

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

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

TestAmerica Job ID: 240-106461-1

Client Project/Site: Ford LTP Livonia MI - E203631
Revision: 1

For:

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

Attn: Kristoffer Hinskey



Authorized for release by:
1/18/2019 11:23:21 AM

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

LINKS

Review your project
results through
Total Access

Have a Question?



Visit us at:
www.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.

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



Table of Contents

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

Definitions/Glossary

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

TestAmerica Job ID: 240-106461-1

Qualifiers

GC/MS VOA

| Qualifier | Qualifier Description |
|-----------|--|
| U | Indicates the analyte was analyzed for but not detected. |
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |

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 |
| CNF | Contains No Free Liquid |
| DER | Duplicate Error Ratio (normalized absolute difference) |
| Dil Fac | Dilution Factor |
| DL | Detection Limit (DoD/DOE) |
| DL, RA, RE, IN | Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample |
| DLC | Decision Level Concentration (Radiochemistry) |
| EDL | Estimated Detection Limit (Dioxin) |
| LOD | Limit of Detection (DoD/DOE) |
| LOQ | Limit of Quantitation (DoD/DOE) |
| MDA | Minimum Detectable Activity (Radiochemistry) |
| MDC | Minimum Detectable Concentration (Radiochemistry) |
| MDL | Method Detection Limit |
| ML | Minimum Level (Dioxin) |
| NC | Not Calculated |
| ND | Not Detected at the reporting limit (or MDL or EDL if shown) |
| PQL | Practical Quantitation Limit |
| QC | Quality Control |
| RER | Relative Error Ratio (Radiochemistry) |
| RL | Reporting Limit or Requested Limit (Radiochemistry) |
| RPD | Relative Percent Difference, a measure of the relative difference between two points |
| TEF | Toxicity Equivalent Factor (Dioxin) |
| TEQ | Toxicity Equivalent Quotient (Dioxin) |

Case Narrative

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

TestAmerica Job ID: 240-106461-1

Job ID: 240-106461-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-106461-1

Revision

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.

Revised 1/18/2019 - Report was revised to report samples separately.

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

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

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

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

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

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

RECEIPT

The samples were received on 1/3/2019 8:35 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Sample MW-109S_122818 (240-106461-1) was analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 01/08/2019.

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-109S_122818 (240-106461-1) was analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The samples were analyzed on 01/08/2019.

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

Method Summary

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

TestAmerica Job ID: 240-106461-1

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



Sample Summary

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

TestAmerica Job ID: 240-106461-1

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---------------|------------------|--------|----------------|----------------|
| 240-106461-1 | MW-109S_122818 | Water | 12/28/18 11:58 | 01/03/19 08:35 |

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

Detection Summary

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

TestAmerica Job ID: 240-106461-1

Client Sample ID: MW-109S_122818

Lab Sample ID: 240-106461-1

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|--------------------------|--------|-----------|-----|------|------|---------|---|--------|-----------|
| cis-1,2-Dichloroethene | 0.45 | J | 1.0 | 0.16 | ug/L | 1 | | 8260B | Total/NA |
| trans-1,2-Dichloroethene | 0.25 | J | 1.0 | 0.19 | ug/L | 1 | | 8260B | Total/NA |
| Vinyl chloride | 0.28 | J | 1.0 | 0.20 | ug/L | 1 | | 8260B | Total/NA |

This Detection Summary does not include radiochemical test results.

