

ANALYTICAL REPORT

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

Laboratory Job ID: 240-112801-1
Client Project/Site: Ford LTP Livonia MI - E203631

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

Attn: Kristoffer Hinskey



Authorized for release by:
5/29/2019 5:02:12 PM

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

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

Table of Contents

Cover Page	1
Table of Contents	2
Definitions/Glossary	3
Case Narrative	4
Method Summary	5
Sample Summary	6
Detection Summary	7
Client Sample Results	8
Surrogate Summary	9
QC Sample Results	10
QC Association Summary	13
Lab Chronicle	14
Certification Summary	15
Chain of Custody	16



Definitions/Glossary

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

Job ID: 240-112801-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

Glossary

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

Case Narrative

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

Job ID: 240-112801-1

Job ID: 240-112801-1

Laboratory: Eurofins TestAmerica, Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-112801-1

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 sample was 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, sample was 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 sample was received on 5/17/2019 8:30 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.6° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Sample SUMP-34424-BEACON-01_051519 (240-112801-1) was analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The sample was analyzed on 05/28/2019.

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

VOLATILE ORGANIC COMPOUNDS (GCMS SIM)

Sample SUMP-34424-BEACON-01_051519 (240-112801-1) was analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The sample was analyzed on 05/21/2019.

1,4-Dioxane was detected in method blank MB 240-382312/5 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

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

Method Summary

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

Job ID: 240-112801-1

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

Protocol References:

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

Laboratory References:

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



Sample Summary

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

Job ID: 240-112801-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-112801-1	SUMP-34424-BEACON-01_051519	Water	05/15/19 09:18	05/17/19 08:30	

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

Detection Summary

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

Job ID: 240-112801-1

Client Sample ID: SUMP-34424-BEACON-01_051519

Lab Sample ID: 240-112801-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dioxane	1.3	J B	2.0	0.86	ug/L	1		8260B SIM	Total/NA

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

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton

Client Sample Results

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

Job ID: 240-112801-1

Client Sample ID: SUMP-34424-BEACON-01_051519

Lab Sample ID: 240-112801-1

Date Collected: 05/15/19 09:18

Matrix: Water

Date Received: 05/17/19 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	1.3	J B	2.0	0.86	ug/L	-		05/21/19 12:51	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	90		63 - 125		05/21/19 12:51	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L	-		05/28/19 16:05	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L	-		05/28/19 16:05	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L	-		05/28/19 16:05	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L	-		05/28/19 16:05	1
Trichloroethene	1.0	U	1.0	0.10	ug/L	-		05/28/19 16:05	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L	-		05/28/19 16:05	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	90		70 - 121		05/28/19 16:05	1
4-Bromofluorobenzene (Surr)	83		59 - 120		05/28/19 16:05	1
Toluene-d8 (Surr)	82		70 - 123		05/28/19 16:05	1
Dibromofluoromethane (Surr)	94		75 - 128		05/28/19 16:05	1

Surrogate Summary

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

Job ID: 240-112801-1

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

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA	BFB	TOL	DBFM
		(70-121)	(59-120)	(70-123)	(75-128)
240-112801-1	SUMP-34424-BEACON-01_051	90	83	82	94
240-112826-B-17 MS	Matrix Spike	90	82	83	96
240-112826-B-17 MSD	Matrix Spike Duplicate	88	82	83	94
LCS 240-383319/6	Lab Control Sample	88	83	82	91
MB 240-383319/8	Method Blank	90	84	83	96

Surrogate Legend

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

BFB = 4-Bromofluorobenzene (Surr)

TOL = Toluene-d8 (Surr)

DBFM = Dibromofluoromethane (Surr)

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

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA
		(63-125)
240-112801-1	SUMP-34424-BEACON-01_051	90
240-112905-C-1 MS	Matrix Spike	91
240-112905-C-1 MSD	Matrix Spike Duplicate	87
LCS 240-382312/4	Lab Control Sample	84
MB 240-382312/5	Method Blank	84

Surrogate Legend

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

QC Sample Results

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

Job ID: 240-112801-1

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

Lab Sample ID: MB 240-383319/8
Matrix: Water
Analysis Batch: 383319

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/19 14:55	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/19 14:55	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/19 14:55	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/19 14:55	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/19 14:55	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/19 14:55	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	90		70 - 121		05/28/19 14:55	1
4-Bromofluorobenzene (Surr)	84		59 - 120		05/28/19 14:55	1
Toluene-d8 (Surr)	83		70 - 123		05/28/19 14:55	1
Dibromofluoromethane (Surr)	96		75 - 128		05/28/19 14:55	1

Lab Sample ID: LCS 240-383319/6
Matrix: Water
Analysis Batch: 383319

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	20.0	21.6		ug/L		108	65 - 139
cis-1,2-Dichloroethene	20.0	20.3		ug/L		102	76 - 128
Tetrachloroethene	20.0	18.3		ug/L		92	74 - 130
trans-1,2-Dichloroethene	20.0	21.2		ug/L		106	78 - 133
Trichloroethene	20.0	19.4		ug/L		97	76 - 125
Vinyl chloride	20.0	23.5		ug/L		117	58 - 143

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	88		70 - 121
4-Bromofluorobenzene (Surr)	83		59 - 120
Toluene-d8 (Surr)	82		70 - 123
Dibromofluoromethane (Surr)	91		75 - 128

