849-1

Laboratory: Eurofins TestAmerica, Canton

Narrative

CASE NARRATIVE

Case Narrative

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-116849-1

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

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

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

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

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

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

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

RECEIPT

The samples were received on 8/2/2019 8:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.9° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples SUMP1-12131BOSTONPOST-080119 (240-116849-1) and TRIP BLANK (240-116849-2) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 08/09/2019.

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

VOLATILE ORGANIC COMPOUNDS (GCMS SIM)

Sample SUMP1-12131BOSTONPOST-080119 (240-116849-1) was analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The sample was analyzed on 08/06/2019.

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

Eurofins TestAmerica, Canton

Sample Summary

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

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-116849-1	SUMP1-12131BOSTONPOST-080119	Water	08/01/19 09:38	08/02/19 08:30	
240-116849-2	TRIP BLANK	Water	08/01/19 00:00	08/02/19 08:30	

Detection Summary

Client: ARCADIS U.S., Inc. Project/Site: Ford LTP Livonia MI - E203631 Job ID: 240-116849-1

Lab Sample ID: 240-116849-2

Client Sample ID: SUMP1-12131BOSTONPOST-080119 Lab Sample ID: 240-116849-1

No Detections.

Client Sample ID: TRIP BLANK

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample Results

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

Client Sample ID: SUMP1-12131BOSTONPOST-080119 Date Collected: 08/01/19 09:38 Date Received: 08/02/19 08:30

Method: 8260B SIM - Volat	ile Organic Co	mpounds	(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			08/06/19 16:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	103		63 - 125			-		08/06/19 16:54	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			08/09/19 16:13	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/09/19 16:13	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/09/19 16:13	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/09/19 16:13	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/09/19 16:13	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/09/19 16:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		70 - 121			-		08/09/19 16:13	1
4-Bromofluorobenzene (Surr)	88		59 - 120					08/09/19 16:13	1
Toluene-d8 (Surr)	95		70 - 123					08/09/19 16:13	1
Dibromofluoromethane (Surr)	106		75 - 128					08/09/19 16:13	1

8/12/2019

Job ID: 240-116849-1

Matrix: Water

Lab Sample ID: 240-116849-1

Client Sample Results

1.0

1.0

1.0

Limits

70 - 121

59 - 120

70 - 123

75 - 128

1.0 U

1.0 U

1.0 U

%Recovery Qualifier

111

85

96

119

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

Client Sample ID: TRIP BLANK Date Collected: 08/01/19 00:00 Date Received: 08/

Trichloroethene

Toluene-d8 (Surr)

Vinyl chloride

Surrogate

trans-1,2-Dichloroethene

1,2-Dichloroethane-d4 (Surr)

4-Bromofluorobenzene (Surr)

Dibromofluoromethane (Surr)

Date Received: 08/02/19 08:30										
Method: 8260B - Volatile Org	janic Compo	unds (GC/MS	S)							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
1,1-Dichloroethene	1.0	<u> </u>	1.0	0.19	ug/L			08/09/19 16:37	1	
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/09/19 16:37	1	
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/09/19 16:37	1	

0.19 ug/L

0.10 ug/L

0.20 ug/L

Lab Sample ID: 240-116849-2

08/09/19 16:37

08/09/19 16:37

08/09/19 16:37

Analyzed

08/09/19 16:37

08/09/19 16:37

08/09/19 16:37

08/09/19 16:37

Prepared

Matrix: Water

1

1

1

1

1

1

1

Dil Fac

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Matrix: Water

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

Prep Type: Total/NA

-			Pe	ercent Surr	ogate Recovery (Ac	ceptance Limits)
		DCA	BFB	TOL	DBFM	
Lab Sample ID	Client Sample ID	(70-121)	(59-120)	(70-123)	(75-128)	
240-116800-N-2 MS	Matrix Spike	87	106	107	99	
240-116800-N-2 MSD	Matrix Spike Duplicate	87	105	107	102	
240-116849-1	SUMP1-12131BOSTONPOST-0 80119	99	88	95	106	
240-116849-2	TRIP BLANK	111	85	96	119	
_CS 240-395242/4	Lab Control Sample	88	106	106	98	
VB 240-395242/7	Method Blank	106	81	99	116	
Surrogate Legend						
DCA = 1,2-Dichloroeth						
BFB = 4-Bromofluorob						
TOL = Toluene-d8 (Su	,					
DBFM = Dibromofluor	omethane (Surr)					
ethod: 8260B S	IM - Volatile Organic Co	mpoun	ds (GC/	MS)		
atrix: Water	•	· .		,		Prep Type: Total/NA
			Pe	ercent Surr	ogate Recovery (Ac	ceptance Limits)
		DCA				
_ab Sample ID	Client Sample ID	(63-125)				
240-116849-1	SUMP1-12131BOSTONPOST-0	103				
240-116849-1 MS	SUMP1-12131BOSTONPOST-0 80119	109				
240-116849-1 MSD	SUMP1-12131BOSTONPOST-0 80119	111				

110

110

Surrogate Legend

LCS 240-394601/4

MB 240-394601/5

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

Lab Control Sample

Method Blank

5

10

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

Lab Sample ID: MB 240-395242/7

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

Matrix: Water Analysis Batch: 395242

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/09/19 13:50	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/09/19 13:50	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/09/19 13:50	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/09/19 13:50	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/09/19 13:50	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/09/19 13:50	1
	MR	MR							

	MB	MB				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		70 - 121		08/09/19 13:50	1
4-Bromofluorobenzene (Surr)	81		59 - 120		08/09/19 13:50	1
Toluene-d8 (Surr)	99		70 - 123		08/09/19 13:50	1
Dibromofluoromethane (Surr)	116		75 - 128		08/09/19 13:50	1

Lab Sample ID: LCS 240-395242/4 Matrix: Water Analysis Batch: 395242

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
1,1-Dichloroethene	10.0	10.2		ug/L		102	65 - 139	
cis-1,2-Dichloroethene	10.0	10.5		ug/L		105	76 - 128	
Tetrachloroethene	10.0	10.2		ug/L		102	74 - 130	
trans-1,2-Dichloroethene	10.0	11.0		ug/L		110	78 - 133	
Trichloroethene	10.0	10.1		ug/L		101	76 - 125	
Vinyl chloride	10.0	8.39		ug/L		84	58 - 143	

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	88		70 - 121
4-Bromofluorobenzene (Surr)	106		59 - 120
Toluene-d8 (Surr)	106		70 - 123
Dibromofluoromethane (Surr)	98		75 - 128

107

Lab Sample ID: 240-116800-N-2 MS **Matrix: Water** Analysis Batch: 395242

Toluene-d8 (Surr)

Analysis Datch. 333242										
	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
1,1-Dichloroethene	200	U	2000	2090		ug/L		105	53 - 140	
cis-1,2-Dichloroethene	1600		2000	3430		ug/L		91	64 - 130	
Tetrachloroethene	200	U	2000	2040		ug/L		102	51 ₋ 136	
trans-1,2-Dichloroethene	39	J	2000	2240		ug/L		110	68 - 133	
Trichloroethene	97	J	2000	2110		ug/L		100	55 ₋ 131	
Vinyl chloride	890		2000	2580		ug/L		84	43 - 154	
	MS	MS								
Surrogate	%Recovery	Qualifier	Limits							
1,2-Dichloroethane-d4 (Surr)	87		70 - 121							
4-Bromofluorobenzene (Surr)	106		59 - 120							