TestAmerica Canton

Client Sample Results

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

TestAmerica Job ID: 240-106461-1

Client Sample ID: MW-109S_122818

Lab Sample ID: 240-106461-1

Date Collected: 12/28/18 11:58

Matrix: Water

Date Received: 01/03/19 08:35

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 | | | 01/08/19 20:35 | 1 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 1,2-Dichloroethane-d4 (Surr) | 87 | | 63 - 125 | | | | | 01/08/19 20:35 | 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 | | | 01/08/19 16:03 | 1 |
| cis-1,2-Dichloroethene | 0.45 | J | 1.0 | 0.16 | ug/L | | | 01/08/19 16:03 | 1 |
| Tetrachloroethene | 1.0 | U | 1.0 | 0.15 | ug/L | | | 01/08/19 16:03 | 1 |
| trans-1,2-Dichloroethene | 0.25 | J | 1.0 | 0.19 | ug/L | | | 01/08/19 16:03 | 1 |
| Trichloroethene | 1.0 | U | 1.0 | 0.10 | ug/L | | | 01/08/19 16:03 | 1 |
| Vinyl chloride | 0.28 | J | 1.0 | 0.20 | ug/L | | | 01/08/19 16:03 | 1 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 1,2-Dichloroethane-d4 (Surr) | 99 | | 70 - 121 | | | | | 01/08/19 16:03 | 1 |
| 4-Bromofluorobenzene (Surr) | 63 | | 59 - 120 | | | | | 01/08/19 16:03 | 1 |
| Toluene-d8 (Surr) | 86 | | 70 - 123 | | | | | 01/08/19 16:03 | 1 |
| Dibromofluoromethane (Surr) | 105 | | 75 - 128 | | | | | 01/08/19 16:03 | 1 |

Surrogate Summary

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

TestAmerica Job ID: 240-106461-1

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

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

| Lab Sample ID | Client Sample ID | DCA (70-121) | BFB (59-120) | TOL (70-123) | DBFM (75-128) |
|--------------------|------------------------|-----------------|-----------------|-----------------|------------------|
| 240-106456-E-1 MS | Matrix Spike | 83 | 85 | 93 | 88 |
| 240-106456-H-1 MSD | Matrix Spike Duplicate | 79 | 85 | 94 | 88 |
| 240-106461-1 | MW-109S_122818 | 99 | 63 | 86 | 105 |
| LCS 240-363153/4 | Lab Control Sample | 73 | 76 | 84 | 81 |
| MB 240-363153/6 | Method Blank | 86 | 59 | 78 | 92 |

Surrogate Legend

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

BFB = 4-Bromofluorobenzene (Surr)

TOL = Toluene-d8 (Surr)

DBFM = Dibromofluoromethane (Surr)

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

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

| Lab Sample ID | Client Sample ID | DCA (63-125) |
|--------------------|------------------------|-----------------|
| 240-106461-1 | MW-109S_122818 | 87 |
| 500-156985-D-2 MS | Matrix Spike | 92 |
| 500-156985-D-2 MSD | Matrix Spike Duplicate | 88 |
| LCS 240-363200/12 | Lab Control Sample | 85 |
| MB 240-363200/13 | Method Blank | 86 |

Surrogate Legend

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

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

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

| Lab Sample ID | Client Sample ID | DCA (10-150) |
|-------------------|--------------------|-----------------|
| MRL 240-363200/14 | Lab Control Sample | 87 |

Surrogate Legend

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

QC Sample Results

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

TestAmerica Job ID: 240-106461-1

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

Lab Sample ID: MB 240-363153/6

Matrix: Water

Analysis Batch: 363153

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 | | | 01/08/19 10:03 | 1 |
| cis-1,2-Dichloroethene | 1.0 | U | 1.0 | 0.16 | ug/L | | | 01/08/19 10:03 | 1 |
| Tetrachloroethene | 1.0 | U | 1.0 | 0.15 | ug/L | | | 01/08/19 10:03 | 1 |
| trans-1,2-Dichloroethene | 1.0 | U | 1.0 | 0.19 | ug/L | | | 01/08/19 10:03 | 1 |
| Trichloroethene | 1.0 | U | 1.0 | 0.10 | ug/L | | | 01/08/19 10:03 | 1 |
| Vinyl chloride | 1.0 | U | 1.0 | 0.20 | ug/L | | | 01/08/19 10:03 | 1 |

| Surrogate | MB %Recovery | MB Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|------------------------------|--------------|--------------|----------|----------|----------------|---------|
| 1,2-Dichloroethane-d4 (Surr) | 86 | | 70 - 121 | | 01/08/19 10:03 | 1 |
| 4-Bromofluorobenzene (Surr) | 59 | | 59 - 120 | | 01/08/19 10:03 | 1 |
| Toluene-d8 (Surr) | 78 | | 70 - 123 | | 01/08/19 10:03 | 1 |
| Dibromofluoromethane (Surr) | 92 | | 75 - 128 | | 01/08/19 10:03 | 1 |

