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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: 240-112927-1

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: 5/31/2019 3:25:33 PM

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

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

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



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

Qualifiers

Qualifiers		3
GC/MS VOA Qualifier	Qualifier Description	Λ
	Indicates the analyte was analyzed for but not detected.	4
х	Surrogate is outside control limits	5

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: 240-112927-1

Laboratory: Eurofins TestAmerica, Canton

Narrative

CASE NARRATIVE

Case Narrative

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-112927-1

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 sample was received on 5/18/2019 10:15 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.2° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Sample MW-121S_051319 (240-112927-1) was analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The sample was analyzed on 05/23/2019.

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

VOLATILE ORGANIC COMPOUNDS (GCMS SIM)

Sample MW-121S_051319 (240-112927-1) 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.

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

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
240-112927-1	MW-121S_051319	Water	05/13/19 16:02	05/20/19 10:15	

Detection Summary

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

Client Sample ID: MW-121S_051319

No Detections.

Lab Sample ID: 240-112927-1

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: MW-121S_051319 Date Collected: 05/13/19 16:02 Date Received: 05/20/19 10:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/21/19 19:32	1	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
1,2-Dichloroethane-d4 (Surr)	107		63 - 125					05/21/19 19:32	1	
Method: 8260B - Volatile O	ganic Compo	unds (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			05/23/19 16:05	1	
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/23/19 16:05	1	
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/23/19 16:05	1	
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/23/19 16:05	1	
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/23/19 16:05	1	
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/23/19 16:05	1	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
1,2-Dichloroethane-d4 (Surr)	95		70 - 121					05/23/19 16:05	1	
4-Bromofluorobenzene (Surr)	106		59 - 120					05/23/19 16:05	1	
Toluene-d8 (Surr)	108		70 - 123					05/23/19 16:05	1	
Dibromofluoromethane (Surr)	104		75 - 128					05/23/19 16:05	1	

Job ID: 240-112927-1

Matrix: Water

Lab Sample ID: 240-112927-1

2 3 4 5 6 7

Surrogate Summary

Job ID: 240-112927-1

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

-			Pe	ercent Surre	ogate Recovery	(Acceptance Limits)	
		DCA	BFB	TOL	DBFM		
Lab Sample ID	Client Sample ID	(70-121)	(59-120)	(70-123)	(75-128)		5
240-112528-C-2 MSD	Matrix Spike Duplicate	91	123 X	117	101		
240-112528-D-2 MS	Matrix Spike	92	126 X	115	99		
240-112927-1	MW-121S_051319	95	106	108	104		
LCS 240-382711/4	Lab Control Sample	88	110	109	96		
MB 240-382711/6	Method Blank	99	113	113	106		
Surrogate Legend							8
DCA = 1,2-Dichloroeth							
BFB = 4-Bromofluorob							9
TOL = Toluene-d8 (Su	,						
DBFM = Dibromofluor							
	IM - Volatile Organic	Compoun	ds (GC/	MS)			
latrix: Water						Prep Type: Total/NA	
			D	arcont Surr	aato Rocovory	(Accentance Limits)	

			Percent Surrogate Recovery (Acceptance Limits)	
		DCA		
Lab Sample ID	Client Sample ID	(63-125)		13
240-112927-1	MW-121S_051319	107		
240-112950-A-1 MS	Matrix Spike	114		
240-112950-A-1 MSD	Matrix Spike Duplicate	111		
LCS 240-382402/4	Lab Control Sample	109		
MB 240-382402/5	Method Blank	105		
Surrogato Logond				

Surrogate Legend

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

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

Lab Sample ID: MB 240-382711/6 Matrix: Water Analysis Batch: 382711

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

MB MB Analyte **Result Qualifier** RL MDL Unit Prepared Analyzed Dil Fac D 1,1-Dichloroethene 1.0 U 1.0 0.19 ug/L 05/23/19 08:16 1 cis-1,2-Dichloroethene 1.0 U 1.0 0.16 ug/L 05/23/19 08:16 1 Tetrachloroethene 1.0 U 1.0 0.15 ug/L 05/23/19 08:16 1 trans-1,2-Dichloroethene 0.19 ug/L 1.0 U 1.0 05/23/19 08:16 1 Trichloroethene 0.10 ug/L 1.0 U 1.0 05/23/19 08:16 1 Vinyl chloride 1.0 U 1.0 0.20 ug/L 05/23/19 08:16 1

	IVID	IVID				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		70 - 121		05/23/19 08:16	1
4-Bromofluorobenzene (Surr)	113		59 - 120		05/23/19 08:16	1
Toluene-d8 (Surr)	113		70 - 123		05/23/19 08:16	1
Dibromofluoromethane (Surr)	106		75 - 128		05/23/19 08:16	1