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

Client Sample ID: Matrix Spike

Prep Type: Total/NA

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70 - 123

QC Sample Results

Lab Sample ID: 240-116800-N-2 MS

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

Matrix: Water										Prep Тур		
Analysis Batch: 395242												
	МС	MS										
Surrogate	WS %Recovery		or	Limits								
Dibromofluoromethane (Surr)		Quum		75 - 128								
Lab Sample ID: 240-1168 Matrix: Water	00-N-2 MSD						Client	Samp	le ID: N	latrix Spik Prep Typ		
Analysis Batch: 395242	<u> </u>			• •						a/ -		
Amelia	Sample			Spike Added	-	MSD	11		0/ D = =	%Rec.		RPD
Analyte 1,1-Dichloroethene			er	2000	2170	Qualifier	Unit	D	%Rec	Limits	RPD 4	Limi 35
cis-1,2-Dichloroethene	200 1600	0		2000	3630		ug/L		109 101	53 - 140 64 - 130	4	30 21
Tetrachloroethene	200			2000	1920		ug/L ug/L		96	51 - 130	6	23
trans-1,2-Dichloroethene	200			2000	2240				110	68 - 133	0	24
Trichloroethene	39 97			2000	2240		ug/L		103	55 - 135	2	23
Vinyl chloride	97 890	J		2000	2150		ug/L ug/L		89	43 - 154	4	29
Virgi chloride	890			2000	2070		ug/L		09	45 - 154	4	28
	MSD	MSD										
Surrogate	%Recovery	Qualifi	er	Limits								
1,2-Dichloroethane-d4 (Surr)	87			70 - 121								
4-Bromofluorobenzene (Surr)	105			59 - 120								
Toluene-d8 (Surr)	107			70 - 123								
	102			75_128								
Dibromofluoromethane (Surr) Method: 8260B SIM - Lab Sample ID: MB 240-3 Matrix: Water	/olatile Or	ganic			(GC/M	S)		Clie	ent San	nple ID: Mo Prep Typ		
Method: 8260B SIM - \ Lab Sample ID: MB 240-3	/olatile Org		Com		(GC/M	S)		Clie	ent San	-		
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601	/olatile Org 94601/5	ganic MB Mi	Com	pounds		S) MDL Unit				Ргер Тур	oe: To	tal/NA
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water	/olatile Org 94601/5	MB M	Com	pounds	RL I	MDL Unit			ent San	-	ced ced	tal/NA Dil Fac
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte	/olatile Org 94601/5	MB Mi esult Qu 2.0 U	B ualifier	pounds	RL I					Prep Typ Analyz	ced ced	
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB M	B ualifier B	pounds	RL I	MDL Unit		D P	repared	Prep Typ 	2ed 11:56	tal/NA Dil Fac
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane Surrogate	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu	B ualifier B	pounds	RL	MDL Unit		D P		Analyz Analyz 08/06/19 Analyz	2ed 11:56	Dil Fac Dil Fac
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB M	B ualifier B	pounds	RL	MDL Unit		D P	repared	Prep Typ 	2ed 11:56	tal/NA Dil Fac
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane Surrogate	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu	B ualifier B	pounds	RL	MDL Unit	Clie	D P	repared Prepared	Prep Typ Analyz 08/06/19 <u>Analyz</u> 08/06/19 9: Lab Con	eed 11:56 11:56	Dil Fac 1 Dil Fac 1 ample
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane Surrogate 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: LCS 240- Matrix: Water	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu	B ualifier B	pounds	RL	MDL Unit	Clie	D P	repared Prepared	Prep Typ Analyz 08/06/19 Analyz 08/06/19	eed 11:56 11:56	Dil Fac 1 Dil Fac 1 ample
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane Surrogate 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: LCS 240-	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu	B ualifier B	pounds	RL	MDL Unit	Clie	D P	repared Prepared	Prep Typ Analyz 08/06/19 <u>Analyz</u> 08/06/19 9: Lab Con	eed 11:56 11:56	Dil Fac 1 Dil Fac 1 ample
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane Surrogate 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: LCS 240- Matrix: Water	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu	B ualifier B	pounds	RL	MDL Unit 0.86 ug/L	Clie	D P	repared Prepared	Prep Typ Analyz 08/06/19 Analyz 08/06/19 D: Lab Con Prep Typ	eed 11:56 11:56	Dil Fac 1 Dil Fac 1 ample
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane Surrogate 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: LCS 240- Matrix: Water Analysis Batch: 394601	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu	B ualifier B	pounds	RL	MDL Unit 0.86 ug/L		D P P	repared Prepared	Prep Typ — Analyz 08/06/19 — Analyz 08/06/19 0: Lab Con Prep Typ %Rec.	eed 11:56 11:56	Dil Fac 1 Dil Fac 1 ample
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane Surrogate 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: LCS 240- Matrix: Water Analysis Batch: 394601 Analyte	/olatile Org 94601/5 	MB MI esult Qu 2.0 U MB Mi very Qu 110	B ualifier B	pounds	LCS Result	MDL Unit 0.86 ug/L	Unit	D P P	repared repared mple ID %Rec	Prep Typ Analyz 08/06/19 Analyz 08/06/19 Characteristics Contemporation Prep Typ %Rec. Limits	eed 11:56 11:56	Dil Fac 1 Dil Fac 1 ample
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i> 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: LCS 240- Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu 110	B ualifier B ualifier	pounds F 2 Limits 63 - 12 Spike Added 10.0	LCS Result	MDL Unit 0.86 ug/L	Unit	D P P	repared repared mple ID %Rec	Prep Typ Analyz 08/06/19 Analyz 08/06/19 Characteristics Contemporation Prep Typ %Rec. Limits	eed 11:56 11:56	Dil Fac 1 Dil Fac 1 ample
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i> 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: LCS 240- Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i>	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu 110	B ualifier B ualifier	pounds	LCS Result	MDL Unit 0.86 ug/L	Unit	D P P	repared repared mple ID %Rec	Prep Typ Analyz 08/06/19 Analyz 08/06/19 Characteristics Contemporation Prep Typ %Rec. Limits	eed 11:56 11:56	Dil Fac 1 Dil Fac 1 ample
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i> 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: LCS 240- Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu 110	B ualifier B ualifier	pounds F 2 Limits 63 - 12 Spike Added 10.0	LCS Result	MDL Unit 0.86 ug/L	Unit	D P P	repared repared mple ID %Rec	Prep Typ Analyz 08/06/19 Analyz 08/06/19 Characteristics Contemporation Prep Typ %Rec. Limits	eed 11:56 11:56	Dil Fac 1 Dil Fac 1 ample
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i> 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: LCS 240- Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i> 1,2-Dichloroethane-d4 (Surr)	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu 110	B ualifier B ualifier	pounds	LCS Result 10.6	MDL Unit 0.86 ug/L LCS Qualifier	Unit ug/L	D P P ent Sar	repared Prepared mple ID <u>%Rec</u> 106	Prep Typ Analyz 08/06/19 <i>Analyz</i> 08/06/19 : Lab Con Prep Typ %Rec. Limits 59 - 131	2ed 11:56 2ed 11:56 11:56 11:56 11:56 11:56	tal/NA Dil Fac 1 Dil Fac 1 ample tal/NA
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i> 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: LCS 240- Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i> 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: 240-1168	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu 110	B ualifier B ualifier	pounds F 2 Limits 63 - 12 Spike Added 10.0 Limits	LCS Result 10.6	MDL Unit 0.86 ug/L LCS Qualifier	Unit ug/L	D P P ent Sar	repared Prepared mple ID <u>%Rec</u> 106	Prep Typ Analyz 08/06/19 Analyz 08/06/19 2: Lab Con Prep Typ %Rec. Limits 59 - 131 BOSTONP(red 11:56 red 11:56 otrol S oe: To OST-0	tal/NA Dil Fac
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i> 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: LCS 240- Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i> 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: 240-1168 Matrix: Water	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu 110	B ualifier B ualifier	pounds F 2 Limits 63 - 12 Spike Added 10.0 Limits	LCS Result 10.6	MDL Unit 0.86 ug/L LCS Qualifier	Unit ug/L	D P P ent Sar	repared Prepared mple ID <u>%Rec</u> 106	Prep Typ Analyz 08/06/19 <i>Analyz</i> 08/06/19 : Lab Con Prep Typ %Rec. Limits 59 - 131	red 11:56 red 11:56 otrol S oe: To OST-0	tal/NA Dil Fac
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i> 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: LCS 240- Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i> 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: 240-1168	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu 110	E Com	pounds F 2 Limits 63 - 12 Spike Added 10.0 Limits	LCS Result 10.6	MDL Unit 0.86 ug/L LCS Qualifier	Unit ug/L	D P P ent Sar	repared Prepared mple ID <u>%Rec</u> 106	Prep Typ Analyz 08/06/19 Analyz 08/06/19 2: Lab Con Prep Typ %Rec. Limits 59 - 131 BOSTONP(red 11:56 red 11:56 otrol S oe: To OST-0	tal/NA Dil Fac 1 Dil Fac 1 ample tal/NA 80119
Method: 8260B SIM - \ Lab Sample ID: MB 240-3 Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i> 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: LCS 240- Matrix: Water Analysis Batch: 394601 Analyte 1,4-Dioxane <i>Surrogate</i> 1,2-Dichloroethane-d4 (Surr) Lab Sample ID: 240-1168 Matrix: Water	/olatile Org 94601/5 	MB Mi esult Qu 2.0 U MB Mi very Qu 110	E Com B ualifier B ualifier	pounds E 2 Limits 63 - 12 Added 10.0 Limits 63 - 125	LCS Result 10.6	MDL Unit 0.86 ug/L LCS Qualifier	Unit ug/L	D P P ent Sar	repared Prepared mple ID <u>%Rec</u> 106	Analyz 08/06/19 Analyz 08/06/19 2 08/06/19 2: Lab Comprep Type %Rec. Limits 59 - 131 BOSTONP Prep Type	red 11:56 red 11:56 otrol S oe: To OST-0	tal/NA Dil Fac 1 Dil Fac 1 ample tal/NA 80119

Eurofins TestAmerica, Canton

Job ID: 240-116849-1

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10

Client Sample ID: Matrix Spike

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

	MS	MS									
Surrogate	%Recovery	Qualifier	Limits								
1,2-Dichloroethane-d4 (Surr)	109		63 - 125								
Lab Sample ID: 240-11684 Matrix: Water	19-1 MSD			Clie	nt Samp	e ID: Sl	JMP1-	12131E	SOSTONP Prep Ty		
Analysis Batch: 394601											
-	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
1,4-Dioxane	2.0	U	10.0	12.5		ug/L		125	52 - 129	8	13
	MSD	MSD									
Surrogate	%Recovery	Qualifier	Limits								
1,2-Dichloroethane-d4 (Surr)	111		63 - 125								

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10

QC Association Summary

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

GC/MS VOA

Analysis Batch: 394601

240-116849-1 SUMP1-12131BOSTONPOST- MB 240-394601/5 Method Blank	080119 Total/NA Total/NA	Water Water	8260B SIM	
	Total/NA	W/ater		
		valor	8260B SIM	
LCS 240-394601/4 Lab Control Sample	Total/NA	Water	8260B SIM	
240-116849-1 MS SUMP1-12131BOSTONPOST-	080119 Total/NA	Water	8260B SIM	
240-116849-1 MSD SUMP1-12131BOSTONPOST-	080119 Total/NA	Water	8260B SIM	

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-116849-1	SUMP1-12131BOSTONPOST-080119	Total/NA	Water	8260B	
240-116849-2	TRIP BLANK	Total/NA	Water	8260B	
MB 240-395242/7	Method Blank	Total/NA	Water	8260B	
LCS 240-395242/4	Lab Control Sample	Total/NA	Water	8260B	
240-116800-N-2 MS	Matrix Spike	Total/NA	Water	8260B	
240-116800-N-2 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Job ID: 240-116849-1

Job ID: 240-116849-1

Matrix: Water

Matrix: Water

Lab Sample ID: 240-116849-1

Lab Sample ID: 240-116849-2

Client Sample ID: SUMP1-12131BOSTONPOST-080119 Date Collected: 08/01/19 09:38 Date Received: 08/02/19 08:30

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	395242	08/09/19 16:13	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	394601	08/06/19 16:54	SAM	TAL CAN

Client Sample ID: TRIP BLANK Date Collected: 08/01/19 00:00 Date Received: 08/02/19 08:30

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	395242	08/09/19 16:37	LRW	TAL CAN

Laboratory References:

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

Accreditation/Certification Summary

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

Job ID: 240-116849-1

Laboratory: Eurofins TestAmerica, Canton

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

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State		2927	02-23-20
California	State Program	9	2927	02-23-20
Connecticut	State		PH-0590	12-31-19
Connecticut	State Program	1	PH-0590	12-31-19
Florida	NELAP	4	E87225	06-30-20
Florida	NELAP		E87225	06-30-20
Georgia	State Program	4	N/A	02-23-20
Illinois	NELAP	5	200004	07-31-20
Iowa	State Program	7	421	06-01-21
Kansas	NELAP	7	E-10336	04-30-20
Kansas	NELAP		E-10336	04-30-20
Kentucky (UST)	State Program	4	58	02-23-20
Kentucky (WW)	State		KY98016	12-31-19
Kentucky (WW)	State Program	4	98016	12-31-19
Minnesota	NELAP	5	039-999-348	12-31-19 *
Minnesota	NELAP		OH00048	12-31-19
Minnesota (Petrofund)	State Program	1	3506	07-31-21
New Jersey	NELAP	2	OH001	06-30-20
New Jersey	NELAP		OH001	06-30-20
New York	NELAP	2	10975	03-31-20
New York	NELAP		10975	03-31-20
Ohio VAP	State		CL0024	06-05-21
Ohio VAP	State Program	5	CL0024	06-05-21
Oregon	NELAP	10	4062	02-23-20
Oregon	NELAP		4062	02-23-20
Pennsylvania	NELAP	3	68-00340	08-31-19 *
Pennsylvania	NELAP		68-00340	08-31-19
Texas	NELAP	6	T104704517-19-11	08-31-20
Texas	NELAP		T104704517-18-10	08-31-19
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-19 *
Virginia	NELAP		010101	09-14-19
Washington	State		C971	01-12-20
Washington	State Program	10	C971	01-12-20 *
West Virginia DEP	State		210	12-31-19
West Virginia DEP	State Program	3	210	12-31-19