Lab Sample ID: 240-112826-B-17 MS
Matrix: Water
Analysis Batch: 383319

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	8.3	U	167	185		ug/L		111	53 - 140
cis-1,2-Dichloroethene	150		167	348		ug/L		118	64 - 130
Tetrachloroethene	8.3	U	167	151		ug/L		90	51 - 136
trans-1,2-Dichloroethene	7.2	J	167	188		ug/L		109	68 - 133
Trichloroethene	8.3	U	167	168		ug/L		101	55 - 131
Vinyl chloride	7.0	J	167	209		ug/L		121	43 - 154

Surrogate	MS %Recovery	MS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	90		70 - 121
4-Bromofluorobenzene (Surr)	82		59 - 120
Toluene-d8 (Surr)	83		70 - 123

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QC Sample Results

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

Job ID: 240-112801-1

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

Lab Sample ID: 240-112826-B-17 MS
Matrix: Water
Analysis Batch: 383319

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

Surrogate	MS %Recovery	MS Qualifier	Limits
Dibromofluoromethane (Surr)	96		75 - 128

Lab Sample ID: 240-112826-B-17 MSD
Matrix: Water
Analysis Batch: 383319

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethene	8.3	U	167	191		ug/L		115	53 - 140	3	35
cis-1,2-Dichloroethene	150		167	337		ug/L		112	64 - 130	3	21
Tetrachloroethene	8.3	U	167	162		ug/L		97	51 - 136	8	23
trans-1,2-Dichloroethene	7.2	J	167	196		ug/L		113	68 - 133	4	24
Trichloroethene	8.3	U	167	178		ug/L		107	55 - 131	6	23
Vinyl chloride	7.0	J	167	200		ug/L		116	43 - 154	4	29

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	88		70 - 121
4-Bromofluorobenzene (Surr)	82		59 - 120
Toluene-d8 (Surr)	83		70 - 123
Dibromofluoromethane (Surr)	94		75 - 128

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

Lab Sample ID: MB 240-382312/5
Matrix: Water
Analysis Batch: 382312

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	1.51	J	2.0	0.86	ug/L			05/21/19 12:01	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	84		63 - 125		05/21/19 12:01	1

Lab Sample ID: LCS 240-382312/4
Matrix: Water
Analysis Batch: 382312

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	10.0	12.7		ug/L		127	59 - 131

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	84		63 - 125

Lab Sample ID: 240-112905-C-1 MS
Matrix: Water
Analysis Batch: 382312

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	1.1	J B	10.0	12.2		ug/L		111	52 - 129

Eurofins TestAmerica, Canton

QC Sample Results

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

Job ID: 240-112801-1

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

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

Lab Sample ID: 240-112905-C-1 MSD
Matrix: Water
Analysis Batch: 382312

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

<i>Analyte</i>	<i>Sample Result</i>	<i>Sample Qualifier</i>	<i>Spike Added</i>	<i>MSD Result</i>	<i>MSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec. Limits</i>	<i>RPD</i>	<i>RPD Limit</i>
1,4-Dioxane	1.1	J B	10.0	12.3		ug/L		112	52 - 129	1	13

<i>Surrogate</i>	<i>%Recovery</i>	<i>MSD MSD Qualifier</i>	<i>Limits</i>
1,2-Dichloroethane-d4 (Surr)	87		63 - 125



QC Association Summary

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

Job ID: 240-112801-1

GC/MS VOA

Analysis Batch: 382312

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-112801-1	SUMP-34424-BEACON-01_051519	Total/NA	Water	8260B SIM	
MB 240-382312/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-382312/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-112905-C-1 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-112905-C-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

Analysis Batch: 383319

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-112801-1	SUMP-34424-BEACON-01_051519	Total/NA	Water	8260B	
MB 240-383319/8	Method Blank	Total/NA	Water	8260B	
LCS 240-383319/6	Lab Control Sample	Total/NA	Water	8260B	
240-112826-B-17 MS	Matrix Spike	Total/NA	Water	8260B	
240-112826-B-17 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Lab Chronicle

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

Job ID: 240-112801-1

Client Sample ID: SUMP-34424-BEACON-01_051519

Lab Sample ID: 240-112801-1

Date Collected: 05/15/19 09:18

Matrix: Water

Date Received: 05/17/19 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	383319	05/28/19 16:05	HMB	TAL CAN
Total/NA	Analysis	8260B SIM		1	382312	05/21/19 12:51	SAM	TAL CAN

Laboratory References:

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

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- 2
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- 5
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Accreditation/Certification Summary

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

Job ID: 240-112801-1

Laboratory: Eurofins TestAmerica, Canton

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

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

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

Eurofins TestAmerica, Canton

1.8/Ch. 6

Chain of Custody Record

TestAmerica Laboratory location: N.Canton — 4101 Shuffel Street NW/ North Canton, OH 44720 / 330-497-9396

Client Contact		Regulatory program: <input type="checkbox"/> DW <input type="checkbox"/> NPDES <input type="checkbox"/> RCRA <input type="checkbox"/> Other		TestAmerica Laboratories, Inc.																						
Company Name: Arcadis		Client Project Manager: Kris Hinskey		Site Contact: Angela DeGrandis			Lab Contact: Mike DelMonico			COC No:																
Address: 28550 Cabot Drive, Suite 500		Telephone: 248-994-2340		Telephone: 734-320-0065			Telephone: 330-497-9396			of COCs																
City/State/Zip: Novi, MI, 48377		Email: kristoffer.hinskey@arcadis.com		Analysis Turnaround Time			Analyses							For lab use only												
Phone: 248-994-2340		Method of Shipment/Carrier:		5 Day			TAT if different from below <input type="checkbox"/> 3 weeks <input type="checkbox"/> 2 weeks <input checked="" type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day							Walk-in client												
Project Name: Ford LTP														Lab sampling												
Project Number: MI001454.0003														Job/SDG No:												
PO # MI001454.0003		Shipping/Tracking No:		Matrix			Containers & Preservatives							Sample Specific Notes / Special Instructions:												
Sample Identification		Sample Date	Sample Time	Air	Aqueous	Sediment	Solid	Other:	H2SO4	HNO3	HCl	NaOH	ZnAc		NaOH	Unpres	Other:	Filtered Sample (Y/N)	Composite-C / Grab-G	1,1-DCE 8260B	cis-1,2-DCE 8260B	Trans-1,2-DCE 8260B	PCE 8260B	TCE 8260B	Vinyl Chloride 8260B	1,4-Dioxane 8260B SIM
Samp-34424 Beacon-01_051519		5-15-19	0918	X							X							NG	X	X	X	X	X	X	X	6 containers (Vials)



