

ANALYTICAL REPORT

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

Laboratory Job ID: 240-149674-1
Client Project/Site: Ford LTP Off-Site

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

Attn: Kristoffer Hinskey



Authorized for release by:
6/4/2021 10:29:12 AM

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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	13
QC Sample Results	14
QC Association Summary	18
Lab Chronicle	19
Certification Summary	20
Chain of Custody	21

Definitions/Glossary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Case Narrative

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

Job ID: 240-149674-1

Laboratory: Eurofins TestAmerica, Canton

Narrative

Job Narrative
240-149674-1

Comments

No additional comments.

Receipt

The samples were received on 5/20/2021 8:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.6° C.

GC/MS VOA

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

VOA Prep

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

- 1
- 2
- 3
- 4
- 5
- 6
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- 13
- 14

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

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 Off-Site

Job ID: 240-149674-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-149674-1	TRIP BLANK_105	Water	05/18/21 00:00	05/19/21 08:00	
240-149674-2	MW-125_051821	Water	05/18/21 10:00	05/19/21 08:00	
240-149674-3	MW-125S_051821	Water	05/18/21 10:45	05/19/21 08:00	
240-149674-4	MW-129S_051821	Water	05/18/21 12:30	05/19/21 08:00	
240-149674-5	MW-129_051821	Water	05/18/21 13:50	05/19/21 08:00	

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- 10
- 11
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- 13
- 14

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

Client Sample ID: TRIP BLANK_105

Lab Sample ID: 240-149674-1

No Detections.

Client Sample ID: MW-125_051821

Lab Sample ID: 240-149674-2

No Detections.

Client Sample ID: MW-125S_051821

Lab Sample ID: 240-149674-3

No Detections.

Client Sample ID: MW-129S_051821

Lab Sample ID: 240-149674-4

No Detections.

Client Sample ID: MW-129_051821

Lab Sample ID: 240-149674-5

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton



Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

Client Sample ID: TRIP BLANK_105

Lab Sample ID: 240-149674-1

Date Collected: 05/18/21 00:00

Matrix: Water

Date Received: 05/19/21 08:00

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			05/28/21 15:12	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/21 15:12	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/21 15:12	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 15:12	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/21 15:12	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/21 15:12	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	127		75 - 130		05/28/21 15:12	1
4-Bromofluorobenzene (Surr)	104		47 - 134		05/28/21 15:12	1
Toluene-d8 (Surr)	111		69 - 122		05/28/21 15:12	1
Dibromofluoromethane (Surr)	125		78 - 129		05/28/21 15:12	1

Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

Client Sample ID: MW-125_051821

Lab Sample ID: 240-149674-2

Date Collected: 05/18/21 10:00

Matrix: Water

Date Received: 05/19/21 08:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/24/21 23:16	1
Surrogate									
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	95		70 - 133					05/24/21 17:21	1
1,2-Dichloroethane-d4 (Surr)	82		70 - 133					05/24/21 23:16	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 17:30	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/21 17:30	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/21 17:30	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 17:30	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/21 17:30	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/21 17:30	1
Surrogate									
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	124		75 - 130					05/28/21 17:30	1
4-Bromofluorobenzene (Surr)	106		47 - 134					05/28/21 17:30	1
Toluene-d8 (Surr)	113		69 - 122					05/28/21 17:30	1
Dibromofluoromethane (Surr)	126		78 - 129					05/28/21 17:30	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

Client Sample ID: MW-125S_051821

Lab Sample ID: 240-149674-3

Date Collected: 05/18/21 10:45

Matrix: Water

Date Received: 05/19/21 08:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/24/21 23:41	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	81		70 - 133		05/24/21 23:41	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			05/28/21 17:53	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/21 17:53	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/21 17:53	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 17:53	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/21 17:53	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/21 17:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	122		75 - 130		05/28/21 17:53	1
4-Bromofluorobenzene (Surr)	104		47 - 134		05/28/21 17:53	1
Toluene-d8 (Surr)	114		69 - 122		05/28/21 17:53	1
Dibromofluoromethane (Surr)	123		78 - 129		05/28/21 17:53	1

Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

Client Sample ID: MW-129S_051821

Lab Sample ID: 240-149674-4

Date Collected: 05/18/21 12:30

Matrix: Water

Date Received: 05/19/21 08:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/25/21 00:06	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	84		70 - 133					05/25/21 00:06	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			05/28/21 18:16	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/21 18:16	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/21 18:16	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 18:16	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/21 18:16	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/21 18:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	122		75 - 130					05/28/21 18:16	1
4-Bromofluorobenzene (Surr)	106		47 - 134					05/28/21 18:16	1
Toluene-d8 (Surr)	115		69 - 122					05/28/21 18:16	1
Dibromofluoromethane (Surr)	122		78 - 129					05/28/21 18:16	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

Client Sample ID: MW-129_051821

Lab Sample ID: 240-149674-5

Date Collected: 05/18/21 13:50

Matrix: Water

Date Received: 05/19/21 08:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/26/21 20:31	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	82		70 - 133		05/26/21 20:31	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 18:39	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/21 18:39	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/21 18:39	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 18:39	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/21 18:39	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/21 18:39	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	127		75 - 130		05/28/21 18:39	1
4-Bromofluorobenzene (Surr)	104		47 - 134		05/28/21 18:39	1
Toluene-d8 (Surr)	114		69 - 122		05/28/21 18:39	1
Dibromofluoromethane (Surr)	126		78 - 129		05/28/21 18:39	1

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DCA (75-130)	BFB (47-134)	TOL (69-122)	DBFM (78-129)
240-149674-1	TRIP BLANK_105	127	104	111	125
240-149674-2	MW-125_051821	124	106	113	126
240-149674-3	MW-125S_051821	122	104	114	123
240-149674-4	MW-129S_051821	122	106	115	122
240-149674-5	MW-129_051821	127	104	114	126
240-149695-G-5 MS	Matrix Spike	106	109	109	109
240-149695-M-5 MSD	Matrix Spike Duplicate	103	107	107	106
LCS 240-488080/5	Lab Control Sample	109	111	110	114
MB 240-488080/7	Method Blank	118	104	111	118

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

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)
		DCA (70-133)
240-149527-I-2 MS	Matrix Spike	96
240-149527-P-2 MSD	Matrix Spike Duplicate	97
240-149674-2	MW-125_051821	82
240-149674-2	MW-125_051821	95
240-149674-3	MW-125S_051821	81
240-149674-4	MW-129S_051821	84
240-149674-5	MW-129_051821	82
240-149695-H-5 MS	Matrix Spike	87
240-149695-N-5 MSD	Matrix Spike Duplicate	84
LCS 240-487235/4	Lab Control Sample	81
LCS 240-487242/4	Lab Control Sample	100
LCS 240-487671/4	Lab Control Sample	84
MB 240-487235/5	Method Blank	82
MB 240-487242/5	Method Blank	97
MB 240-487671/5	Method Blank	83

Surrogate Legend

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

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

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

Lab Sample ID: MB 240-488080/7
Matrix: Water
Analysis Batch: 488080

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			05/28/21 13:16	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/21 13:16	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/21 13:16	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 13:16	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/21 13:16	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/21 13:16	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	118		75 - 130		05/28/21 13:16	1
4-Bromofluorobenzene (Surr)	104		47 - 134		05/28/21 13:16	1
Toluene-d8 (Surr)	111		69 - 122		05/28/21 13:16	1
Dibromofluoromethane (Surr)	118		78 - 129		05/28/21 13:16	1

Lab Sample ID: LCS 240-488080/5
Matrix: Water
Analysis Batch: 488080

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	25.0	28.8		ug/L		115	73 - 129
cis-1,2-Dichloroethene	25.0	28.0		ug/L		112	75 - 124
Tetrachloroethene	25.0	27.7		ug/L		111	70 - 125
trans-1,2-Dichloroethene	25.0	29.1		ug/L		116	74 - 130
Trichloroethene	25.0	27.5		ug/L		110	71 - 121
Vinyl chloride	25.0	26.1		ug/L		104	61 - 134