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

Eurofins TestAmerica, Canton





Client Contact	Regula	tory program:		-	DW	٧	7	NPD	ES		11	RCR	A	11	Othe	r												
Company Name: Arcadis							_	_						_						_		_			_	and the second se	erica Lat	oratorie
ddress: 28550 Cabot Drive, Suite 500	Client Project	Manager: Kris	Hinske	7			Site	Cont	act: A	Ango	ela De	Gra	ndis				Lab C	ontac	t: Mil	e Del	Monic	:0				COC No	:	
	Telephone: 24	3-994-2240					Tel	ephon	e: 734	4-32	0-006	5		-		-	Telepi	ione:	330-4	97-93	96	-						_
ity/State/Zip: Novi, MI, 48377	Family bristoff	er.hinskey@arc	adir co				1000	Anal	ysis T	urn	arour	d Tr	me			1				A	nalys	es	-			For lab u	of)	COC
hone: 248-994-2240	Email, Kriston	er annskey og ar e	aus.co				-		5 3-10		145415		Who H			1		1			1	-			T	1992 2217	- alter at	19876
roject Name: Ford LTP	-						TAT	T if diff	ferent fr		3 wee	ks														Walk-in o	lient	
										5	2 wee	ks		13	50											Lab samp	ling	
roject Number: MI001454.0003	Method of Ship	oment/Carrier:						5 Day	4		1 wee 2 day			2	ų			8				WI	-			982 <u>-</u>		
O # MI001454.0003	Shipping/Trac	king No:			-		1				1 day			e (V/1	Grab		808	8260			82608	260B S	TANERS			Job/SDG	No:	
		1	5.1.07	M	atrix		100	Con	tainer	5 &	Preses	vativ	res	dua	102	1260	E 81	DCE		8	ride	ne 8	AN			1000	33211	
Sample Identification	Sample Date	Sample Time	Air	Aqueous Sodiment	Solid	Other:	H2S04	EONH	HCI	NaOH	ZaAcl	Unpres	Other:	Filtered Sample (V / N)	Composite-C/Grab-G	1,1-DCE 8260B	cis-1,2-DCE 8280B	Trans-1,2-DCE 8260B	PCE 8260B	TCE 8260B	Vinyl Chloride 82608	1,4-Dioxane 8260B SIM	C.WT			Sa S	mple Spec pecial Ins	ific Notes
CupI-RIJIRSTUPEST-080119 RIPJELANIC	8/1/4	0938			T	T	T	T	X	-	T			X	6	X	X	x	X	X	X	X	6					
DUPT RISTICS COLOS	01111	10	1	+	+	+	+	+-	1	-		-		1	-	1	~	~	1		-	1	1		-	-		
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Possible Hazard Identification		1		-	-	1	+						may be												_			
Non-Hazard ['lammable] sin Irrita ipecial Instructions/QC Requirements & Comments:	int Pois	on B	JInkn	חיייס	-		1	П	Retu	rn to	o Clier	nt	1	Dispo	osal B	y Lab	-	1.	Archiv	e For			Months					
ubmit all results through Cadena at jim.tomalia@cadena evel IV Reporting.	a.com. Cadena #	E203631																										
elinguished by:	Company:		I	Date/Ti	ime:		-		-	Rec	eived	by:		-		-			-	Con	pany:					Date/Ti	ne:	
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tinduiside by	EA		le le	ater In	/-	15	12	5-	7	Rec	renved	2	aborat	ory b	y:	2/	_			Con	ipany	R	-			Z	2/10	8
Relinquished by:	Company	-	E	Date/Ti	ime: /-	15.	13	57	7	Rec	ceived	The	aborat	ory b	ay:	21				-	apany	2	-			Date/Ti	me:	

8/12/2019

ent Arcelys Site Name Cooler_papacked by: opened on State Opened on State Opened on State Cooler excipt After-hours: Drop-off Date/Time Storage Location estAmerica Cooler if Foam Box Client Cooler Packing material used: Eubble Wrap Foam Plastic Bigs None Cooler tempercustody seals in the cooler(s) See Multiple Cooler TempC Corrected Cooler TempC Cooler tempercustody seals on the outside of the cooler(s)? Yes No NA -Were tamper/custody seals on the bottle(s) or bottle kits (LLEg/MeHg)? Yes No -Were tamper/custody seals intact and uncompromised? Yes No Shippers' packed papers religneshed: Yes No Did custody papers accompany the sample(s)? Yes No Were the seals on the collect(s)? Yes No Did all bottle soles be reconciled with the COC? Yes No Were toractody papers accompany the sample(s)? Yes No Were toractody papers accompany the sample(s) Yes No Were toractody papers accompany the sample(s) Yes No Variation quantity received to perform indicated analyses? Yes No Sufficient quantity received to perform indicated analyses? <th>ent </th> <th>anton Facility</th> <th>Login # :_</th> <th>116849</th>	ent	anton Facility	Login # :_	116849
And the second secon	and	A second s		
db::1 ^o GrQDExp LPS FAS Clipper Client Cooler Box Other est/America Cooler #	dBx: 1 ⁴ Grd DExp APS FAS Clipper Client Cooler Storge Location stAmerica Cooler # Foam Box Client Cooler Box Other Packing material used: Buble Wight Foam Box Client Cooler Box Other COOLANT: Wetles Buble Cooler Day Lee Max None Other Cooler temperature upon receipt	ient Hradis I Site Name	Cooler un	packed by:
db::1 ^o GrQDExp LPS FAS Clipper Client Cooler Box Other est/America Cooler #	dBx: 1 ⁴ Grd DExp APS FAS Clipper Client Cooler Storge Location stAmerica Cooler # Foam Box Client Cooler Box Other Packing material used: Buble Wight Foam Box Client Cooler Box Other COOLANT: Wetles Buble Cooler Day Lee Max None Other Cooler temperature upon receipt	poler Received on 8/2/19 Opened on 8/2/19	A	/
stAmerica Cooler #	stAmerica Cooler # Foam Box Client Cooler Box Other Packing material used: Bubble Wrap Foam Plastic Bap None Other COOLANT: Well B Blue Leo Dry Lee Water None Cooler temperature upon receipt / / & Corrected Cooler Temp, *C IR GUN #36 (CF +0.6°C) Observed Cooler Temp, / & Corrected Cooler Temp, *C Were tamper/custody seals on the outside of the cooler(s) signed & dated? Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/McHg)? Yes No NA -Were the seals on the outside of the cooler(s)? Did custody papers accompany the sample(s)? Were tamper/custody seals intact and uncompromised? Shippers' packing slip Attached to the cooler(s)? Did custody papers accompany the sample(s)? Were the extra the person(s) who collected the samples clearly identified on the COC? Were correct bottle(s) used for the test(s) indicated? Sufficient quantity received to perform indicated analyses? Are these work share samples? If yes, Questions 12-16 have been checked at the originating laboratory. Were altherevered sample(s) at the correct pH upon receipt? Were VOAs on the COC? Were any perform in any VOA vials? Were altherevered sample(s) at the correct pH upon receipt? Were VOAs on the COC? Were a transform in any VOA vials? Were altherevered sample(s) at the correct pH upon receipt? Were VOAs on the COC? Were a transform in any VOA vials? Were altherevered sample(s) at the correct pH upon receipt? Were XOAs on the COC? Were altherevered sample(s) at the correct pH upon receipt? Were VOAs on the COC? Samples processed by: CL Samples Processed by: CL	edEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier	Other	
Packing material used: Bubble Windows Form Plastic Bigs None Other	Packing material used: Bubble Window Plastic Bag None Other			
COOLANT: Weiles Blue Ice Dry Ice Water None Cooler temperature upon receipt IR GUNN IR-8 (CF +0.6°C) Observed Cooler Temp. // 8°C Corrected Cooler Temp. // 9°C IR GUNN IR-8 (CF +0.6°C) Observed Cooler Temp. // 8°C Corrected Cooler Temp. // 9°C IR GUNN IR-8 (CF +0.6°C) Observed Cooler Temp. // 8°C Corrected Cooler Temp. // 9°C IR GUNN IR-8 (CF +0.6°C) Observed Cooler Temp. // 8°C Corrected Cooler Temp. // 9°C IR GUNN IR-8 (CF +0.6°C) Observed Cooler Temp. // 8°C Corrected Cooler Temp. // 9°C IR GUNN IR-8 (CF +0.6°C) Observed Cooler Temp. // 8°C Corrected Cooler Temp. // 9°C IR GUNN IR-8 (CF +0.1°C) Observed Cooler Temp. // 8°C Corrected Cooler Temp. // 9°C IR GUNN IR-8 (CF +0.1°C) Observed Cooler Temp. // 8°C Corrected Cooler Temp. // 9°C Were tamper/custody seals on the bottice of the cooler(5)? If Yes Quantity // 9°S No Were tamper/custody seals intext and uncompromised? Subjects arrive ingo condition (Unbroken)? Could all bottle labels be reconciled with the COC? Were tomset sort is good condition (Unbroken)? Could all bottle labels be reconciled with the COC? User No Sufficient quantity received to perform indicated analyses? Are these work share samples? Were Voice Mail Or the test(s) indicated? Were Voice Mail Preserved in any VOA vials? Were all preserved sample(s) at the correct pH upon receipt? Were all preserved sample(s) at the cooler(s)? Trip Blank Lot #// 9°C No Na A vas a LL Bg or Me Hg trip blank present? Were received after the recommended holding time had expired. Were further preserved in a broken container. Were received after the recommended holding time had expired. Meple(s)	COOLANT: Weiles Blue loc Dry loc Water None Cooler temperature upon receipt Is & Water See Multiple Cooler Form If & C IR GUN#36 (CF +0.6°C) Observed Cooler Temp. If & C Corrected Cooler Temp. "C Were tamper/custody seals on the outside of the cooler(s) signed & dated? Test No NA -Were tamper/custody seals intat and uncompromised? Yes No Yes No Were tamper/custody appers accompany the sample(s)? Were the person(s) who collected the samples clearly identified on the COC? Yes No Did all bottle labels be reconciled with the COC? Yes No Yes No Were the events start sample of condition (Unbroken)? Yes No Yes No Sufficient quantify received to perform indicated analyses? Yes No Yes No Are these work share sample(s) at the correct pH upon receipt? No No Na Were air bubles >6 min any VOA vials? Larger than this. No Na PH Strip Lot# HCOS473 Were air bubles >6 min in any VOA vials? Larger than this. Yes No Yes No Mere air bubles >6 min in any VOA vials? Larger than this. Yes No Yes No Mere air bubl			
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IR GUN# (R-8 (CF +0.1 *C) Observed Cooler Temp*C Corrected Cooler Temp*C Were tamper/custody seals on the outside of the cooler(s)? If Yes QuantityY Yes No Were tamper/custody seals on the outside of the cooler(s)? If Yes QuantityY Yes No Were tamper/custody seals intact and uncompromised? Yes No Were tamper/custody seals intact and uncompromised? Yes No Were tamper/custody seals intact and uncompromised? Yes No Shippers' packing slip datached to the cooler(s)? Yes No Were tamper/custody seals intact and uncompromised? Yes No Was'were the person(s) who collected the samples clearly identified on the COC? Yes No Was'were the custody papers acompany the sample(s)? Yes No Could all bottles arrive ing good condition (Unbroken)? Yes No Could all bottle labels be reconciled with the COC? Yes No Were corse tobtle(s) used for the test(s) indicated? Yes No Sufficient quantity received to perform indicated analyses? Yes No Are these work share sample(s) at the corter(s)? Trip Blank Lot # Yes No Were VoAs on the COC? Yes No	IR GUN# IR-8 (CF +0.1 °C) Observed Cooler TempC Corrected Cooler TempC If GUN# 36 (CF +0.6 °C) Observed Cooler TempC Corrected Cooler TempC TempC Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity Yes No Yes No Were tamper/custody seals indat and uncompromised? Yes No Yes No Yes No Yes No Shippers' packing slip attached to the cooler(s)? If Yes Quantity Yes No Yes No Yes No Were tamper/custody seals indat and uncompromised? Yes No Yes No Yes No Yes No Were tamper/custody papers accompany the sample(s)? Were the person(s) who collected the samples clearly identified on the COC? Yes No Yes No Outlad lbottle labels be reconciled with the COC? Yes No Yes No Yes No Sufficient quantity received to perform indicated analyses? Are these work share samples? Yes No Yes No If yes, Questions 12-16 have been checked at the originating laboratory. Yes No Yes No Yes No Yes No Were all publies ~6 mm in any VOA vials? Larger than this. Yes No Yes No Yes No Was a LL Hg or Me Hg trip blank present? yes No Yes No			
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OA Sample Preservation - Date/Time VOAs Frozen:	ne preserved: Preservative(s) added/Lot number(s):	ample(s) were received after the recommended he ample(s) were received ample(s) were received with bubble >6 mi O. SAMPLE PRESERVATION	ved in a broken o m in diameter. (1	container. Notify PM)
	DA Sample Preservation - Date/Time VOAs Frozen:	ample(s) were received after the recommended he ample(s) were received ample(s) were received with bubble >6 mi O. SAMPLE PRESERVATION	ved in a broken o m in diameter. (1	container. Notify PM)