Lab Sample ID: LCS 240-363153/4

Matrix: Water

Analysis Batch: 363153

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 | 10.0 | 9.92 | | ug/L | | 99 | 65 - 139 |
| cis-1,2-Dichloroethene | 10.0 | 9.49 | | ug/L | | 95 | 76 - 128 |
| Tetrachloroethene | 10.0 | 9.56 | | ug/L | | 96 | 74 - 130 |
| trans-1,2-Dichloroethene | 10.0 | 10.3 | | ug/L | | 103 | 78 - 133 |
| Trichloroethene | 10.0 | 8.39 | | ug/L | | 84 | 76 - 125 |
| Vinyl chloride | 10.0 | 10.0 | | ug/L | | 100 | 58 - 143 |

| Surrogate | LCS %Recovery | LCS Qualifier | Limits |
|------------------------------|---------------|---------------|----------|
| 1,2-Dichloroethane-d4 (Surr) | 73 | | 70 - 121 |
| 4-Bromofluorobenzene (Surr) | 76 | | 59 - 120 |
| Toluene-d8 (Surr) | 84 | | 70 - 123 |
| Dibromofluoromethane (Surr) | 81 | | 75 - 128 |

Lab Sample ID: 240-106456-E-1 MS

Matrix: Water

Analysis Batch: 363153

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 | 10.0 | 8.56 | | ug/L | | 86 | 53 - 140 |
| cis-1,2-Dichloroethene | 1.0 | U | 10.0 | 8.72 | | ug/L | | 87 | 64 - 130 |
| Tetrachloroethene | 1.0 | U | 10.0 | 9.43 | | ug/L | | 94 | 51 - 136 |
| trans-1,2-Dichloroethene | 1.0 | U | 10.0 | 9.48 | | ug/L | | 95 | 68 - 133 |
| Trichloroethene | 0.23 | J | 10.0 | 7.83 | | ug/L | | 76 | 55 - 131 |
| Vinyl chloride | 1.0 | U | 10.0 | 10.3 | | ug/L | | 103 | 43 - 154 |

| Surrogate | MS %Recovery | MS Qualifier | Limits |
|------------------------------|--------------|--------------|----------|
| 1,2-Dichloroethane-d4 (Surr) | 83 | | 70 - 121 |
| 4-Bromofluorobenzene (Surr) | 85 | | 59 - 120 |
| Toluene-d8 (Surr) | 93 | | 70 - 123 |

TestAmerica Canton

QC Sample Results

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

TestAmerica Job ID: 240-106461-1

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

Lab Sample ID: 240-106456-E-1 MS
Matrix: Water
Analysis Batch: 363153

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

| Surrogate | MS %Recovery | MS Qualifier | Limits |
|-----------------------------|-----------------|-----------------|----------|
| Dibromofluoromethane (Surr) | 88 | | 75 - 128 |

Lab Sample ID: 240-106456-H-1 MSD
Matrix: Water
Analysis Batch: 363153

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 | 10.0 | 8.67 | | ug/L | | 87 | 53 - 140 | 1 | 35 |
| cis-1,2-Dichloroethene | 1.0 | U | 10.0 | 8.95 | | ug/L | | 90 | 64 - 130 | 3 | 21 |
| Tetrachloroethene | 1.0 | U | 10.0 | 9.43 | | ug/L | | 94 | 51 - 136 | 0 | 23 |
| trans-1,2-Dichloroethene | 1.0 | U | 10.0 | 9.58 | | ug/L | | 96 | 68 - 133 | 1 | 24 |
| Trichloroethene | 0.23 | J | 10.0 | 7.97 | | ug/L | | 77 | 55 - 131 | 2 | 23 |
| Vinyl chloride | 1.0 | U | 10.0 | 10.1 | | ug/L | | 101 | 43 - 154 | 2 | 29 |