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	109		75 - 130
4-Bromofluorobenzene (Surr)	111		47 - 134
Toluene-d8 (Surr)	110		69 - 122
Dibromofluoromethane (Surr)	114		78 - 129

Lab Sample ID: 240-149695-G-5 MS
Matrix: Water
Analysis Batch: 488080

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	1.0	U	25.0	26.6		ug/L		106	64 - 132
cis-1,2-Dichloroethene	1.0	U	25.0	25.3		ug/L		101	68 - 121
Tetrachloroethene	1.0	U	25.0	25.6		ug/L		102	52 - 129
trans-1,2-Dichloroethene	1.0	U	25.0	26.3		ug/L		105	69 - 126
Trichloroethene	1.0	U	25.0	25.0		ug/L		100	56 - 124
Vinyl chloride	1.0	U	25.0	23.5		ug/L		94	49 - 136

Surrogate	MS %Recovery	MS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	106		75 - 130
4-Bromofluorobenzene (Surr)	109		47 - 134
Toluene-d8 (Surr)	109		69 - 122

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

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

Lab Sample ID: 240-149695-G-5 MS
Matrix: Water
Analysis Batch: 488080

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

Surrogate	MS %Recovery	MS Qualifier	Limits
Dibromofluoromethane (Surr)	109		78 - 129

Lab Sample ID: 240-149695-M-5 MSD
Matrix: Water
Analysis Batch: 488080

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethene	1.0	U	25.0	26.3		ug/L		105	64 - 132	1	35
cis-1,2-Dichloroethene	1.0	U	25.0	25.0		ug/L		100	68 - 121	1	35
Tetrachloroethene	1.0	U	25.0	26.0		ug/L		104	52 - 129	2	35
trans-1,2-Dichloroethene	1.0	U	25.0	25.6		ug/L		103	69 - 126	2	35
Trichloroethene	1.0	U	25.0	24.7		ug/L		99	56 - 124	1	35
Vinyl chloride	1.0	U	25.0	23.6		ug/L		94	49 - 136	0	35

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	103		75 - 130
4-Bromofluorobenzene (Surr)	107		47 - 134
Toluene-d8 (Surr)	107		69 - 122
Dibromofluoromethane (Surr)	106		78 - 129

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

Lab Sample ID: MB 240-487235/5
Matrix: Water
Analysis Batch: 487235

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/24/21 14:36	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	82		70 - 133		05/24/21 14:36	1

Lab Sample ID: LCS 240-487235/4
Matrix: Water
Analysis Batch: 487235

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	10.5		ug/L		105	80 - 135

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	81		70 - 133

Lab Sample ID: MB 240-487242/5
Matrix: Water
Analysis Batch: 487242

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/24/21 16:31	1

Eurofins TestAmerica, Canton

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

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

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	97		70 - 133		05/24/21 16:31	1

Lab Sample ID: LCS 240-487242/4
Matrix: Water
Analysis Batch: 487242

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	10.3		ug/L		103	80 - 135

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	100		70 - 133

Lab Sample ID: 240-149527-I-2 MS
Matrix: Water
Analysis Batch: 487242

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	2.0	U	10.0	10.3		ug/L		103	46 - 170

Surrogate	MS %Recovery	MS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	96		70 - 133

Lab Sample ID: 240-149527-P-2 MSD
Matrix: Water
Analysis Batch: 487242

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	Limit
1,4-Dioxane	2.0	U	10.0	10.2		ug/L		102	46 - 170	1	26

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	97		70 - 133

Lab Sample ID: MB 240-487671/5
Matrix: Water
Analysis Batch: 487671

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/26/21 15:59	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	83		70 - 133		05/26/21 15:59	1

Lab Sample ID: LCS 240-487671/4
Matrix: Water
Analysis Batch: 487671

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	10.5		ug/L		105	80 - 135

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

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

Lab Sample ID: LCS 240-487671/4
Matrix: Water
Analysis Batch: 487671

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

	<i>LCS</i>	<i>LCS</i>	
<i>Surrogate</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
1,2-Dichloroethane-d4 (Surr)	84		70 - 133