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DATA VERIFICATION REPORT



August 12, 2019

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

CADENA project ID: E203631 Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater Project number: MI001454.0002/3/4.00002/2B/3B Event Specific Scope of Work References: Sample COC Laboratory: TestAmerica - North Canton Laboratory submittal: 116849-1 Sample date: 2019-08-01 Report received by CADENA: 2019-08-12 Initial Data Verification completed by CADENA: 2019-08-12 Number of Samples:2 Sample Matrices:Water Test Categories:GCMS VOC Please see attached criteria report or sample result/qualified analytical result summary for qualifier flags assigned to sample data.

There were no significant QC anomalies or exceptions to report.

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

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

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

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.
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.
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 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: 116849-1

		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
2401168491	SUMP1-12131BOSTONPOST-080119	8/1/2019	9:38:00	х	х	
2401168492	TRIP BLANK	8/1/2019	12:00:00	х		

Analytical Results Summary

Reportable Results Only

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton Laboratory Submittal: 116849-1

		Sample Name:	SUMP1-1	2131BOS	TONPOS	T-080119	TRIP BLANK			
		Lab Sample ID:	24011684	491			2401168	8492		
		Sample Date:	8/1/2019)			8/1/201	9		
				Report		Valid		Report		Valid
	Analyte	Cas No.	Result	Limit	Units	Qualifier	Result	Limit	Units	Qualifier
GC/MS VOC										
<u>OSW-826</u>	<u>0B</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 #240-116849-1 CADENA Verification Report: 2019-08-12

Analyses Performed By: TestAmerica Canton, Ohio

Report #33932R Review Level: Tier III Project: MI001454.0004.00002 (30016346)

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 240-116849-1 for samples collected in association with the Ford – Livonia, Michigan site. The review was conducted as a Tier III validation in addition to a verification/Tier II validation review performed by CADENA Inc. and included review of level IV laboratory data package completeness. Only elements of a Tier III validation effort (Tier III includes a detailed review of laboratory raw data to check for errors in calculation, calibration review, internal standard review and compound identification) and omitted deviations from the CADENA verification/Tier II report are documented in this report. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	VOC (Full	Analysis VOC (SIM)	MISC
240-116849-1	SUMP1- 12131BOSTONPOST- 080119	240-116849-1	Water	8/1/2019		Scan) X	х	
	TRIP BLANK	240-116849-2	Water	8/1/2019		Х		

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

		Rep	orted		mance ptable	Not
	Items Reviewed	No	Yes	No	Yes	Required
1. S	Sample receipt condition		Х		Х	
2. R	Requested analyses and sample results		Х		Х	
3. N	Aaster tracking list		Х		Х	
4. N	Nethods of analysis		Х		Х	
5. R	Reporting limits		Х		Х	
6. S	Sample collection date		Х		Х	
7. L	aboratory sample received date		Х		Х	
8. S	Sample preservation verification (as applicable)		Х		Х	
9. S	Sample preparation/extraction/analysis dates		Х		Х	
10. F	Fully executed Chain-of-Custody (COC) form		Х		Х	
	Iarrative summary of Quality Assurance or sample roblems provided		х		Х	
12. D	Data Package Completeness 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.

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VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

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

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

All samples were analyzed within the specified holding time criteria.

2. Mass Spectrometer Tuning

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

System performance and column resolution were acceptable.

3. Calibration

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

3.1 Initial Calibration

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

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

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

3.2 Continuing Calibration

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

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

4. Internal Standard Performance

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

All internal standard responses were within control limits.

5. Compound Identification

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

DATA REVIEW

All detected compounds met the specified criteria.

6. System Performance and Overall Assessment

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

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: 8260B/8260B-SIM	Re	ported	Performance Acceptable		Not
	No	Yes	No	Yes	Requirec
GAS CHROMATOGRAPHY/MASS SPECTROMET	RY (GC/I	MS)			
Tier II Validation					
Holding times/Preservation		Х		Х	
Tier III Validation	I	1			1
System performance and column resolution		X		X	
Initial calibration %RSDs		X		Х	
Continuing calibration RRFs		X		Х	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		Х	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		Х	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		Х		Х	

Notes:

%RSD Relative standard deviation

- %R Percent recovery
- RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Andrew Korycinski

SIGNATURE:

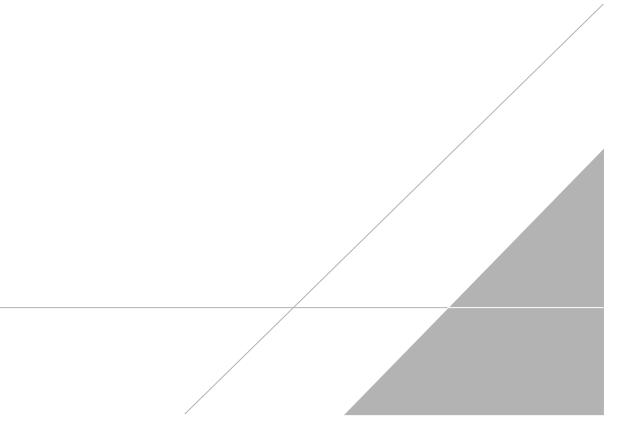
a Kays

DATE: August 28, 2019

PEER REVIEW: Joseph C. Houser

DATE: August 28, 2019

CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS



Oddie Outer Frager Kein Hunder Kein Hunder Kein Hunder Ander Kein Hunder	Client Contact	t Contact Regulatory program:	M0 1	T NPDES T RCRA	Other				
E 200	supany Name: Arcadis								TestAmerica Laboratories, Inc
Tetephone: Tetepho	ddesser 28550 Cabat Drive Suite 500	Client Project Manager: Kris	Hinskey	Site Contact: Angela DeGrandis		Lab Contact:	Mike DelMor	ICO	COC No:
Zentil: Evicientific Zentil: Evicientific Austry 1. Trenterent Time Austry 2. Trenterent Time Austry 3. Trenterent Time Austry		Telephone: 248-994-2240		Telephone: 734-320-0065		Telephone: 33	0-497-9396		
Constraine Constr	ity/State/Zip: Novi, MI. 48377	Email: kristoffer.hinskev@ar	adis.com	Analysis Lurnaround Time	and the		Anal	/ses	
Mithadia	aone: 248-994-2240			and the second states of the second se					
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Skippingr S	oject Number: MI001454.0003	Method of Shipment/Carrier:			Carl Street	8		WIS	 Sundanes or
Matrix Canadiana de Precevativas Samile Dice Matrix Samile Dice Samile Time Samile Dice Samile Ci Samile Dice Samile Dice Samile Dice Samile Dice	0 # M1001454.0003	Shipping/Fracking No:		-1 1 day	Grab		80928	S 809	 Job/SDG No:
Sample Date Sample Tate K			Matrix	Containers & Preservatives	10-1	DCE	80	ta eu	
8/1/YP1 0938 X	Sample Identification	Sample Date Sample Time	Solid Sediment Aqueous	Nubrea N ^a OH S ^{ayq} N ^a OH HCI HNO3	Composit	S, t-ensiT	TCE 8260	exoiO-≯,†	 Sample Specific Notes / Special Instractions:
	Jup 1-12131365 EutrofT-0801	8/1/8	X	X	0	XX	×	X	
The second se	RIG IXANIL	}	×		×	XX	×	X	
Image: Sample Dispessed if Samples are retained longer than 1						-			
Image: Sample Dispessed if Samples are retained longer than 1									
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Sample Disposal (A fee may be assessed if samples are retained longer than 1 mo									
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Client Sample Results