Lab Sample ID: LCS 240-382711/4 Matrix: Water Analysis Batch: 382711

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
1,1-Dichloroethene	10.0	10.6		ug/L		106	65 - 139	
cis-1,2-Dichloroethene	10.0	10.7		ug/L		107	76 - 128	
Tetrachloroethene	10.0	9.20		ug/L		92	74 - 130	
trans-1,2-Dichloroethene	10.0	10.6		ug/L		106	78 - 133	
Trichloroethene	10.0	8.97		ug/L		90	76 - 125	
Vinyl chloride	10.0	11.1		ug/L		111	58 - 143	

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	88		70 - 121
4-Bromofluorobenzene (Surr)	110		59 - 120
Toluene-d8 (Surr)	109		70 - 123
Dibromofluoromethane (Surr)	96		75 - 128

Lab Sample ID: 240-112528-C-2 MSD Matrix: Water Analysis Batch: 382711

Analysis Batch. 302711	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
1,1-Dichloroethene	1.0	U	10.0	10.8		ug/L		108	53 - 140	14	35
cis-1,2-Dichloroethene	1.0	U	10.0	10.0		ug/L		100	64 - 130	1	21
Tetrachloroethene	1.0	U	10.0	9.19		ug/L		92	51 - 136	8	23
trans-1,2-Dichloroethene	1.0	U	10.0	9.90		ug/L		99	68 - 133	2	24
Trichloroethene	1.0	U	10.0	8.89		ug/L		89	55 - 131	3	23
Vinyl chloride	3.2		10.0	14.8		ug/L		117	43 - 154	18	29
		MSD									
Surrogate	%Recoverv	Qualifier	Limits								

Surrogate	%Recovery	Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	91		70 - 121
4-Bromofluorobenzene (Surr)	123	Х	59 - 120
Toluene-d8 (Surr)	117		70 - 123

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

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

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

Lab Sample ID: 240-1125 Matrix: Water Analysis Batch: 382711	28-C-2 MSD					Client	Samp	ole ID: N	Aatrix Spike Du Prep Type: T	
	MSD	MSD								
Surrogate	%Recovery	Qualifier	Limits							
Dibromofluoromethane (Surr)	101		75 - 128							
 Lab Sample ID: 240-1125	28-D-2 MS						С	lient Sa	mple ID: Matri	x Spike
Matrix: Water									Prep Type: T	
Analysis Batch: 382711										
· · · · · · · · · · · · · · · · · · ·	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
1,1-Dichloroethene	1.0	U	10.0	9.43		ug/L		94	53 - 140	
cis-1,2-Dichloroethene	1.0	U	10.0	10.1		ug/L		101	64 ₋ 130	
Tetrachloroethene	1.0	U	10.0	8.52		ug/L		85	51 ₋ 136	
trans-1,2-Dichloroethene	1.0	U	10.0	9.70		ug/L		97	68 - 133	
Trichloroethene	1.0	U	10.0	8.60		ug/L		86	55 ₋ 131	
Vinyl chloride	3.2		10.0	12.4		ug/L		92	43 - 154	
	MS	MS								
Surrogate	%Recovery	Qualifier	Limits							
1,2-Dichloroethane-d4 (Surr)	92		70 - 121							
4-Bromofluorobenzene (Surr)	126	X	59 - 120							
Toluene-d8 (Surr)	115		70 - 123							
Dibromofluoromethane (Surr)	99		75 - 128							
Method: 8260B SIM - \	/olatile Or	ganic Con	npounds	GC/M	S)					
_ Lab Sample ID: MB 240-3	82402/5						Clie	ent San	ple ID: Metho	d Blank
Matrix: Water									Prep Type: T	
Analysis Batch: 382402									The share	
,,		MB MB								
Analyte	Re	sult Qualifier		RL I	MDL Unit	:	D P	repared	Analyzed	Dil Fac
1 4-Diovane		20 11		20	0.86				05/21/10 16:35	1