Lab Sample ID: 240-149695-H-5 MS
Matrix: Water
Analysis Batch: 487671

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

	<i>Sample</i>	<i>Sample</i>	<i>Spike</i>	<i>MS</i>	<i>MS</i>					
<i>Analyte</i>	<i>Result</i>	<i>Qualifier</i>	<i>Added</i>	<i>Result</i>	<i>Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>Limits</i>	<i>%Rec.</i>
1,4-Dioxane	2.0	U	10.0	10.7		ug/L		107	46 - 170	

	<i>MS</i>	<i>MS</i>	
<i>Surrogate</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
1,2-Dichloroethane-d4 (Surr)	87		70 - 133

Lab Sample ID: 240-149695-N-5 MSD
Matrix: Water
Analysis Batch: 487671

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

	<i>Sample</i>	<i>Sample</i>	<i>Spike</i>	<i>MSD</i>	<i>MSD</i>						
<i>Analyte</i>	<i>Result</i>	<i>Qualifier</i>	<i>Added</i>	<i>Result</i>	<i>Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>Limits</i>	<i>RPD</i>	<i>RPD Limit</i>
1,4-Dioxane	2.0	U	10.0	10.4		ug/L		104	46 - 170	3	26

	<i>MSD</i>	<i>MSD</i>	
<i>Surrogate</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
1,2-Dichloroethane-d4 (Surr)	84		70 - 133

QC Association Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

GC/MS VOA

Analysis Batch: 487235

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-149674-2	MW-125_051821	Total/NA	Water	8260B SIM	
240-149674-3	MW-125S_051821	Total/NA	Water	8260B SIM	
240-149674-4	MW-129S_051821	Total/NA	Water	8260B SIM	
MB 240-487235/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-487235/4	Lab Control Sample	Total/NA	Water	8260B SIM	

Analysis Batch: 487242

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-149674-2	MW-125_051821	Total/NA	Water	8260B SIM	
MB 240-487242/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-487242/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-149527-I-2 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-149527-P-2 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

Analysis Batch: 487671

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-149674-5	MW-129_051821	Total/NA	Water	8260B SIM	
MB 240-487671/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-487671/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-149695-H-5 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-149695-N-5 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

Analysis Batch: 488080

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-149674-1	TRIP BLANK_105	Total/NA	Water	8260B	
240-149674-2	MW-125_051821	Total/NA	Water	8260B	
240-149674-3	MW-125S_051821	Total/NA	Water	8260B	
240-149674-4	MW-129S_051821	Total/NA	Water	8260B	
240-149674-5	MW-129_051821	Total/NA	Water	8260B	
MB 240-488080/7	Method Blank	Total/NA	Water	8260B	
LCS 240-488080/5	Lab Control Sample	Total/NA	Water	8260B	
240-149695-G-5 MS	Matrix Spike	Total/NA	Water	8260B	
240-149695-M-5 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

Client Sample ID: TRIP BLANK_105

Lab Sample ID: 240-149674-1

Date Collected: 05/18/21 00:00

Matrix: Water

Date Received: 05/19/21 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	488080	05/28/21 15:12	SAM	TAL CAN

Client Sample ID: MW-125_051821

Lab Sample ID: 240-149674-2

Date Collected: 05/18/21 10:00

Matrix: Water

Date Received: 05/19/21 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	488080	05/28/21 17:30	SAM	TAL CAN
Total/NA	Analysis	8260B SIM		1	487235	05/24/21 23:16	CS	TAL CAN
Total/NA	Analysis	8260B SIM		1	487242	05/24/21 17:21	CS	TAL CAN

Client Sample ID: MW-125S_051821

Lab Sample ID: 240-149674-3

Date Collected: 05/18/21 10:45

Matrix: Water

Date Received: 05/19/21 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	488080	05/28/21 17:53	SAM	TAL CAN
Total/NA	Analysis	8260B SIM		1	487235	05/24/21 23:41	CS	TAL CAN