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

Client Sample ID: SUMP1-12131BOSTONPOST-080119 Date Collected: 08/01/19 09:38 Date Received: 08/02/19 08:30

Method: 8260B SIM - Volat	ile Organic Co	mpounds	(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			08/06/19 16:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	103		63 - 125			-		08/06/19 16:54	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			08/09/19 16:13	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/09/19 16:13	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/09/19 16:13	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/09/19 16:13	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/09/19 16:13	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/09/19 16:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		70 - 121			-		08/09/19 16:13	1
4-Bromofluorobenzene (Surr)	88		59 - 120					08/09/19 16:13	1
Toluene-d8 (Surr)	95		70 - 123					08/09/19 16:13	1
Dibromofluoromethane (Surr)	106		75 - 128					08/09/19 16:13	1

8/12/2019

Job ID: 240-116849-1

Matrix: Water

Lab Sample ID: 240-116849-1

Client Sample Results

1.0

1.0

1.0

Limits

70 - 121

59 - 120

70 - 123

75 - 128

1.0 U

1.0 U

1.0 U

%Recovery Qualifier

111

85

96

119

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

Client Sample ID: TRIP BLANK Date Collected: 08/01/19 00:00 Date Received: 08/

Trichloroethene

Toluene-d8 (Surr)

Vinyl chloride

Surrogate

trans-1,2-Dichloroethene

1,2-Dichloroethane-d4 (Surr)

4-Bromofluorobenzene (Surr)

Dibromofluoromethane (Surr)

Date Received: 08/02/19 08:30									
Method: 8260B - Volatile Orga	anic Compo	unds (GC/MS	S)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/09/19 16:37	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/09/19 16:37	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/09/19 16:37	1

0.19 ug/L

0.10 ug/L

0.20 ug/L

Lab Sample ID: 240-116849-2

08/09/19 16:37

08/09/19 16:37

08/09/19 16:37

Analyzed

08/09/19 16:37

08/09/19 16:37

08/09/19 16:37

08/09/19 16:37

Prepared

Matrix: Water

1

1

1

1

1

1

1

Dil Fac

8

Eurofins TestAmerica, Canton



Air Toxics

8/12/2019 Mr. Jim Tomalia Arcadis U.S., Inc. 28550 Cabot Dr. Suite 500 Novi MI 48377

Project Name: Ford LTP Project #: MI001454.0003 / 30016344 Workorder #: 1908084

Dear Mr. Jim Tomalia

The following report includes the data for the above referenced project for sample(s) received on 8/5/2019 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Scott

Ausha Scott Project Manager

A Eurofins Lancaster Laboratories Company

180 Blue Ravine Road, Suite B Folsom, CA 95630



Air Toxics

WORK ORDER #: 1908084

Work Order Summary

CLIENT:	Mr. Jim Tomalia Arcadis U.S., Inc. 28550 Cabot Dr. Suite 500 Novi, MI 48377	BILL TO:	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
PHONE:	517-819-0356	P.O. #	MI001454.0004.0001B
FAX:		PROJECT #	MI001454.0003 / 30016344 Ford LTP
DATE RECEIVED:	08/05/2019	CONTACT:	Ausha Scott
DATE COMPLETED:	08/12/2019		

			RECEIPT	FINAL
FRACTION #	NAME	TEST	VAC./PRES.	PRESSURE
01A	SSMP-12131BOSTONPOST-01_080119	TO-15	6.0 "Hg	15 psi
02A	Lab Blank	TO-15	NA	NA
03A	CCV	TO-15	NA	NA
04A	LCS	TO-15	NA	NA
04AA	LCSD	TO-15	NA	NA

CERTIFIED BY:

layes

08/12/19 DATE:

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP – CA009332019-11, VA NELAP - 460197, WA NELAP - C935 Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program) Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019. Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020



Air Toxics

LABORATORY NARRATIVE EPA Method TO-15 Arcadis U.S., Inc. Workorder# 1908084

One 1 Liter Summa Canister (100% Certified) sample was received on August 05, 2019. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per client project requirements, the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified may be false positives.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

- M Reported value may be biased due to apparent matrix interferences.
- CN See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

🔅 eurofins

Air Toxics

EPA METHOD TO-15 GC/MS FULL SCAN

Lab ID: 1908084-01 Date/Time Collected: 8/1/19 08:37		Date/Time A Dilution Fact Instrument/F	tor: 2.52	04:11 PM i / a080809	
Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	1.5	4.0	5.0	Not Detected
1,4-Dioxane	123-91-1	2.6	14	18	Not Detected
cis-1,2-Dichloroethene	156-59-2	1.0	4.0	5.0	Not Detected
Tetrachloroethene	127-18-4	1.0	6.8	8.5	Not Detected
trans-1,2-Dichloroethene	156-60-5	1.9	4.0	5.0	Not Detected
Trichloroethene	79-01-6	0.68	5.4	6.8	Not Detected
Vinyl Chloride	75-01-4	0.64	2.6	3.2	Not Detected
D: Analyte not within the DoD scop	be of accreditation.				
Surrogates	CAS#			Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0			70-130	86
4-Bromofluorobenzene	460-00-4			70-130	105
Toluene-d8	2037-26-5			70-130	97

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Air Toxics

EPA METHOD TO-15 GC/MS FULL SCAN

Ford LTP **Client ID:**

Lab ID:

Media:

Lab Blank 1908084-02A

NA - Not Applicable

Date/Time Collected: NA - Not Applicable

Date/Time Analyzed: 8/8/19 11:38 AM **Dilution Factor:** 1.00 Instrument/Filename:

msda.i / a080805a

		MDL	LOD	Rpt. Limit	Amount
Compound	CAS#	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)
1,1-Dichloroethene	75-35-4	0.59	1.6	2.0	Not Detected
1,4-Dioxane	123-91-1	1.0	5.4	7.2	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.40	1.6	2.0	Not Detected
Tetrachloroethene	127-18-4	0.41	2.7	3.4	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.75	1.6	2.0	Not Detected
Trichloroethene	79-01-6	0.27	2.1	2.7	Not Detected
Vinyl Chloride	75-01-4	0.26	1.0	1.3	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	84
4-Bromofluorobenzene	460-00-4	70-130	102
Toluene-d8	2037-26-5	70-130	98

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EPA METHOD TO-15 GC/MS FULL SCAN

Ford LTP

Client ID:	CCV		
Lab ID:	1908084-03A	Date/Time Analyzed:	8/8/19 10:22 AM
Date/Time Collected:	NA - Not Applicable	Dilution Factor:	1.00
Media:	NA - Not Applicable	Instrument/Filename:	msda.i / a080802

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	88
1,4-Dioxane	123-91-1	82
cis-1,2-Dichloroethene	156-59-2	86
Tetrachloroethene	127-18-4	94
trans-1,2-Dichloroethene	156-60-5	83
Trichloroethene	79-01-6	90
Vinyl Chloride	75-01-4	84

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	86
4-Bromofluorobenzene	460-00-4	70-130	103
Toluene-d8	2037-26-5	70-130	100

Air Toxics

Air Toxics

EPA METHOD TO-15 GC/MS FULL SCAN

Ford LTP

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Client ID:	LCS		
Lab ID:	1908084-04A	Date/Time Analyzed:	8/8/19 10:46 AM
Date/Time Collected:	NA - Not Applicable	Dilution Factor:	1.00
Media:	NA - Not Applicable	Instrument/Filename:	msda.i / a080803

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	90
1,4-Dioxane	123-91-1	86
cis-1,2-Dichloroethene	156-59-2	97
Tetrachloroethene	127-18-4	100
trans-1,2-Dichloroethene	156-60-5	71
Trichloroethene	79-01-6	93
Vinyl Chloride	75-01-4	87

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	82
4-Bromofluorobenzene	460-00-4	70-130	105
Toluene-d8	2037-26-5	70-130	100

* % Recovery is calculated using unrounded analytical results.

Air Toxics

EPA METHOD TO-15 GC/MS FULL SCAN

Ford LTP

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Client ID:	LCSD		
Lab ID:	1908084-04AA	Date/Time Analyzed:	8/8/19 11:11 AM
Date/Time Collected:	NA - Not Applicable	Dilution Factor:	1.00
Media:	NA - Not Applicable	Instrument/Filename:	msda.i / a080804

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	93
1,4-Dioxane	123-91-1	88
cis-1,2-Dichloroethene	156-59-2	97
Tetrachloroethene	127-18-4	99
trans-1,2-Dichloroethene	156-60-5	75
Trichloroethene	79-01-6	93
Vinyl Chloride	75-01-4	90

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	84
4-Bromofluorobenzene	460-00-4	70-130	105
Toluene-d8	2037-26-5	70-130	99

* % Recovery is calculated using unrounded analytical results.

August 12, 2019



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

CADENA project ID: E203631 Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater Project number: MI001454.0002/3/4.00002/2B/3B Client project scope reference: Sample COC only was used to define project analytical requirements. Laboratory: Eurofins Air Toxics - Folsom Laboratory submittal: 1908084 Sample date: 2019-08-01 Report received by CADENA: 2019-08-12 Initial Data Verificationcompleted by CADENA: 2019-08-12

1 Air sample was analyzed for TO-15 parameters.

There were no significant QC anomalies or exceptions to report.

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

Analytical results reported between RDL and MDL are flagged 'J' and considered estimated values.

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

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

CADENA Inc, 1099 Highland Drive, Suite E, Ann Arbor, MI 48108 517-819-0356

CADENA Valid Qualifiers

Valid Qualifiers	Description
<	Less than the reported concentration.
>	Greater than the reported concentration.
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.