Lab Sample ID: MB 240-38 Matrix: Water	82402/5								(Clie	nt Sam	ple ID: Method Prep Type: Te	
Analysis Batch: 382402												пер турс. т	
		мв	мв										
Analyte	Re	sult	Qualifier	RI	_	MDL	Unit		D	Pr	repared	Analyzed	Dil Fac
1,4-Dioxane		2.0	U	2.0	0	0.86	ug/L				•	05/21/19 16:35	1
		MB	МВ										
Surrogate	%Recov	very	Qualifier	Limits						Pi	repared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)		105		63 - 125	-				-			05/21/19 16:35	1
Lab Sample ID: LCS 240-3	382402/4							Cl	ient	Sar	nple ID	: Lab Control S	Sample
Matrix: Water												Prep Type: T	otal/NA
Analysis Batch: 382402													
				Spike	LCS	LCS	5					%Rec.	
Analyte				Added	Result	Qua	lifier	Unit		D	%Rec	Limits	
1,4-Dioxane				10.0	11.2			ug/L		_	112	59 - 131	
	LCS	LCS											
Surrogate	%Recovery	Qual	lifier	Limits									
1,2-Dichloroethane-d4 (Surr)	109			63 - 125									
Lab Sample ID: 240-11295	50-A-1 MS									CI	ient Sa	mple ID: Matrix	x Spike
Matrix: Water												· Prep Type: T	
Analysis Batch: 382402													
	Sample	Sam	ple	Spike	MS	MS						%Rec.	
Analyte	Result	Qual	ifier	Added	Result	Qua	lifier	Unit		D	%Rec	Limits	
1.4-Dioxane	2.0			10.0	10.5			ug/L		_	105	52 - 129	

Job ID: 240-112927-1

Eurofins TestAmerica, Canton

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

	MS	MS										
Surrogate	%Recovery	Qualifier	Limits									
1,2-Dichloroethane-d4 (Surr)	114		63 - 125									
Lab Sample ID: 240-1129	50-A-1 MSD					Client	Samp	le ID: N	latrix Spil	ke Dup	licate	-
Matrix: Water									Prep Ty	pe: Tot	al/NA	
Analysis Batch: 382402												
-	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	10.7		ug/L		107	52 - 129	1	13	
	MSD	MSD										
Surrogate	%Recovery	Qualifier	Limits									
1,2-Dichloroethane-d4 (Surr)	111		63 - 125									5

QC Association Summary

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

GC/MS VOA

Analysis Batch: 382402

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-112927-1	MW-121S_051319	Total/NA	Water	8260B SIM	
MB 240-382402/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-382402/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-112950-A-1 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-112950-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	
Analysis Batch: 3827	711				
Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch

Lab Sample ID	Client Sample ID	Prep Туре	Matrix	Method Prep Ba	atch
240-112927-1	MW-121S_051319	Total/NA	Water	8260B	_
MB 240-382711/6	Method Blank	Total/NA	Water	8260B	
LCS 240-382711/4	Lab Control Sample	Total/NA	Water	8260B	
240-112528-C-2 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	
240-112528-D-2 MS	Matrix Spike	Total/NA	Water	8260B	

Client Sample ID: MW-121S_051319 Date Collected: 05/13/19 16:02 Date Received: 05/20/19 10:15

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	382711	05/23/19 16:05	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	382402	05/21/19 19:32	SAM	TAL CAN

Laboratory References:

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

Lab Sample ID: 240-112927-1 Matrix: Water

Accreditation/Certification Summary

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

Job ID: 240-112927-1

Laboratory: Eurofins TestAmerica, Canton

	eld by this laboratory are listed. No	t all accreditations/certific	cations 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.

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Inferencie Inferencie <thinferencie< th=""> Inferencie Inferenc</thinferencie<>	Millerenter Montantial Montan	ate, Zip. 1, 48377		C			12.0				D - Nitric Acid E - NaHSO4	P - Na204S 0 - Na2S03
Colore #: EC0051 Colore#: EC0051 <thcolore#: ec0051<<="" td=""><td>Contrary Econdition Contrary Econdition <thcontrary econdition<="" th=""> Contrary Econdition</thcontrary></td><td>tone:</td><td>PO#: MI001318.0002</td><td></td><td>07454.00</td><td></td><td>10</td><td></td><td></td><td></td><td>F - MeUH G - Amchlor H - Ascorbic Aci</td><td></td></thcolore#:>	Contrary Econdition Contrary Econdition <thcontrary econdition<="" th=""> Contrary Econdition</thcontrary>	tone:	PO#: MI001318.0002		07454.00		10				F - MeUH G - Amchlor H - Ascorbic Aci	
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Stortis Stortis Matrix	319 Sample Date Sample Date<	oject Name: ord LTP Livonia MI - E203631	Project #: 24015353					(tei-				W - pH 4-5 Z - other (specify)
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Client Arcadis Site Name	Cooler unpacked by:
5.5.0	A
	Other
FedEx: 1 st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Receipt After-hours: Drop-off Date/Time Storage Location	Other
COOLANT: Wet Ice Blue Ice Dry Ice Water None	
1. Cooler temperature upon receipt	rm
IR GUN# IR-8 (CF -0.2 °C) Observed Cooler Temp. 1.4 °C Corrected Cooler Te	emp. 2.2 °C
IR GUN #36 (CF +0.7°C) Observed Cooler Temp°C Corrected Cooler Tem	np°C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity	s No
	No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes	s ®ø
-Were tamper/custody seals intact and uncompromised?	s No NA
	No
	No Tests that are not
	o No checked for pH by
	No Receiving:
	s No
8. Could all bottle labels be reconciled with the COC?	Oil and Crosse
9. Were correct bottle(s) used for the test(s) indicated?	TOC
······································	s No
11. Are these work share samples? Yes	; Ng
If yes, Questions 12-16 have been checked at the originating laboratory.	No Do Hard I we Hone and
	No (NA) pH Strip Lot# <u>HC98473</u> No
	NO NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes	· 03
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DATA VERIFICATION REPORT