Possible Hazard Identification: Non-Hazard Flammable Irritant Poison B Unknown

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

Special Instructions/QC Requirements & Comments:

Submit all results through Cadena at jim.tomalia@cadena.com. Cadena #E203631
Level IV Reporting.

Relinquished by:	Company: Arcadis	Date/Time: 5-15-19 / 1400	Received by: Novi Cold Storage	Company: Arcadis	Date/Time: 5-15-19 / 1400
Relinquished by:	Company: Arcadis	Date/Time: 5-16-19 / 1215	Received by:	Company: ETA	Date/Time: 5-16-19 / 1215
Relinquished by:	Company: ETA	Date/Time: 5-16-19 / 1254	Received in Laboratory by:	Company: ETA	Date/Time: 5-17-19 / 830

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TestAmerica Canton Sample Receipt Form/Narrative

Login # : 112801

Canton Facility

Client Arcadis Site Name Cooler unpacked by: Cooler Received on 5-17-19 Opened on 5-17-19 830

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

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

TestAmerica Cooler # TA Foam Box Client Cooler Box Other Packing material used: Bubble Wrap Foam Plastic Bag None Other

COOLANT: Wet Ice Blue Ice Dry Ice Water None 1. Cooler temperature upon receipt IR GUN# IR-8 (CF -0.2 °C) Observed Cooler Temp. 1.8 °C Corrected Cooler Temp. 1.6 °C

- 2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes No
-Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
-Were tamper/custody seals intact and uncompromised? Yes No NA
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC984738
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials? Yes No NA Larger than this.
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes No
16. Was a LL Hg or Me Hg trip blank present? Yes No

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

Contacted PM Date by via Verbal Voice Mail Other

Concerning

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by: JR.

18. SAMPLE CONDITION

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

19. SAMPLE PRESERVATION

Sample(s) were further preserved in the laboratory.
Time preserved: Preservative(s) added/Lot number(s):

VOA Sample Preservation - Date/Time VOAs Frozen:

DATA VERIFICATION REPORT



May 30, 2019

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

CADENA project ID: E203631
Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater
Project number: MI001454.0002/3/4.00002/2B/3B
Event Specific Scope of Work References: Sample COC
Laboratory: TestAmerica - North Canton
Laboratory submittal: 112801-1
Sample date: 2019-05-15
Report received by CADENA: 2019-05-29
Initial Data Verification completed by CADENA: 2019-05-30
Number of Samples:1
Sample Matrices: Water
Test Categories: GCMS VOC

Please see attached criteria report or sample result/qualified analytical result summary for qualifier flags assigned to sample data.

The following minor QC exceptions or missing information were noted:

MBK - GCMS VOC SIM QC batch 382312 method blank had a detection below the RL for the following analyte: 1,4-DIOXANE. The following client sample results should be considered to be non-detect at the RL and qualified with UB flags: -001.

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

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

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

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

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

CADENA Valid Qualifiers

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

SAMPLING AND ANALYSIS SUMMARY

CADENA Project ID: E203631

Laboratory: TestAmerica-North Canton

Laboratory Submittal: 112801-1

Lab Sample ID	Sample ID	Collection Date (mm/yy/dd)	Collection Time (hh:mm:ss)	Volatile Organics by GCMS	8260B with Single Ion Monitoring	Comment
2401128011	SUMP-34424-BEACON-01_051519	5/15/2019	9:18:00	X	X	

Qualified Results Summary

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton

Laboratory Submittal: 112801-1

Sample Name: SUMP-34424-BEACON-01_051519

Lab Sample ID: 2401128011

Sample Date: 5/15/2019

Analyte	Cas No.	Result	Report Limit	Units	Valid Qualifier
GC/MS VOC					
<u>OSW-8260BBSim</u>					
1,4-Dioxane	123-91-1	1.3	2.0	ug/l	UB

Analytical Results Summary

Reportable Results Only

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton

Laboratory Submittal: 112801-1

Sample Name: SUMP-34424-BEACON-01_051519

Lab Sample ID: 2401128011

Sample Date: 5/15/2019

Analyte	Cas No.	Result	Report Limit	Units	Valid Qualifier
GC/MS VOC					
<u>OSW-8260B</u>					
1,1-Dichloroethene	75-35-4	ND	1.0	ug/l	---
cis-1,2-Dichloroethene	156-59-2	ND	1.0	ug/l	---
Tetrachloroethene	127-18-4	ND	1.0	ug/l	---
trans-1,2-Dichloroethene	156-60-5	ND	1.0	ug/l	---
Trichloroethene	79-01-6	ND	1.0	ug/l	---
Vinyl chloride	75-01-4	ND	1.0	ug/l	---
<u>OSW-8260BBSim</u>					
1,4-Dioxane	123-91-1	1.3	2.0	ug/l	UB