Ford Motor Company – Livonia Transmission Project

DATA REVIEW

Livonia, Michigan

Volatile Organic Compounds (VOC) TO-15 Analysis

SDG #1908084 CADENA Verification Report: 2019-08-12

Analyses Performed By: Eurofins Air Toxics Folsom, California

Report #33938R Review Level: Tier III Project: MI001454.0004.00002 (30016346)

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 1908084 for samples collected in association with the Ford – Livonia, Michigan site. The review was conducted as a Tier III validation in addition to a verification/Tier II validation review performed by CADENA Inc. and included review of level IV laboratory data package completeness. Only elements of a Tier III validation effort (Tier III includes a detailed review of laboratory raw data to check for errors in calculation, calibration review, internal standard review and compound identification) and omitted deviations from the CADENA verification/Tier II report are documented in this report. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	TO-15 (Full Scan)	Analysis TO-15 (SIM)	
1908084	SSMP- 12131BOSTONPOST- 01_080119	1908084-01A	Air	8/1/2019		х		

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

			orted	Performance Acceptable		Not	
Items I	Reviewed	No	Yes	No	Yes	Required	
1. Sample receipt condition			Х		Х		
2. Requested analyses and s	ample results		Х		Х		
3. Master tracking list			Х		Х		
4. Methods of analysis			Х		Х		
5. Reporting limits			Х		Х		
6. Sample collection date			Х		Х		
7. Laboratory sample receive	d date		Х		Х		
8. Sample preservation verifie	cation (as applicable)		Х		Х		
9. Sample preparation/extrac	tion/analysis dates		Х		Х		
10. Fully executed Chain-of-Cu	ustody (COC) form		Х		Х		
11. Narrative summary of Qua problems provided	lity Assurance or sample		х		х		
12. Data Package Completene	ess and Compliance		Х		Х		

DATA REVIEW

ORGANIC ANALYSIS INTRODUCTION

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

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

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

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

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

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

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

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

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

2. Mass Spectrometer Tuning

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

System performance and column resolution were acceptable.

3. Calibration

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

3.1 Initial Calibration

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

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

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

3.2 Continuing Calibration

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

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

4. Internal Standard Performance

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

All internal standard responses were within control limits.

DATA REVIEW

5. Compound Identification

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

All identified compounds met the specified criteria.

6. Field Duplicate Sample Analysis

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

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

7. System Performance and Overall Assessment

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

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: TO-15 (Full Scan)	Re	eported	Perfo Acc	Not	
	No	Yes	No	Yes	Required
GAS CHROMATOGRAPHY/MASS SPECTROME	FRY (GC/I	MS)			
Tier II Validation					
Canister return pressure (<-2"Hg)		Х		Х	
Tier III Validation		-	!		1
System performance and column resolution		X		X	
Initial calibration %RSDs		Х		Х	
Continuing calibration RRFs		Х		Х	
Continuing calibration %Ds		Х		Х	
Instrument tune and performance check		Х		Х	
Ion abundance criteria for each instrument used		Х		X	
Internal standard		Х		Х	
Field Duplicate Sample RPD					Х
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		X		X	
D. Transcription/calculation errors present		Х		Х	
E. Reporting limits adjusted to reflect sample dilutions		Х		Х	

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Joseph C. Houser

SIGNATURE:

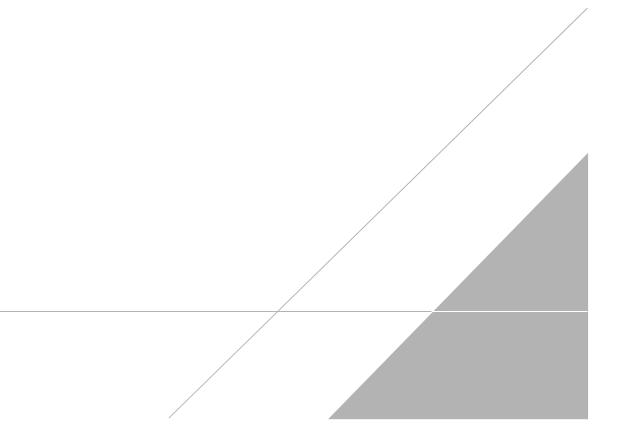
Jough c. House

DATE: August 28, 2019

PEER REVIEW: Andrew Korycinski

DATE: August 29, 2019

CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS



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Air Toxics

EPA METHOD TO-15 GC/MS FULL SCAN

Lab ID: 1908084-01 Date/Time Collected: 8/1/19 08:37		Date/Time A Dilution Fact Instrument/F	tor: 2.52	04:11 PM i / a080809	
Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	1.5	4.0	5.0	Not Detected
1,4-Dioxane	123-91-1	2.6	14	18	Not Detected
cis-1,2-Dichloroethene	156-59-2	1.0	4.0	5.0	Not Detected
Tetrachloroethene	127-18-4	1.0	6.8	8.5	Not Detected
trans-1,2-Dichloroethene	156-60-5	1.9	4.0	5.0	Not Detected
Trichloroethene	79-01-6	0.68	5.4	6.8	Not Detected
Vinyl Chloride	75-01-4	0.64	2.6	3.2	Not Detected
D: Analyte not within the DoD scop	be of accreditation.				
Surrogates	CAS#			Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0			70-130	86
4-Bromofluorobenzene	460-00-4			70-130	105
Toluene-d8	2037-26-5			70-130	97

		Analys	s Rea	lest/	Canis	er Ch	ain of C	lustor	V						
				For Labo	ratory Use On	lv	190808		y						
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	5955; Fax (916) 351-8279										Shroud V				
Client:	Ford	PID:	NA	Special I	nstructions/	lotes: Repo	rt ONLY: 1,1-DO	E, cis-1,2-	Ť	urnarou	nd Time	(Rush su	charges	may a	pply)
Project Name:	Ford LTP		1454.0003 /	DCE, trai	ns-1,2-DCE, 1	,4-Dioxane,	PCE, TCE and	VC. Submit			5 Day	Turnarou	nd Time		
Project Manager:	Kris Hinskey	P.O.#30	016344	1					Cani	ster Vac	:uum/Pre	ssure	Requ	ested /	Analyses
Sampler:	Emma Witherspoon			results th	rougn Cadena	i at jim.toma	lia@cadena.con	n. Cadena			Lab U	se Only	is)	ø	
Site Name:	12131 BOSTON POST			#E20363	1. Level IV Re	porting			6	_		ø	Spec	alyz	
Lab ID S	ample Identification	Can #	1	ontroller	Start Sa Inform		Stop Sa Inform		Initial (in Hg)	Final (in Hg)	apt	(psig) N ₂ / He	TO-15 (See Special Instructions/Notes)	Not Analyze	
					Date	Time	Date	Time	Initia	Fina	Receipt	Final Gas:	TO-1 Instr	Dol	
014 SSMP-12131	BOSTONPOST-01_080119	1L2552	23169		8/1/2019	8:27	8/1/2019	8:37	-29.5	-6	a parta		x	++	
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					Lab Use (Only									
Shipper Name: 🖓		Custody Seals In	tact?	Yes	No	None	60	10						Malandada)	
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of any kind. Relinquis	ning signature also indicates agre	ement to hold harr	nless, defend,	and indem	nnify Eurofins	Air Toxics a	gainst any claim	, demand, or	action. of	any kind	related	to the colle	syuiations action be	s, and 0 ndling	of shipping
	·····			of sample:	s. D.O.T Hotlir	ne (800) 467	-4922	,		.,	,				si omphing



Air Toxics

8/12/2019 Mr. Jim Tomalia Arcadis U.S., Inc. 28550 Cabot Dr. Suite 500 Novi MI 48377

Project Name: Ford LTP Project #: MI001454.0003 / 30016344 Workorder #: 1908088

Dear Mr. Jim Tomalia

The following report includes the data for the above referenced project for sample(s) received on 8/5/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Scott

Ausha Scott Project Manager

A Eurofins Lancaster Laboratories Company

180 Blue Ravine Road, Suite B Folsom, CA 95630



Air Toxics

WORK ORDER #: 1908088

Work Order Summary

CLIENT:	Mr. Jim Tomalia Arcadis U.S., Inc. 28550 Cabot Dr. Suite 500 Novi, MI 48377	BILL TO:	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
PHONE:	517-819-0356	P.O. #	MI001454.0004.0001B
FAX:		PROJECT #	MI001454.0003 / 30016344 Ford LTP
DATE RECEIVED: DATE COMPLETED:	08/05/2019 08/12/2019	CONTACT:	Ausha Scott

			KEUEIP I	FINAL
FRACTION #	NAME	<u>TEST</u>	VAC./PRES.	PRESSURE
01A	AA-12131BOSTONPOST-01_080119	Modified TO-15	5.9 "Hg	4.8 psi
02A	IAF-12131BOSTONPOST-01_080119	Modified TO-15	4.7 "Hg	4.8 psi
03A	IAB-12131BOSTONPOST-04_080119	Modified TO-15	7.1 "Hg	4.6 psi
04A	DUP-12131BOSTONPOST-01_080119	Modified TO-15	2 "Hg	5.2 psi
05A	IAG-12131BOSTONPOST-03_080119	Modified TO-15	6.7 "Hg	5.2 psi
06A	Lab Blank	Modified TO-15	NA	NA
07A	CCV	Modified TO-15	NA	NA
08A	LCS	Modified TO-15	NA	NA
08AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:

Lai

DATE: <u>08/12/19</u>

FINAT

DECEIDT

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935 Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program) Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016. Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE Modified TO-15 Arcadis U.S., Inc. Workorder# 1908088

Five 6 Liter Summa Canister (100% Cert Ambient) samples were received on August 05, 2019. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	TO-15	ATL Modifications
Initial Calibration	<pre><!--=30% RSD with 2 compounds allowed out to < 40% RSD</pre--></pre>	=30% RSD with 4 compounds allowed out to < 40% RSD</td
Blank and standards	Zero Air	UHP Nitrogen provides a higher purity gas matrix than zero air

Receiving Notes

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There were no receiving discrepancies.