May 31, 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: 112927-1 Sample date: 2019-05-13 Report received by CADENA: 2019-05-31 Initial Data Verification completed by CADENA: 2019-06-01 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:

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

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 <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: 112927-1

		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
2401129271	MW-121S_051319	5/13/2019	4:02:00	х	Х	

Analytical Results Summary

Reportable Results Only

CADENA Project ID: E203631 Laboratory: TestAmerica - North Canton Laboratory Submittal: 112927-1

		Sample Name: Lab Sample ID: Sample Date:	MW-122 2401129 5/13/20	9271	19	
	Analyte	Cas No.	Result	Report Limit	Units	Valid Qualifier
GC/MS VOC					•	Quanner
OSW-8260	ЭВ					
	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-8260</u>	<u>DBBSim</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 #240-112927-1 CADENA Verification Report: 2019-06-01

Analyses Performed By: TestAmerica Canton, Ohio

Report #33130R Review Level: Tier III Project: MI001454.0004.00002

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 240-112927-1 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:

				Sample		ļ	Analysis	
SDG	Sample ID	Lab ID	Matrix	Collection Date	Parent Sample	VOC (Full	VOC (SIM)	MISC
						Scan)		
240-112927-1	MW-121S_051319	240-112927-1	Water	5/13/2019		Х	Х	

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

		Reported		Performance Acceptable		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		
	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) 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/8260B-SIM	Water	14 days from collection to analysis	Cool to < 6 °C; pH < 2 with HCl

All samples were analyzed within the specified holding time criteria.

2. Mass Spectrometer Tuning

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

System performance and column resolution were acceptable.

3. Calibration

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

3.1 Initial Calibration

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

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

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

3.2 Continuing Calibration

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

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

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 identified 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	
	No	Yes	No	Yes	Requirec
GAS CHROMATOGRAPHY/MASS SPECTROMET	'RY (GC/I	MS)			
Tier II Validation					
Holding times/Preservation		Х		Х	
Tier III Validation		1			1
System performance and column resolution		X		X	
Initial calibration %RSDs		Х		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		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		Х		X	
B. Quantitation Reports		Х		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:

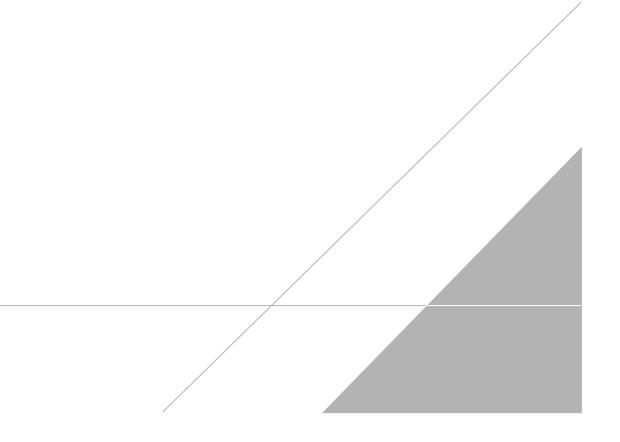
a Kap

DATE: June 14, 2019

PEER REVIEW: Dennis Capria

DATE: June 26, 2019

CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS



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Client Sample Results

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

Client Sample ID: MW-121S_051319 Date Collected: 05/13/19 16:02 Date Received: 05/20/19 10:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/21/19 19:32	1	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
1,2-Dichloroethane-d4 (Surr)	107		63 - 125					05/21/19 19:32	1	
Method: 8260B - Volatile O	ganic Compo	unds (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			05/23/19 16:05	1	
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/23/19 16:05	1	
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/23/19 16:05	1	
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/23/19 16:05	1	
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/23/19 16:05	1	
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/23/19 16:05	1	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
1,2-Dichloroethane-d4 (Surr)	95		70 - 121					05/23/19 16:05	1	
4-Bromofluorobenzene (Surr)	106		59 - 120					05/23/19 16:05	1	
Toluene-d8 (Surr)	108		70 - 123					05/23/19 16:05	1	
Dibromofluoromethane (Surr)	104		75 - 128					05/23/19 16:05	1	

Job ID: 240-112927-1

Matrix: Water

Lab Sample ID: 240-112927-1

. 2 3 4 5 6 7