Ford Motor Company – Livonia Transmission Project

DATA REVIEW

Livonia, Michigan

Volatile Organic Compounds (VOC) Analysis

SDG #240-112801-1

CADENA Verification Report: 2019-05-30

Analyses Performed By:

TestAmerica
Canton, Ohio

Report #33494R

Review Level: Tier III

Project: MI001454.0003.00002 (30016344)



DATA REVIEW

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 240-112801-1 for samples collected in association with the Ford – Livonia, Michigan site. The review was conducted as a Tier III validation in addition to a verification/Tier II validation review performed by CADENA Inc. and included review of level IV laboratory data package completeness. Only elements of a Tier III validation effort (Tier III includes a detailed review of laboratory raw data to check for errors in calculation, calibration review, internal standard review and compound identification) and omitted deviations from the CADENA verification/Tier II report are documented in this report. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						VOC (Full Scan)	VOC (SIM)	MISC
240-112801-1	SUMP-34424-BEACON-01_051519	240-112801-1	Water	5/15/2019		X	X	

DATA REVIEW

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of Quality Assurance or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

DATA REVIEW

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8260B and 8260B SIM. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999.

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

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

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

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

DATA REVIEW

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

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

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

All samples were analyzed within the specified holding time criteria.

2. Mass Spectrometer Tuning

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

System performance and column resolution were acceptable.

3. Calibration

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

3.1 Initial Calibration

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

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

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

3.2 Continuing Calibration

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

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

4. Internal Standard Performance

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

All internal standard responses were within control limits.

5. Compound Identification

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

DATA REVIEW

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 REVIEW

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: 8260B/8260B-SIM	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times/Preservation		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	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Andrew Korycinski

SIGNATURE:



DATE: July 16, 2019

PEER REVIEW: Dennis Capria

DATE: July 17, 2019



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



Client Sample Results

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

Job ID: 240-112801-1

Client Sample ID: SUMP-34424-BEACON-01_051519

Lab Sample ID: 240-112801-1

Date Collected: 05/15/19 09:18

Matrix: Water

Date Received: 05/17/19 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0 UB	1.3 JB	2.0	0.86	ug/L			05/21/19 12:51	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	90		63 - 125					05/21/19 12:51	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/19 16:05	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/19 16:05	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/19 16:05	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/19 16:05	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/19 16:05	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/19 16:05	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	90		70 - 121					05/28/19 16:05	1
4-Bromofluorobenzene (Surr)	83		59 - 120					05/28/19 16:05	1
Toluene-d8 (Surr)	82		70 - 123					05/28/19 16:05	1
Dibromofluoromethane (Surr)	94		75 - 128					05/28/19 16:05	1

5/23/2019

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

Project Name: Ford LTP
Project #: MI001454.0003.00002
Workorder #: 1905341

Dear Mr. Jim Tomalia

The following report includes the data for the above referenced project for sample(s) received on 5/17/2019 at Air Toxics Ltd.

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

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

Regards,



Ausha Scott
Project Manager

WORK ORDER #: 1905341

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 #	MI001454.0003.00002 Ford LTP
DATE RECEIVED:	05/17/2019	CONTACT:	Ausha Scott
DATE COMPLETED:	05/23/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	AA-34424BEACON-01_051419	Modified TO-15	5.7 "Hg	5 psi
02A	DUP-34424BEACON-01_051419	Modified TO-15	5.5 "Hg	5 psi
03A	IAB-34424BEACON-01_051419	Modified TO-15	5.9 "Hg	5 psi
04A	DUP-34424BEACON-02_051419	Modified TO-15	3.9 "Hg	5.1 psi
05A	IAF-34424BEACON-02_051419	Modified TO-15	5.9 "Hg	5 psi
06A	DUP-34424BEACON-03_051419	Modified TO-15	6.5 "Hg	4.9 psi
07A	IAG-34424BEACON-04_051419	Modified TO-15	4.9 "Hg	4.9 psi
08A	DUP-34424BEACON-04_051419	Modified TO-15	6.5 "Hg	4.9 psi
09A	Lab Blank	Modified TO-15	NA	NA
10A	CCV	Modified TO-15	NA	NA
11A	LCS	Modified TO-15	NA	NA
11AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: 

 Technical Director

DATE: 05/23/19

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# 1905341

Eight 6 Liter Summa Canister (100% Cert Ambient) samples were received on May 17, 2019. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

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

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

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

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

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

Definition of Data Qualifying Flags

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

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

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

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

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

N - The identification is based on presumptive evidence.

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

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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

Client ID:	AA-34424BEACON-01_051419	Date/Time Analyzed:	5/20/19 02:43 PM
Lab ID:	1905341-01A	Dilution Factor:	1.66
Date/Time Collected:	5/15/19 09:00 AM	Instrument/Filename:	msd20.i / 20052009
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.59	0.66	Not Detected
1,4-Dioxane	123-91-1	0.48	0.54	0.60	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.59	0.66	Not Detected
Tetrachloroethene	127-18-4	0.70	1.0	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.37	0.59	0.66	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-d4	17060-07-0	70-130	91
4-Bromofluorobenzene	460-00-4	70-130	118
Toluene-d8	2037-26-5	70-130	93