Analytical Notes

As per client project requirements, the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified may be false positives.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates

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as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client ID: Lab ID: Date/Time Collected: Media:	AA-12131BOSTONPOST-01_080119 1908088-01A 8/1/19 09:47 AM 6 Liter Summa Canister (100% Cert Ambier	Date/Time A Dilution Fact Instrument/F	tor:	8/7/19 04:11 PM 1.65 msd20.i / 20080711	
Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.59	0.65	Not Detected
1,4-Dioxane	123-91-1	0.48	0.54	0.59	Not Detected
cis-1,2-Dichloroethen	e 156-59-2	0.35	0.59	0.65	Not Detected
Tetrachloroethene	127-18-4	0.70	1.0	1.1	Not Detected
trans-1,2-Dichloroethe	ene 156-60-5	0.37	0.59	0.65	Not Detected
Trichloroethene	79-01-6	0.44	0.80	0.89	Not Detected
Vinyl Chloride	75-01-4	0.14	0.38	0.42	Not Detected
D: Analyte not within	the DoD scope of accreditation.				
Surrogates	CAS#			Limits	%Recovery
1,2-Dichloroethane-de	4 17060-07-0			70-130	103
4-Bromofluorobenzen	460-00-4			70-130	99
Toluene-d8	2037-26-5			70-130	98

Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client ID: Lab ID: Date/Time Collected: Media:	Collected: 8/1/19 08:08 AM Dilution Factor: 1.57		8/7/19 01:57 PM 1.57 msd20.i / 20080709			
Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit) (ug/m3)	Amount (ug/m3)	
1,1-Dichloroethene	75-35-4	0.15	0.56	0.62	Not Detected	
1,4-Dioxane	123-91-1	0.46	0.51	0.56	Not Detected	
cis-1,2-Dichloroethen	e 156-59-2	0.34	0.56	0.62	Not Detected	
Tetrachloroethene	127-18-4	0.66	0.96	1.1	Not Detected	
trans-1,2-Dichloroethe	ene 156-60-5	0.35	0.56	0.62	Not Detected	
Trichloroethene	79-01-6	0.41	0.76	0.84	Not Detected	
Vinyl Chloride	75-01-4	0.13	0.36	0.40	Not Detected	
D: Analyte not within	the DoD scope of accreditation.					
Surrogates	CAS#			Limits	%Recovery	
1,2-Dichloroethane-d4	4 17060-07-0			70-130	101	
4-Bromofluorobenzen	e 460-00-4			70-130	101	
Toluene-d8	2037-26-5			70-130	97	

Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client ID: Lab ID: Date/Time Collected: Media:	IAB-12131BOSTONPOST-04_080119 1908088-03A 8/1/19 09:02 AM 6 Liter Summa Canister (100% Cert Ambie	Date/Time A Dilution Fact Instrument/F	tor:	8/7/19 03:32 PM 1.72 msd20.i / 20080710	
Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit) (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.61	0.68	Not Detected
1,4-Dioxane	123-91-1	0.50	0.56	0.62	Not Detected
cis-1,2-Dichloroethen	e 156-59-2	0.37	0.61	0.68	Not Detected
Tetrachloroethene	127-18-4	0.72	1.0	1.2	Not Detected
trans-1,2-Dichloroethe	ene 156-60-5	0.38	0.61	0.68	Not Detected
Trichloroethene	79-01-6	0.45	0.83	0.92	Not Detected
Vinyl Chloride	75-01-4	0.14	0.40	0.44	Not Detected
D: Analyte not within	the DoD scope of accreditation.				
Surrogates	CAS#			Limits	%Recovery
1,2-Dichloroethane-d4	4 17060-07-0			70-130	112
4-Bromofluorobenzen	e 460-00-4			70-130	99
Toluene-d8	2037-26-5			70-130	99

Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client ID: Lab ID: Date/Time Collected: Media:	DUP-12131BOSTONPOST-01_080119 1908088-04A 8/1/19 12:00 AM 6 Liter Summa Canister (100% Cert Ambier	Date/Time A Dilution Fact Instrument/F	tor:	8/7/19 04:50 PM I.45 nsd20.i / 20080712	
Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.14	0.52	0.57	Not Detected
1,4-Dioxane	123-91-1	0.42	0.47	0.52	Not Detected
cis-1,2-Dichloroethen	e 156-59-2	0.31	0.52	0.57	Not Detected
Tetrachloroethene	127-18-4	0.61	0.88	0.98	Not Detected
trans-1,2-Dichloroethe	ene 156-60-5	0.32	0.52	0.57	Not Detected
Trichloroethene	79-01-6	0.38	0.70	0.78	Not Detected
Vinyl Chloride	75-01-4	0.12	0.33	0.37	Not Detected
D: Analyte not within	the DoD scope of accreditation.				
Surrogates	CAS#			Limits	%Recovery
1,2-Dichloroethane-de	4 17060-07-0			70-130	112
4-Bromofluorobenzen	e 460-00-4			70-130	101
Toluene-d8	2037-26-5			70-130	98

Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client ID: Lab ID: Date/Time Collected: Media:	IAG-12131BOSTONPOST-03_080119 1908088-05A 8/1/19 09:19 AM 6 Liter Summa Canister (100% Cert Ambie	Date/Time A Dilution Fact Instrument/F	tor:	8/7/19 05:41 PM 1.74 msd20.i / 20080713	
Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.17	0.62	0.69	Not Detected
1,4-Dioxane	123-91-1	0.51	0.56	0.63	Not Detected
cis-1,2-Dichloroethen	e 156-59-2	0.37	0.62	0.69	Not Detected
Tetrachloroethene	127-18-4	0.73	1.1	1.2	Not Detected
trans-1,2-Dichloroethe	ene 156-60-5	0.39	0.62	0.69	Not Detected
Trichloroethene	79-01-6	0.46	0.84	0.94	Not Detected
Vinyl Chloride	75-01-4	0.14	0.40	0.44	Not Detected
D: Analyte not within	the DoD scope of accreditation.				
Surrogates	CAS#			Limits	%Recovery
1,2-Dichloroethane-d4	4 17060-07-0			70-130	104
4-Bromofluorobenzen	e 460-00-4			70-130	101
Toluene-d8	2037-26-5			70-130	91

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Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Ford LTP **Client ID:**

Lab ID:

Media:

Lab Blank 1908088-06A

Date/Time Collected: NA - Not Applicable

NA - Not Applicable

Date/Time Analyzed:

Dilution Factor: 1.00 Instrument/Filename:

msd20.i / 20080706a

8/7/19 10:26 AM

		MDL	LOD	Rpt. Limit	Amount
Compound	CAS#	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)
1,1-Dichloroethene	75-35-4	0.095	0.36	0.40	Not Detected
1,4-Dioxane	123-91-1	0.29	0.32	0.36	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.21	0.36	0.40	Not Detected
Tetrachloroethene	127-18-4	0.42	0.61	0.68	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.22	0.36	0.40	Not Detected
Trichloroethene	79-01-6	0.26	0.48	0.54	Not Detected
Vinyl Chloride	75-01-4	0.082	0.23	0.26	Not Detected
D: Analyte not within the DoD scope	e of accreditation.				

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	106
4-Bromofluorobenzene	460-00-4	70-130	96
Toluene-d8	2037-26-5	70-130	101

Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Ford LTP

Client ID:	CCV		
Lab ID:	1908088-07A	Date/Time Analyzed:	8/7/19 06:45 AM
Date/Time Collected:	NA - Not Applicable	Dilution Factor:	1.00
Media:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20080702

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	91
1,4-Dioxane	123-91-1	96
cis-1,2-Dichloroethene	156-59-2	94
Tetrachloroethene	127-18-4	101
trans-1,2-Dichloroethene	156-60-5	93
Trichloroethene	79-01-6	96
Vinyl Chloride	75-01-4	94

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	93
4-Bromofluorobenzene	460-00-4	70-130	96
Toluene-d8	2037-26-5	70-130	98

Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Ford LTP

Client ID:	LCS		
Lab ID:	1908088-08A	Date/Time Analyzed:	8/7/19 07:45 AM
Date/Time Collected:	NA - Not Applicable	Dilution Factor:	1.00
Media:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20080703

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	87
1,4-Dioxane	123-91-1	105
cis-1,2-Dichloroethene	156-59-2	82
Tetrachloroethene	127-18-4	99
trans-1,2-Dichloroethene	156-60-5	97
Trichloroethene	79-01-6	94
Vinyl Chloride	75-01-4	89

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	93
4-Bromofluorobenzene	460-00-4	70-130	97
Toluene-d8	2037-26-5	70-130	100

* % Recovery is calculated using unrounded analytical results.

Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Ford LTP

Client ID:	LCSD		
Lab ID:	1908088-08AA	Date/Time Analyzed:	8/7/19 08:24 AM
Date/Time Collected:	NA - Not Applicable	Dilution Factor:	1.00
Media:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20080704

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	90
1,4-Dioxane	123-91-1	104
cis-1,2-Dichloroethene	156-59-2	84
Tetrachloroethene	127-18-4	99
trans-1,2-Dichloroethene	156-60-5	99
Trichloroethene	79-01-6	93
Vinyl Chloride	75-01-4	94

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	96
4-Bromofluorobenzene	460-00-4	70-130	94
Toluene-d8	2037-26-5	70-130	99

* % Recovery is calculated using unrounded analytical results.

August 12, 2019



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

CADENA project ID: E203631 Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater Project number: MI001454.0002/3/4.00002/2B/3B Client project scope reference: Sample COC only was used to define project analytical requirements. Laboratory: Eurofins Air Toxics - Folsom Laboratory submittal: 1908088 Sample date: 2019-08-01 Report received by CADENA: 2019-08-12 Initial Data Verificationcompleted by CADENA: 2019-08-12

5 Air samples were analyzed for TO-15 parameters.

There were no significant QC anomalies or exceptions to report.

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

Analytical results reported between RDL and MDL are flagged 'J' and considered estimated values.

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

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

CADENA Inc, 1099 Highland Drive, Suite E, Ann Arbor, MI 48108 517-819-0356

CADENA Valid Qualifiers

Valid Qualifiers	Description					
<	Less than the reported concentration.					
>	Greater than the reported concentration.					
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.					