Client Sample ID: MW-129S_051821

Lab Sample ID: 240-149674-4

Date Collected: 05/18/21 12:30

Matrix: Water

Date Received: 05/19/21 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	488080	05/28/21 18:16	SAM	TAL CAN
Total/NA	Analysis	8260B SIM		1	487235	05/25/21 00:06	CS	TAL CAN

Client Sample ID: MW-129_051821

Lab Sample ID: 240-149674-5

Date Collected: 05/18/21 13:50

Matrix: Water

Date Received: 05/19/21 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	488080	05/28/21 18:39	SAM	TAL CAN
Total/NA	Analysis	8260B SIM		1	487671	05/26/21 20:31	CS	TAL CAN

Laboratory References:

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

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
 Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

Laboratory: Eurofins TestAmerica, Canton

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

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-22
Connecticut	State	PH-0590	12-31-21
Florida	NELAP	E87225	06-30-21
Georgia	State	4062	02-23-22
Illinois	NELAP	200004	07-31-21
Iowa	State	421	06-01-21
Kansas	NELAP	E-10336	04-30-21 *
Kentucky (UST)	State	112225	02-23-22
Kentucky (WW)	State	KY98016	12-31-21
Minnesota	NELAP	OH00048	12-31-21
Minnesota (Petrofund)	State	3506	08-01-21
New Jersey	NELAP	OH001	06-30-21
New York	NELAP	10975	03-31-22
Ohio VAP	State	CL0024	12-21-23
Oregon	NELAP	4062	02-23-22
Pennsylvania	NELAP	68-00340	08-31-21
Texas	NELAP	T104704517-18-10	08-31-21
USDA	US Federal Programs	P330-18-00281	09-17-21
Virginia	NELAP	010101	09-14-21
Washington	State	C971	01-12-22
West Virginia DEP	State	210	12-31-21

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



15/16

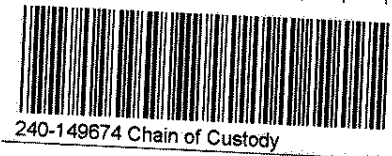
Chain of Custody Record

TestAmerica

TestAmerica Laboratory location Brighton — 10448 Citation Drive, Suite 200 / Brighton, MI 48116 / 810-229-2763

MICHIGAN 190

Client Contact		Regulatory program		DW	NPDES	RCRA	Other																	
Company Name: Arcadis		Client Project Manager: Kris Hinskey				Site Contact: Julia McClafferty				Lab Contact: Mike DelMonico				TestAmerica Laboratories, Inc.										
Address: 28550 Cabot Drive, Suite 500		Telephone: 248-994-2240				Telephone: 734-644-5131				Telephone: 330-497-9396				COC No:										
City/State/Zip: Novi, MI, 48377		Email: kristoffer.hinskey@arcadis.com				Analysis Turnaround Time				Analyses				1 of 1 COC										
Phone: 248-994-2240		Sampler Name: Emma Witherspoon				TAT: 10 day				<input type="checkbox"/> 3 weeks <input checked="" type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> days <input type="checkbox"/> 1 day				For lab use only										
Project Name: Ford LTP Off-Site		Method of Shipment/Carrier:				Shipping/Tracking No:				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				Walk-in client										
Project Number: 30080642.402.04														Lab sampling										
PO # 30080642.402.04														Job/SDG No:										
Sample Identification		Sample Date	Sample Time	Matrix					Containers & Preservatives					Sample Specific Notes										
				Air	Aqueous	Sediment	Solid	Other	H2SO4	HNO3	HCl	NaOH	ZnAc	NaOH	Unpres	Other								
TRIP BLANK_105			--	X							1						NG	X	X	X	X	X	X	1 Trip Blank
MW 125_051821		5/18/21	1000	X							6						NG	X	X	X	X	X	X	3 VOAs for 8260B 3 VOAs for 8260B SIM
MW 1255_051821		5/18/21	1045	X							6						NG	X	X	X	X	X	X	
MW 1295_051821		5/18/21	1230	X							6						NG	X	X	X	X	X	X	
MW 129_051821		5/18/21	1350	X							6						NG	X	X	X	X	X	X	



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 jtomalia@cadenaco.com, Cadena #E203631
 Level IV Reporting requested.