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

Client ID:	DUP-34424BEACON-01_051419	Date/Time Analyzed:	5/20/19 03:27 PM
Lab ID:	1905341-02A	Dilution Factor:	1.64
Date/Time Collected:	5/15/19 12:00 AM	Instrument/Filename:	msd20.i / 20052010
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.58	0.65	Not Detected
1,4-Dioxane	123-91-1	0.48	0.53	0.59	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.35	0.58	0.65	Not Detected
Tetrachloroethene	127-18-4	0.69	1.0	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.36	0.58	0.65	Not Detected
Trichloroethene	79-01-6	0.43	0.79	0.88	Not Detected
Vinyl Chloride	75-01-4	0.13	0.38	0.42	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	92
4-Bromofluorobenzene	460-00-4	70-130	116
Toluene-d8	2037-26-5	70-130	92

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

Client ID:	IAB-34424BEACON-01_051419	Date/Time Analyzed:	5/20/19 04:06 PM
Lab ID:	1905341-03A	Dilution Factor:	1.67
Date/Time Collected:	5/15/19 09:11 AM	Instrument/Filename:	msd20.i / 20052011
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.60	0.66	Not Detected
1,4-Dioxane	123-91-1	0.49	0.54	0.60	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.60	0.66	Not Detected
Tetrachloroethene	127-18-4	0.70	1.0	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.37	0.60	0.66	Not Detected
Trichloroethene	79-01-6	0.44	0.81	0.90	Not Detected
Vinyl Chloride	75-01-4	0.14	0.38	0.43	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	99
4-Bromofluorobenzene	460-00-4	70-130	109
Toluene-d8	2037-26-5	70-130	94

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

Client ID:	DUP-34424BEACON-02_051419	Date/Time Analyzed:	5/20/19 04:45 PM
Lab ID:	1905341-04A	Dilution Factor:	1.55
Date/Time Collected:	5/15/19 12:00 AM	Instrument/Filename:	msd20.i / 20052012
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.15	0.55	0.61	Not Detected
1,4-Dioxane	123-91-1	0.45	0.50	0.56	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.33	0.55	0.61	Not Detected
Tetrachloroethene	127-18-4	0.65	0.95	1.0	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.34	0.55	0.61	Not Detected
Trichloroethene	79-01-6	0.41	0.75	0.83	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	17060-07-0	70-130	88
4-Bromofluorobenzene	460-00-4	70-130	116
Toluene-d8	2037-26-5	70-130	90

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

Client ID:	IAF-34424BEACON-02_051419	Date/Time Analyzed:	5/20/19 05:24 PM
Lab ID:	1905341-05A	Dilution Factor:	1.67
Date/Time Collected:	5/15/19 09:07 AM	Instrument/Filename:	msd20.i / 20052013
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.60	0.66	Not Detected
1,4-Dioxane	123-91-1	0.49	0.54	0.60	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.60	0.66	Not Detected
Tetrachloroethene	127-18-4	0.70	1.0	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.37	0.60	0.66	Not Detected
Trichloroethene	79-01-6	0.44	0.81	0.90	Not Detected
Vinyl Chloride	75-01-4	0.14	0.38	0.43	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-Bromofluorobenzene	460-00-4	70-130	111
Toluene-d8	2037-26-5	70-130	93

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

Client ID:	DUP-34424BEACON-03_051419	Date/Time Analyzed:	5/20/19 06:04 PM
Lab ID:	1905341-06A	Dilution Factor:	1.70
Date/Time Collected:	5/15/19 12:00 AM	Instrument/Filename:	msd20.i / 20052014
Media:	6 Liter Summa Canister (100% Cert Ambier		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.61	0.67	Not Detected
1,4-Dioxane	123-91-1	0.50	0.55	0.61	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.61	0.67	Not Detected
Tetrachloroethene	127-18-4	0.72	1.0	1.2	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.38	0.61	0.67	Not Detected
Trichloroethene	79-01-6	0.45	0.82	0.91	Not Detected
Vinyl Chloride	75-01-4	0.14	0.39	0.43	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	99
4-Bromofluorobenzene	460-00-4	70-130	113
Toluene-d8	2037-26-5	70-130	93

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

Client ID:	IAG-34424BEACON-04_051419	Date/Time Analyzed:	5/20/19 06:43 PM
Lab ID:	1905341-07A	Dilution Factor:	1.59
Date/Time Collected:	5/15/19 08:57 AM	Instrument/Filename:	msd20.i / 20052015
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.15	0.57	0.63	Not Detected
1,4-Dioxane	123-91-1	0.46	0.52	0.57	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.34	0.57	0.63	Not Detected
Tetrachloroethene	127-18-4	0.67	0.97	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.35	0.57	0.63	Not Detected
Trichloroethene	79-01-6	0.42	0.77	0.85	Not Detected
Vinyl Chloride	75-01-4	0.13	0.36	0.41	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	95
4-Bromofluorobenzene	460-00-4	70-130	116
Toluene-d8	2037-26-5	70-130	88

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

Client ID:	DUP-34424BEACON-04_051419	Date/Time Analyzed:	5/20/19 07:22 PM
Lab ID:	1905341-08A	Dilution Factor:	1.70
Date/Time Collected:	5/15/19 12:00 AM	Instrument/Filename:	msd20.i / 20052016
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.61	0.67	Not Detected
1,4-Dioxane	123-91-1	0.50	0.55	0.61	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.61	0.67	Not Detected
Tetrachloroethene	127-18-4	0.72	1.0	1.2	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.38	0.61	0.67	Not Detected
Trichloroethene	79-01-6	0.45	0.82	0.91	Not Detected
Vinyl Chloride	75-01-4	0.14	0.39	0.43	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	95
4-Bromofluorobenzene	460-00-4	70-130	113
Toluene-d8	2037-26-5	70-130	92