| Surrogate | MSD %Recovery | MSD Qualifier | Limits |
|------------------------------|------------------|------------------|----------|
| 1,2-Dichloroethane-d4 (Surr) | 79 | | 70 - 121 |
| 4-Bromofluorobenzene (Surr) | 85 | | 59 - 120 |
| Toluene-d8 (Surr) | 94 | | 70 - 123 |
| Dibromofluoromethane (Surr) | 88 | | 75 - 128 |

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

Lab Sample ID: MB 240-363200/13
Matrix: Water
Analysis Batch: 363200

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 | | | 01/08/19 16:23 | 1 |

| Surrogate | MB %Recovery | MB Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|------------------------------|-----------------|-----------------|----------|----------|----------------|---------|
| 1,2-Dichloroethane-d4 (Surr) | 86 | | 63 - 125 | | 01/08/19 16:23 | 1 |

Lab Sample ID: LCS 240-363200/12
Matrix: Water
Analysis Batch: 363200

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 | 11.8 | | ug/L | | 118 | 59 - 131 |

| Surrogate | LCS %Recovery | LCS Qualifier | Limits |
|------------------------------|------------------|------------------|----------|
| 1,2-Dichloroethane-d4 (Surr) | 85 | | 63 - 125 |

TestAmerica Canton

QC Sample Results

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

TestAmerica Job ID: 240-106461-1

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

Lab Sample ID: MRL 240-363200/14
Matrix: Water
Analysis Batch: 363200

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

| Analyte | Spike Added | MRL Result | MRL Qualifier | Unit | D | %Rec | %Rec. Limits |
|------------------------------|------------------|----------------------|---------------|-------|---|------|--------------|
| 1,4-Dioxane | 0.00100 | 0.00105 | J | ng/uL | | 105 | 10 - 150 |
| Surrogate | %Recovery | MRL Qualifier | Limits | | | | |
| 1,2-Dichloroethane-d4 (Surr) | 87 | | 10 - 150 | | | | |

Lab Sample ID: 500-156985-D-2 MS
Matrix: Water
Analysis Batch: 363200

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 | 12.5 | | ug/L | | 125 | 52 - 129 |
| Surrogate | %Recovery | MS Qualifier | Limits | | | | | | |
| 1,2-Dichloroethane-d4 (Surr) | 92 | | 63 - 125 | | | | | | |

Lab Sample ID: 500-156985-D-2 MSD
Matrix: Water
Analysis Batch: 363200

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 |
|------------------------------|------------------|----------------------|---------------|------------|---------------|------|---|------|--------------|-----|-----------|
| 1,4-Dioxane | 2.0 | U | 10.0 | 11.7 | | ug/L | | 117 | 52 - 129 | 7 | 13 |
| Surrogate | %Recovery | MSD Qualifier | Limits | | | | | | | | |
| 1,2-Dichloroethane-d4 (Surr) | 88 | | 63 - 125 | | | | | | | | |

QC Association Summary

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

TestAmerica Job ID: 240-106461-1

GC/MS VOA

Analysis Batch: 363153

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|--------------------|------------------------|-----------|--------|--------|------------|
| 240-106461-1 | MW-109S_122818 | Total/NA | Water | 8260B | |
| MB 240-363153/6 | Method Blank | Total/NA | Water | 8260B | |
| LCS 240-363153/4 | Lab Control Sample | Total/NA | Water | 8260B | |
| 240-106456-E-1 MS | Matrix Spike | Total/NA | Water | 8260B | |
| 240-106456-H-1 MSD | Matrix Spike Duplicate | Total/NA | Water | 8260B | |