Relinquished by: <i>Witherspoon</i>	Company: Arcadis	Date/Time: 5/18/21 510	Received by: <i>Nancy Goldy Storgye</i>	Company: Arcadis	Date/Time: 5/18/21 510
Relinquished by: <i>Christy Little</i>	Company: ARCADIS	Date/Time: 5/19/21	Received by: <i>Amarah Balkhu</i>	Company: ETA	Date/Time: 5/19/21 956
Relinquished by: <i>Amarah Balkhu</i>	Company: ETA	Date/Time: 5/19/21 1520	Received in Laboratory by: <i>Joe Cor</i>	Company: ETA	Date/Time: 5/19/21 800

20
 5/24/21

Page 21 of 22

6/4/2021

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Canton Facility
 Client Arcaadis 20 25 21 Site Name _____ Cooler unpacked by: Trent C
 Cooler Received on 5-19-21 Opened on 5-20-21
 FedEx 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

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

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

1 Cooler temperature upon receipt See Multiple Cooler Form
 IR GUN# IR-11 (CF +0.1 °C) Observed Cooler Temp 15 °C Corrected Cooler Temp 16 °C
 IR GUN #IR-12 (CF +0.2°C) Observed Cooler Temp _____ °C Corrected Cooler Temp _____ °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 NA
 -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 (ID/Date/Time) be reconciled with the COC? Yes No
 9 For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp (Y/N)?
 10 Were correct bottle(s) used for the test(s) indicated? Yes No
 11 Sufficient quantity received to perform indicated analyses? Yes No
 12 Are these work share samples and all listed on the COC? Yes No
 If yes, Questions 13-17 have been checked at the originating laboratory
 13 Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC022887
 14 Were VOAs on the COC? Yes No
 15 Were air bubbles >6 mm in any VOA vials? Larger than this. Yes No NA
 16 Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # covered Yes No
 17 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 _____

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES additional next page Samples processed by: _____

19. 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)

20. 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

June 04, 2021

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: 30080642.402.04_W01 OFF-SITE GW
Event Specific Scope of Work References: Sample COC
Laboratory: TestAmerica - North Canton
Laboratory submittal: 149674-1
Sample date: 2021-05-18
Report received by CADENA: 2021-06-04
Initial Data Verification completed by CADENA: 2021-06-04
Number of Samples: 4 Water and 1 trip blank
Sample Matrices: Water
Test Categories: GCMS VOC

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

There were no significant QC anomalies or exceptions to report.

Sample/MS/MSD Surrogate Recovery, Blank/LCS Surrogate Recovery, LCS/LCD Recovery, 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.

Analytical Results Summary

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton

Laboratory Submittal: 149674-1

Analyte	Cas No.	Sample Name: TRIP BLANK_105				Sample Name: MW-125_051821				Sample Name: MW-125S_051821				Sample Name: MW-129S_051821				Sample Name: MW-129_051821			
		Result	Limit	Units	Qualifier	Result	Limit	Units	Qualifier	Result	Limit	Units	Qualifier	Result	Limit	Units	Qualifier	Result	Limit	Units	Qualifier
GC/MS VOC																					
<u>OSW-8260B</u>																					
1,1-Dichloroethene	75-35-4	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---
cis-1,2-Dichloroethene	156-59-2	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---
Tetrachloroethene	127-18-4	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---
trans-1,2-Dichloroethene	156-60-5	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---
Trichloroethene	79-01-6	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---
Vinyl chloride	75-01-4	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---
<u>OSW-8260BBSim</u>																					
1,4-Dioxane	123-91-1					ND	2.0	ug/l	---	ND	2.0	ug/l	---	ND	2.0	ug/l	---	ND	2.0	ug/l	---

Ford Motor Company – Livonia Transmission Project

DATA REVIEW

Livonia, Michigan

Volatile Organic Compounds (VOC) Analysis

SDG # 240-149674-1

CADENA Verification Report: 2021-06-04

Analyses Performed By:

TestAmerica

North Canton, Ohio

Report # 41715R

Review Level: Tier III

Project: 30080642.402.04



DATA REVIEW

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 240-149674-1 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 ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis	
					VOC	VOC SIM
TRIP BLANK_105	240-149674-1	Water	05/18/21		X	
MW-125_051821	240-149674-2	Water	05/18/21		X	X
MW-125S_051821	240-149674-3	Water	05/18/21		X	X
MW-129S_051821	240-149674-4	Water	05/18/21		X	X
MW-129_051821	240-149674-5	Water	05/18/21		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/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 ensure 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. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water 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 less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

A field duplicate sample was not collected for samples from this SDG.

DATA REVIEW

6. Compound Identification

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

No compounds were detected in the samples within this SDG.

7. System Performance and Overall Assessment

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

DATA 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	
Field Duplicate RPD	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

DATA REVIEW

VALIDATION PERFORMED BY: Hrishikesh Upadhyaya

SIGNATURE: 

DATE: June 23, 2021

PEER REVIEW: Andrew Korycinski

DATE: June 24, 2021

NO CORRECTIONS/QUALIFIERS ADDED TO SAMPLE ANALYSIS DATA SHEETS



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



15/16

Chain of Custody Record

TestAmerica

TestAmerica Laboratory location Brighton — 10448 Citation Drive, Suite 200 / Brighton, MI 48116 / 810-229-2763

MICHIGAN
190

Client Contact		Regulatory program		DW	NPDES	RCRA	Other																		
Company Name: Arcadis		Client Project Manager: Kris Hinskey				Site Contact: Julia McClafferty				Lab Contact: Mike DelMonico				TestAmerica Laboratories, Inc.											
Address: 28550 Cabot Drive, Suite 500		Telephone: 248-994-2240				Telephone: 734-644-5131				Telephone: 330-497-9396				COC No:											
City/State/Zip: Novi, MI, 48377		Email: kristoffer.hinskey@arcadis.com				Analysis Turnaround Time				Analyses				For lab use only											
Phone: 248-994-2240		Sampler Name: Emma Witherspoon				TAT: 10 day				Walk-in client				Lab sampling											
Project Name: Ford LTP Off-Site		Method of Shipment/Carrier:				1 week days				Job/SDG No:				Sample Specific Notes											
Project Number: 30080642.402.04		Shipping/Tracking No:				1 day				Special Instructions:															
PO # 30080642.402.04				Matrix		Containers & Preservatives						Filtered Sample (Y/N)		Composite=C/Grab=G											
Sample Identification		Sample Date	Sample Time	Air	Aqueous	Sediment	Solid	Other	H2SO4	HN03	HCl	NaOH	ZnAc	NaOH	Unpres	Other:	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		
TRIP BLANK_105			--	X							1						NG	X	X	X	X	X	X	1 Trip Blank	
MW 125_051821		5/18/21	1000	X							6						NG	X	X	X	X	X	X	3 VOAs for 8260B 3 VOAs for 8260B SIM	
MW 255_051821		5/18/21	1045	X							6						NG	X	X	X	X	X	X		
MW 129S_051821		5/18/21	1230	X							6						NG	X	X	X	X	X	X		
MW 129_051821		5/18/21	1350	X							6						NG	X	X	X	X	X	X		



240-149674 Chain of Custody

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 jtomalia@cadenaco.com. Cadena #E203631
 Level IV Reporting requested.

Relinquished by: <i>Witherspoon</i>	Company: Arcadis	Date/Time: 5/18/21 510	Received by: <i>Naomi Coldy Storage</i>	Company: Arcadis	Date/Time: 5/18/21 510
Relinquished by: <i>Christy L...</i>	Company: Arcadis	Date/Time: 5/19/21	Received by: <i>Amend Bathell</i>	Company: ETA	Date/Time: 5/19/21 956
Relinquished by: <i>Amend Bathell</i>	Company: ETA	Date/Time: 5/19/21 1520	Received in Laboratory by: <i>Janice</i>	Company: ETA	Date/Time: 5/19/21 800