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

Client ID:	Lab Blank	Date/Time Analyzed:	5/20/19 11:20 AM
Lab ID:	1905341-09A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20052006a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.095	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 of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	102
4-Bromofluorobenzene	460-00-4	70-130	114
Toluene-d8	2037-26-5	70-130	96

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

Client ID:	CCV	Date/Time Analyzed:	5/20/19 07:51 AM
Lab ID:	1905341-10A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20052002
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	91
1,4-Dioxane	123-91-1	100
cis-1,2-Dichloroethene	156-59-2	97
Tetrachloroethene	127-18-4	103
trans-1,2-Dichloroethene	156-60-5	94
Trichloroethene	79-01-6	93
Vinyl Chloride	75-01-4	78

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	89
4-Bromofluorobenzene	460-00-4	70-130	109
Toluene-d8	2037-26-5	70-130	95

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

Client ID:	LCS	Date/Time Analyzed:	5/20/19 08:38 AM
Lab ID:	1905341-11A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20052003
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	90
1,4-Dioxane	123-91-1	104
cis-1,2-Dichloroethene	156-59-2	102
Tetrachloroethene	127-18-4	111
trans-1,2-Dichloroethene	156-60-5	79
Trichloroethene	79-01-6	100
Vinyl Chloride	75-01-4	81

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	90
4-Bromofluorobenzene	460-00-4	70-130	112
Toluene-d8	2037-26-5	70-130	95

* % Recovery is calculated using unrounded analytical results.

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

Client ID:	LCSD	Date/Time Analyzed:	5/20/19 09:17 AM
Lab ID:	1905341-11AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd20.i / 20052004
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethene	75-35-4	93
1,4-Dioxane	123-91-1	103
cis-1,2-Dichloroethene	156-59-2	105
Tetrachloroethene	127-18-4	108
trans-1,2-Dichloroethene	156-60-5	80
Trichloroethene	79-01-6	97
Vinyl Chloride	75-01-4	79

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	89
4-Bromofluorobenzene	460-00-4	70-130	111
Toluene-d8	2037-26-5	70-130	96

* % Recovery is calculated using unrounded analytical results.



May 23, 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: 1905341
Sample date: 2019-05-15
Report received by CADENA: 2019-05-23
Initial Data Verification completed by CADENA: 2019-05-23

8 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.
B	The analyte / compound was detected in the associated blank. For Organic methods the sample concentration was greater than the RDL and less than 5x (or 10x for common lab contaminants) the blank concentration and is considered non-detect at the reported concentration. For Inorganic methods the sample concentration was greater than the RDL and less than 10x the blank concentration and is considered non-detect at the reported concentration.
E	The analyte / Compound reported exceeds the calibration range and is considered estimated.
EMPC	Estimated Minimum Potential Contamination - Dioxin/Furan analyses only.
J	Indicates an estimated value. This flag is used either when estimating a concentration for a tentatively identified compound or when the data indicates the presence of an analyte / compound but the result is less than the sample Quantitation limit, but greater than zero. The flag is also used in data validation to indicate a reported value should be considered estimated due to associated quality assurance deficiencies.
J-	The result is an estimated quantity, but the result may be biased low.
JB	NON-DETECT AT THE CONCENTRATION REPORTED AND ESTIMATED
JH	The sample result is considered estimated and is potentially biased high.
JL	The sample result is considered estimated and is potentially biased low.
JUB	NON-DETECT AT THE REPORTING LIMIT AND ESTIMATED
NJ	Tentatively identified compound with approximated concentration.
R	Indicates the value is considered to be unusable. (Note: The analyte / compound may or may not be present.)
TNTC	Too Numerous to Count - Asbestos and Microbiological Results.
U	Indicates that the analyte / compound was analyzed for, but not detected.
UB	The analyte / compound was detected in the associated blank. For Organic methods the sample concentration was less than the RDL and less than 5x (or 10x for common lab contaminants) the blank concentration and is considered non-detect at the RDL. For Inorganic methods the sample concentration was less than the RDL and less than 10x the blank concentration and is considered non-detect at the RDL.
UJ	The analyte / compound was not detected above the reported sample Quantitation limit. However, the Quantitation limit is considered to be approximate due to associated quality assurance results and may or may not represent the actual limit of Quantitation to accurately and precisely report the analyte in the sample.

Ford Motor Company – Livonia Transmission Project

DATA REVIEW

Livonia, Michigan

Volatile Organic Compounds (VOC) TO-15 Analysis

SDG #1905341

CADENA Verification Report: 2019-05-23

Analyses Performed By:
Eurofins Air Toxics
Folsom, California

Report #33015R
Review Level: Tier III
Project: MI001454.0004.00002



DATA REVIEW

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 1905341 for samples collected in association with the Ford – Livonia, Michigan site. The review was conducted as a Tier III validation in addition to a verification/Tier II validation review performed by CADENA Inc. and included review of level IV laboratory data package completeness. Only elements of a Tier III validation effort (Tier III includes a detailed review of laboratory raw data to check for errors in calculation, calibration review, internal standard review and compound identification) and omitted deviations from the CADENA verification/Tier II report are documented in this report. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						TO-15 (Full Scan)	TO-15 (SIM)	MISC
1905341	AA-34424BEACON-01_051419	1905341-01A	Air	5/15/2019		X		
	DUP-34424BEACON-01_051419	1905341-02A	Air	5/15/2019	AA-34424BEACON-01_051419	X		
	IAB-34424BEACON-01_051419	1905341-03A	Air	5/15/2019		X		
	DUP-34424BEACON-02_051419	1905341-04A	Air	5/15/2019	IAB-34424BEACON-01_051419	X		
	IAF-34424BEACON-02_051419	1905341-05A	Air	5/15/2019		X		
	DUP-34424BEACON-03_051419	1905341-06A	Air	5/15/2019	IAF-34424BEACON-02_051419	X		
	IAG-34424BEACON-04_051419	1905341-07A	Air	5/15/2019		X		
	DUP-34424BEACON-04_051419	1905341-08A	Air	5/15/2019	IAG-34424BEACON-04_051419	X		

DATA REVIEW

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of Quality Assurance or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

DATA REVIEW

ORGANIC ANALYSIS INTRODUCTION

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

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

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

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

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

DATA REVIEW

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

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

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

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

2. Mass Spectrometer Tuning

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

System performance and column resolution were acceptable.