Ford Motor Company – Livonia Transmission Project

DATA REVIEW

Livonia, Michigan

Volatile Organic Compounds (VOC) TO-15 Analysis

SDG #1908088 CADENA Verification Report: 2019-08-12

Analyses Performed By: Eurofins Air Toxics Folsom, California

Report #33939R Review Level: Tier III Project: MI001454.0004.00002 (30016346)

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 1908088 for samples collected in association with the Ford – Livonia, Michigan site. The review was conducted as a Tier III validation in addition to a verification/Tier II validation review performed by CADENA Inc. and included review of level IV laboratory data package completeness. Only elements of a Tier III validation effort (Tier III includes a detailed review of laboratory raw data to check for errors in calculation, calibration review, internal standard review and compound identification) and omitted deviations from the CADENA verification/Tier II report are documented in this report. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG		Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
	Sample ID					TO-15 (Full Scan)	TO-15 (SIM)	MISC
1908088	AA- 12131BOSTONP OST-01_080119	1908088-01A	Air	8/1/2019		х		
	IAF- 12131BOSTONP OST-01_080119	1908088-02A	Air	8/1/2019		х		
	IAB- 12131BOSTONP OST-04_080119	1908088-03A	Air	8/1/2019		х		
	DUP- 12131BOSTONP OST-01_080119	1908088-04A	Air	8/1/2019	IAB- 12131BOSTONP OST-04_080119	х		
	IAG- 12131BOSTONP OST-03_080119	1908088-05A	Air	8/1/2019		x		

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

		Rep	orted		rmance ptable	Not	
	Items Reviewed	No	Yes	No	Yes	Required	
1.	Sample receipt condition		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 date		Х		Х		
7.	Laboratory sample received date		Х		Х		
8.	Sample preservation verification (as applicable)		Х		Х		
9.	Sample preparation/extraction/analysis dates		Х		Х		
10.	Fully executed Chain-of-Custody (COC) form		Х		Х		
11.	Narrative summary of Quality Assurance or sample problems provided		х		х		
12.	Data Package Completeness and Compliance		Х		Х		

ORGANIC ANALYSIS INTRODUCTION

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

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

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

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

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

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VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

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

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

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

2. Mass Spectrometer Tuning

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

System performance and column resolution were acceptable.

3. Calibration

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

3.1 Initial Calibration

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

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

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

3.2 Continuing Calibration

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

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

4. Internal Standard Performance

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

DATA REVIEW

All internal standard responses were within control limits.

5. Compound Identification

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

All identified compounds met the specified criteria.

6. Field Duplicate Sample Analysis

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

Results (in µg/m³) for the field duplicate samples are summarized in the following table.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
IAB-12131BOSTONPOST-04_080119/ DUP-12131BOSTONPOST-01_080119	All compounds	U	U	AC

Notes:

AC Acceptable

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

7. System Performance and Overall Assessment

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

DATA VALIDATION CHECKLIST FOR VOCs

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

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Joseph C. Houser

SIGNATURE:

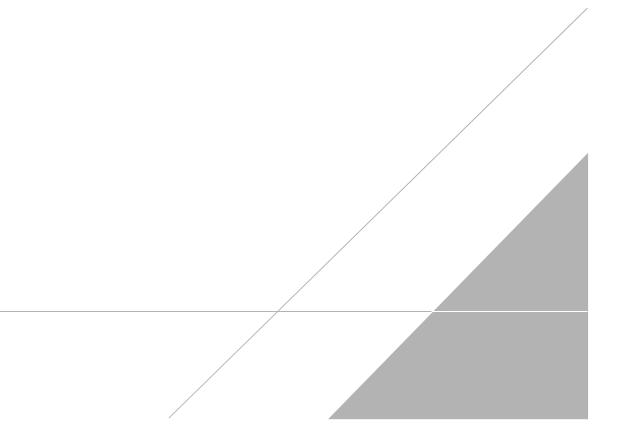
Jough c. House

DATE: August 28, 2019

PEER REVIEW: Andrew Korycinski

DATE: August 29, 2019

CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS



Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client ID: Lab ID: Date/Time Collected: Media:	AA-12131BOSTONPOST-01_080119 1908088-01A 8/1/19 09:47 AM 6 Liter Summa Canister (100% Cert Ambier	Date/Time A Dilution Fact Instrument/F	tor:	8/7/19 04:11 PM 1.65 msd20.i / 20080711			
Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)		
1,1-Dichloroethene	75-35-4	0.16	0.59	0.65	Not Detected		
1,4-Dioxane	123-91-1	0.48	0.54	0.59	Not Detected		
cis-1,2-Dichloroethen	e 156-59-2	0.35	0.59	0.65	Not Detected		
Tetrachloroethene	127-18-4	0.70	1.0	1.1	Not Detected		
trans-1,2-Dichloroethe	ene 156-60-5	0.37	0.59	0.65	Not Detected		
Trichloroethene	79-01-6	0.44	0.80	0.89	Not Detected		
Vinyl Chloride	75-01-4	0.14	0.38	0.42	Not Detected		
D: Analyte not within	the DoD scope of accreditation.						
Surrogates	CAS#			Limits	%Recovery		
1,2-Dichloroethane-de	4 17060-07-0			70-130	103		
4-Bromofluorobenzen	e 460-00-4			70-130	99		
Toluene-d8	2037-26-5			70-130	98		

Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client ID: Lab ID: Date/Time Collected: Media:	IAF-12131BOSTONPOST-01_080119 1908088-02A 8/1/19 08:08 AM 6 Liter Summa Canister (100% Cert Ambie	Date/Time A Dilution Factor Instrument/F	tor:	8/7/19 01:57 PM 1.57 msd20.i / 20080709	
Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit) (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.15	0.56	0.62	Not Detected
1,4-Dioxane	123-91-1	0.46	0.51	0.56	Not Detected
cis-1,2-Dichloroethen	e 156-59-2	0.34	0.56	0.62	Not Detected
Tetrachloroethene	127-18-4	0.66	0.96	1.1	Not Detected
trans-1,2-Dichloroethe	ene 156-60-5	0.35	0.56	0.62	Not Detected
Trichloroethene	79-01-6	0.41	0.76	0.84	Not Detected
Vinyl Chloride	75-01-4	0.13	0.36	0.40	Not Detected
D: Analyte not within	the DoD scope of accreditation.				
Surrogates	CAS#			Limits	%Recovery
1,2-Dichloroethane-d4	4 17060-07-0			70-130	101
4-Bromofluorobenzen	e 460-00-4			70-130	101
Toluene-d8	2037-26-5			70-130	97

Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client ID: Lab ID: Date/Time Collected: Media:	IAB-12131BOSTONPOST-04_080119 1908088-03A 8/1/19 09:02 AM 6 Liter Summa Canister (100% Cert Ambie	Date/Time A Dilution Fact Instrument/F	tor:	8/7/19 03:32 PM 1.72 msd20.i / 20080710	
Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit) (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.61	0.68	Not Detected
1,4-Dioxane	123-91-1	0.50	0.56	0.62	Not Detected
cis-1,2-Dichloroethen	e 156-59-2	0.37	0.61	0.68	Not Detected
Tetrachloroethene	127-18-4	0.72	1.0	1.2	Not Detected
trans-1,2-Dichloroethe	ene 156-60-5	0.38	0.61	0.68	Not Detected
Trichloroethene	79-01-6	0.45	0.83	0.92	Not Detected
Vinyl Chloride	75-01-4	0.14	0.40	0.44	Not Detected
D: Analyte not within	the DoD scope of accreditation.				
Surrogates	CAS#			Limits	%Recovery
1,2-Dichloroethane-d4	4 17060-07-0			70-130	112
4-Bromofluorobenzen	e 460-00-4			70-130	99
Toluene-d8	2037-26-5			70-130	99

Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client ID: Lab ID: Date/Time Collected: Media:	DUP-12131BOSTONPOST-01_080119 1908088-04A 8/1/19 12:00 AM 6 Liter Summa Canister (100% Cert Ambier	Date/Time A Dilution Fact Instrument/F	tor: 1	8/7/19 04:50 PM 1.45 msd20.i / 20080712			
Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)		
1,1-Dichloroethene	75-35-4	0.14	0.52	0.57	Not Detected		
1,4-Dioxane	123-91-1	0.42	0.47	0.52	Not Detected		
cis-1,2-Dichloroethen	e 156-59-2	0.31	0.52	0.57	Not Detected		
Tetrachloroethene	127-18-4	0.61	0.88	0.98	Not Detected		
trans-1,2-Dichloroeth	ene 156-60-5	0.32	0.52	0.57	Not Detected		
Trichloroethene	79-01-6	0.38	0.70	0.78	Not Detected		
Vinyl Chloride	75-01-4	0.12	0.33	0.37	Not Detected		
D: Analyte not within	the DoD scope of accreditation.						
Surrogates	CAS#			Limits	%Recovery		
1,2-Dichloroethane-de	4 17060-07-0			70-130	112		
4-Bromofluorobenzer	460-00-4			70-130	101		
Toluene-d8	2037-26-5			70-130	98		

Air Toxics

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client ID: Lab ID: Date/Time Collected: Media:	IAG-12131BOSTONPOST-03_080119 1908088-05A 8/1/19 09:19 AM 6 Liter Summa Canister (100% Cert Ambie	Date/Time A Dilution Fac Instrument/F	tor:	8/7/19 05:41 PM 1.74 msd20.i / 20080713	
Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.17	0.62	0.69	Not Detected
1,4-Dioxane	123-91-1	0.51	0.56	0.63	Not Detected
cis-1,2-Dichloroethen	e 156-59-2	0.37	0.62	0.69	Not Detected
Tetrachloroethene	127-18-4	0.73	1.1	1.2	Not Detected
trans-1,2-Dichloroethe	ene 156-60-5	0.39	0.62	0.69	Not Detected
Trichloroethene	79-01-6	0.46	0.84	0.94	Not Detected
Vinyl Chloride	75-01-4	0.14	0.40	0.44	Not Detected
D: Analyte not within	the DoD scope of accreditation.				
Surrogates	CAS#			Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0			70-130	104
4-Bromofluorobenzen	e 460-00-4			70-130	101
Toluene-d8	2037-26-5			70-130	91

Analysis Request /Canister Chain of Custody

For Laboratory Use Only

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		-5955; Fax (916) 351-8279			1 							Shroud V			- 1993		
			_PID:	PID: NA Special Instructions/Notes: Report ONLY: 1,1-DCE, cis-1,2-					Turnaround Time (Rush surcharges may apply)								
Project Name: Ford LTP			01454.0003 /	DCE, tra	Ins-1,2-DCE,	1,4-Dioxane,	PCE, TCE and	VC. Submit	5 Day Turnaround Time								
	t Manager:	Kris Hinskey	P.O.#	30016344	16344 results through Cadena at jim.tomalia@cadena.com. Cadena						ster Vac	uum/Pre	ssure	Requested Analyses			
Sampler: C.Weaver, S.Johnson				nesuns tr	nrougn Caden	ia at jim.tom	alla@cadena.co	m. Cadena			Lab U	se Only	es)	e Ze			
Site N	ame:	12131 BOSTON POST			#E20363	31. Level IV R	eporting			6	6	21 I S	<u>_</u> #	See al	Jal y		
Lab ID	S	ample Identification	Can #	Flow C	ontroller #		Start Sampling Information		Stop Sampling Information		Final (in Hg)	Receipt	al (psig) : N ₂ / He	TO-15 (See Special Instructions/Notes)	Do Not Analyze		
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handling, of shipping of samples. D.O.T Hotline (800) 467-4922