20
 5/24/21

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

Client Sample ID: TRIP BLANK_105

Lab Sample ID: 240-149674-1

Date Collected: 05/18/21 00:00

Matrix: Water

Date Received: 05/19/21 08:00

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			05/28/21 15:12	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/21 15:12	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/21 15:12	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 15:12	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/21 15:12	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/21 15:12	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	127		75 - 130		05/28/21 15:12	1
4-Bromofluorobenzene (Surr)	104		47 - 134		05/28/21 15:12	1
Toluene-d8 (Surr)	111		69 - 122		05/28/21 15:12	1
Dibromofluoromethane (Surr)	125		78 - 129		05/28/21 15:12	1

Client Sample ID: MW-125_051821

Lab Sample ID: 240-149674-2

Date Collected: 05/18/21 10:00

Matrix: Water

Date Received: 05/19/21 08:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/24/21 23:16	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	95		70 - 133		05/24/21 17:21	1
1,2-Dichloroethane-d4 (Surr)	82		70 - 133		05/24/21 23:16	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 17:30	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/21 17:30	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/21 17:30	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 17:30	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/21 17:30	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/21 17:30	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	124		75 - 130		05/28/21 17:30	1
4-Bromofluorobenzene (Surr)	106		47 - 134		05/28/21 17:30	1
Toluene-d8 (Surr)	113		69 - 122		05/28/21 17:30	1
Dibromofluoromethane (Surr)	126		78 - 129		05/28/21 17:30	1

Client Sample ID: MW-125S_051821

Lab Sample ID: 240-149674-3

Date Collected: 05/18/21 10:45

Matrix: Water

Date Received: 05/19/21 08:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/24/21 23:41	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	81		70 - 133		05/24/21 23:41	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

Client Sample ID: MW-125S_051821

Lab Sample ID: 240-149674-3

Date Collected: 05/18/21 10:45

Matrix: Water

Date Received: 05/19/21 08:00

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			05/28/21 17:53	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/21 17:53	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/21 17:53	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 17:53	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/21 17:53	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/21 17:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	122		75 - 130		05/28/21 17:53	1
4-Bromofluorobenzene (Surr)	104		47 - 134		05/28/21 17:53	1
Toluene-d8 (Surr)	114		69 - 122		05/28/21 17:53	1
Dibromofluoromethane (Surr)	123		78 - 129		05/28/21 17:53	1

Client Sample ID: MW-129S_051821

Lab Sample ID: 240-149674-4

Date Collected: 05/18/21 12:30

Matrix: Water

Date Received: 05/19/21 08:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/25/21 00:06	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	84		70 - 133		05/25/21 00:06	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			05/28/21 18:16	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/21 18:16	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/21 18:16	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 18:16	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/21 18:16	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/21 18:16	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	122		75 - 130		05/28/21 18:16	1
4-Bromofluorobenzene (Surr)	106		47 - 134		05/28/21 18:16	1
Toluene-d8 (Surr)	115		69 - 122		05/28/21 18:16	1
Dibromofluoromethane (Surr)	122		78 - 129		05/28/21 18:16	1

Client Sample ID: MW-129_051821

Lab Sample ID: 240-149674-5

Date Collected: 05/18/21 13:50

Matrix: Water

Date Received: 05/19/21 08:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/26/21 20:31	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	82		70 - 133		05/26/21 20:31	1

Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Ford LTP Off-Site

Job ID: 240-149674-1

Client Sample ID: MW-129_051821

Lab Sample ID: 240-149674-5

Date Collected: 05/18/21 13:50

Matrix: Water

Date Received: 05/19/21 08:00

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			05/28/21 18:39	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/21 18:39	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/21 18:39	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/21 18:39	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/21 18:39	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/21 18:39	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	127		75 - 130		05/28/21 18:39	1
4-Bromofluorobenzene (Surr)	104		47 - 134		05/28/21 18:39	1
Toluene-d8 (Surr)	114		69 - 122		05/28/21 18:39	1
Dibromofluoromethane (Surr)	126		78 - 129		05/28/21 18:39	1