3. Calibration

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

3.1 Initial Calibration

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

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

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

3.2 Continuing Calibration

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

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

4. Internal Standard Performance

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

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 $\mu\text{g}/\text{m}^3$) for the field duplicate samples are summarized in the following table.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
AA-34424BEACON-01_051419/ DUP-34424BEACON-01_051419	All compounds	U	U	AC
IAB-34424BEACON-01_051419/ DUP-34424BEACON-02_051419	All compounds	U	U	AC
IAF-34424BEACON-02_051419/ DUP-34424BEACON-03_051419	All compounds	U	U	AC
IAG-34424BEACON-04_051419/ DUP-34424BEACON-04_051419	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 REVIEW

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: TO-15 (Full Scan)	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
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		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%RSD Relative standard deviation

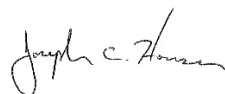
%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Joseph C. Houser

SIGNATURE:



DATE: June 19, 2019

PEER REVIEW: Dennis Capria

DATE: June 20, 2019



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



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

Client ID:	AA-34424BEACON-01_051419	Date/Time Analyzed:	5/20/19 02:43 PM
Lab ID:	1905341-01A	Dilution Factor:	1.66
Date/Time Collected:	5/15/19 09:00 AM	Instrument/Filename:	msd20.i / 20052009
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.59	0.66	Not Detected
1,4-Dioxane	123-91-1	0.48	0.54	0.60	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.59	0.66	Not Detected
Tetrachloroethene	127-18-4	0.70	1.0	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.37	0.59	0.66	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-d4	17060-07-0	70-130	91
4-Bromofluorobenzene	460-00-4	70-130	118
Toluene-d8	2037-26-5	70-130	93

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

Client ID:	DUP-34424BEACON-01_051419	Date/Time Analyzed:	5/20/19 03:27 PM
Lab ID:	1905341-02A	Dilution Factor:	1.64
Date/Time Collected:	5/15/19 12:00 AM	Instrument/Filename:	msd20.i / 20052010
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.58	0.65	Not Detected
1,4-Dioxane	123-91-1	0.48	0.53	0.59	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.35	0.58	0.65	Not Detected
Tetrachloroethene	127-18-4	0.69	1.0	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.36	0.58	0.65	Not Detected
Trichloroethene	79-01-6	0.43	0.79	0.88	Not Detected
Vinyl Chloride	75-01-4	0.13	0.38	0.42	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	92
4-Bromofluorobenzene	460-00-4	70-130	116
Toluene-d8	2037-26-5	70-130	92

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

Client ID:	IAB-34424BEACON-01_051419	Date/Time Analyzed:	5/20/19 04:06 PM
Lab ID:	1905341-03A	Dilution Factor:	1.67
Date/Time Collected:	5/15/19 09:11 AM	Instrument/Filename:	msd20.i / 20052011
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.60	0.66	Not Detected
1,4-Dioxane	123-91-1	0.49	0.54	0.60	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.60	0.66	Not Detected
Tetrachloroethene	127-18-4	0.70	1.0	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.37	0.60	0.66	Not Detected
Trichloroethene	79-01-6	0.44	0.81	0.90	Not Detected
Vinyl Chloride	75-01-4	0.14	0.38	0.43	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	99
4-Bromofluorobenzene	460-00-4	70-130	109
Toluene-d8	2037-26-5	70-130	94

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

Client ID:	DUP-34424BEACON-02_051419	Date/Time Analyzed:	5/20/19 04:45 PM
Lab ID:	1905341-04A	Dilution Factor:	1.55
Date/Time Collected:	5/15/19 12:00 AM	Instrument/Filename:	msd20.i / 20052012
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.15	0.55	0.61	Not Detected
1,4-Dioxane	123-91-1	0.45	0.50	0.56	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.33	0.55	0.61	Not Detected
Tetrachloroethene	127-18-4	0.65	0.95	1.0	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.34	0.55	0.61	Not Detected
Trichloroethene	79-01-6	0.41	0.75	0.83	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	17060-07-0	70-130	88
4-Bromofluorobenzene	460-00-4	70-130	116
Toluene-d8	2037-26-5	70-130	90

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

Client ID:	IAF-34424BEACON-02_051419	Date/Time Analyzed:	5/20/19 05:24 PM
Lab ID:	1905341-05A	Dilution Factor:	1.67
Date/Time Collected:	5/15/19 09:07 AM	Instrument/Filename:	msd20.i / 20052013
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.60	0.66	Not Detected
1,4-Dioxane	123-91-1	0.49	0.54	0.60	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.60	0.66	Not Detected
Tetrachloroethene	127-18-4	0.70	1.0	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.37	0.60	0.66	Not Detected
Trichloroethene	79-01-6	0.44	0.81	0.90	Not Detected
Vinyl Chloride	75-01-4	0.14	0.38	0.43	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-Bromofluorobenzene	460-00-4	70-130	111
Toluene-d8	2037-26-5	70-130	93