Analysis Batch: 363200

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|--------------------|------------------------|-----------|--------|-----------|------------|
| 240-106461-1 | MW-109S_122818 | Total/NA | Water | 8260B SIM | |
| MB 240-363200/13 | Method Blank | Total/NA | Water | 8260B SIM | |
| LCS 240-363200/12 | Lab Control Sample | Total/NA | Water | 8260B SIM | |
| MRL 240-363200/14 | Lab Control Sample | Total/NA | Water | 8260B SIM | |
| 500-156985-D-2 MS | Matrix Spike | Total/NA | Water | 8260B SIM | |
| 500-156985-D-2 MSD | Matrix Spike Duplicate | Total/NA | Water | 8260B SIM | |

Lab Chronicle

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

TestAmerica Job ID: 240-106461-1

Client Sample ID: MW-109S_122818

Lab Sample ID: 240-106461-1

Date Collected: 12/28/18 11:58

Matrix: Water

Date Received: 01/03/19 08:35

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|--------------|-----|-----------------|--------------|----------------------|---------|---------|
| Total/NA | Analysis | 8260B | | 1 | 363153 | 01/08/19 16:03 | LEE | TAL CAN |
| Total/NA | Analysis | 8260B SIM | | 1 | 363200 | 01/08/19 20:35 | SAM | TAL CAN |

Laboratory References:

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

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

Accreditation/Certification Summary

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

TestAmerica Job ID: 240-106461-1

Laboratory: TestAmerica Canton

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

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

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

TestAmerica Canton

TestAmerica Canton Sample Receipt Form/Narrative

Login # : 106461

Canton Facility

Client Accadis Site Name Cooler unpacked by:
Cooler Received on 1/3/19 Opened on 1/3/19
FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

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

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

- 1. Cooler temperature upon receipt
IR GUN# IR-8 (CF -0.2 °C) Observed Cooler Temp. °C Corrected Cooler Temp. °C
IR GUN #36 (CF +0°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
-Were tamper/custody seals intact and uncompromised? Yes No NA
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC854592
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials? Yes No NA Larger than this.
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes No
16. Was a LL Hg or Me Hg trip blank present? Yes No

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

Contacted PM Date by via Verbal Voice Mail Other

Concerning

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by: SR

18. SAMPLE CONDITION

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

19. SAMPLE PRESERVATION

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



REVISED REPORT: January 18, 2019

REVISION SUMMARY: Original lab report was separated into site specific submittals.

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

CADENA project ID: E203631

Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater

Project number: MI001454.0002/3/4.00002/2B/3B

Client project scope reference: Sample COC only was used to define project analytical requirements.

Laboratory: TestAmerica - North Canton

Laboratory submittal: 106461-1

Sample date: 2018-12-28

Report received by CADENA: 2019-01-18

Initial Data Verification completed by CADENA: 2019-01-18

There were no significant QC anomalies or exceptions to report.

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

1 Water sample(s) was analyzed for GCMS VOC parameter(s).

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

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

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

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

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

CADENA Valid Qualifiers

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

Analytical Results Summary

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton

Laboratory Submittal: 106461-1

Sample Name: MW-109S_122818

Lab Sample ID: 2401064611

Sample Date: 12/28/2018

| Analyte | Cas No. | Result | Report | | Valid | |
|--------------------------|----------|--------|--------|-------|-------|-----------|
| | | | Limit | Units | | Qualifier |
| GC/MS VOC | | | | | | |
| <u>OSW-8260B</u> | | | | | | |
| 1,1-Dichloroethene | 75-35-4 | ND | 1.0 | ug/l | --- | |
| cis-1,2-Dichloroethene | 156-59-2 | 0.45 | 1.0 | ug/l | J | |
| Tetrachloroethene | 127-18-4 | ND | 1.0 | ug/l | --- | |
| trans-1,2-Dichloroethene | 156-60-5 | 0.25 | 1.0 | ug/l | J | |
| Trichloroethene | 79-01-6 | ND | 1.0 | ug/l | --- | |
| Vinyl chloride | 75-01-4 | 0.28 | 1.0 | ug/l | J | |
| <u>OSW-8260BBSim</u> | | | | | | |
| 1,4-Dioxane | 123-91-1 | ND | 2.0 | ug/l | --- | |