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

Client ID:	DUP-34424BEACON-03_051419	Date/Time Analyzed:	5/20/19 06:04 PM
Lab ID:	1905341-06A	Dilution Factor:	1.70
Date/Time Collected:	5/15/19 12:00 AM	Instrument/Filename:	msd20.i / 20052014
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.61	0.67	Not Detected
1,4-Dioxane	123-91-1	0.50	0.55	0.61	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.61	0.67	Not Detected
Tetrachloroethene	127-18-4	0.72	1.0	1.2	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.38	0.61	0.67	Not Detected
Trichloroethene	79-01-6	0.45	0.82	0.91	Not Detected
Vinyl Chloride	75-01-4	0.14	0.39	0.43	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	99
4-Bromofluorobenzene	460-00-4	70-130	113
Toluene-d8	2037-26-5	70-130	93

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

Client ID:	IAG-34424BEACON-04_051419	Date/Time Analyzed:	5/20/19 06:43 PM
Lab ID:	1905341-07A	Dilution Factor:	1.59
Date/Time Collected:	5/15/19 08:57 AM	Instrument/Filename:	msd20.i / 20052015
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.15	0.57	0.63	Not Detected
1,4-Dioxane	123-91-1	0.46	0.52	0.57	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.34	0.57	0.63	Not Detected
Tetrachloroethene	127-18-4	0.67	0.97	1.1	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.35	0.57	0.63	Not Detected
Trichloroethene	79-01-6	0.42	0.77	0.85	Not Detected
Vinyl Chloride	75-01-4	0.13	0.36	0.41	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	95
4-Bromofluorobenzene	460-00-4	70-130	116
Toluene-d8	2037-26-5	70-130	88

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

Client ID:	DUP-34424BEACON-04_051419	Date/Time Analyzed:	5/20/19 07:22 PM
Lab ID:	1905341-08A	Dilution Factor:	1.70
Date/Time Collected:	5/15/19 12:00 AM	Instrument/Filename:	msd20.i / 20052016
Media:	6 Liter Summa Canister (100% Cert Ambier)		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethene	75-35-4	0.16	0.61	0.67	Not Detected
1,4-Dioxane	123-91-1	0.50	0.55	0.61	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.36	0.61	0.67	Not Detected
Tetrachloroethene	127-18-4	0.72	1.0	1.2	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.38	0.61	0.67	Not Detected
Trichloroethene	79-01-6	0.45	0.82	0.91	Not Detected
Vinyl Chloride	75-01-4	0.14	0.39	0.43	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	95
4-Bromofluorobenzene	460-00-4	70-130	113
Toluene-d8	2037-26-5	70-130	92



Air Toxics

Analysis Request / Canister Chain of Custody

For Laboratory Use Only

PID: _____ Workorder #: 1905344

180 Blue Ravine Rd. Suite B, Folsom, CA 95630

Phone (800) 985-5955; Fax (916) 351-8279

page 1 of 1

Client: <u>Accadis Food</u>	Special Instructions/Notes: <u>Report ONLY: 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, 1,4-Dioxane, PCE, TCE, and VC. Submit all results through Cadena at jim.tomalia@cadena.com #E203631 Level IV certified</u>	Turnaround Time (Rush surcharges may apply)
Project Name: <u>Food LTP</u>		Standard _____ Rush <u>5-day</u> (specify)
Project Manager: <u>K. Hinskey</u>	Project # <u>MED01454.0003</u>	Canister Vacuum/Pressure
Sampler: <u>C. Weaver H. Lado</u>	<u>00002</u>	Requested Analyses
Site Name: <u>34424 BEACON</u>		

Lab ID	Field Sample Identification(Location)	Can #	Flow Controller #	Start Sampling Information		Stop Sampling Information		Initial (in Hg)	Final (in Hg)	Receipt	Lab Use Only Final (psig) Gas: N ₂ / He	TO-15 (See special instructions)	Requested Analyses		
				Date	Time	Date	Time								
01A	AA-34424 BEACON-01-051419	661902	23861	5/14/19	1012	5/15/19	0900	-29	-5.5			X			
02A	DUP-34424 BEACON-01-051419	661938	23848	5/14/19	1012	5/15/19	0900	-29	-5			X			
03A	IAB-34424 BEACON-01-051419	661844	21925	5/14/19	1008	5/15/19	0911	-29	-6			X			
04A	DUP-34424 BEACON-02-051419	661942	24090	5/14/19	—	5/15/19	—	-29	-4			X			
05A	IAB-34424 BEACON-02-051419	661041	24089	5/14/19	1005	5/15/19	0907	-29	-6			X			
06A	DUP-34424 BEACON-03-051419	661599	21014	5/14/19	—	5/15/19	—	-29	-6			X			
07A	IAB-34424 BEACON-04-051419	661936	22076	5/14/19	1010	5/15/19	0857	-29	-5.5			X			
08A	DUP-34424 BEACON-04-051419	660665	22851	5/14/19	—	5/15/19	—	-29	-7			X			

Relinquished by: (Signature/Affiliation) <u>Christine Wilcox / Accadis</u>	Date <u>5/14/19</u>	Time <u>1200</u>	Received by: (Signature/Affiliation) <u>DAVID KATZ</u>	Date <u>5/17/19</u>	Time <u>0945</u>
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time

Shipper Name: <u>FedEx</u>	Custody Seals Intact?	Yes	No	None	<u>GOOD</u>
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