

3/12/2019
Mr. Jim Tomalia
Arcadis U.S., Inc.
28550 Cabot Dr.
Suite 500
Novi MI 48377

Project Name: Ford LTP
Project #:
Workorder #: 1903145

Dear Mr. Jim Tomalia

The following report includes the data for the above referenced project for sample(s) received on 3/6/2019 at Air Toxics Ltd.

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

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

Regards,



Ausha Scott
Project Manager

WORK ORDER #: 1903145

Work Order Summary

| | | | |
|------------------------|---|------------------|---|
| CLIENT: | Mr. Jim Tomalia Arcadis U.S., Inc. 28550 Cabot Dr. Suite 500 Novi, MI 48377 | BILL TO: | Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129 |
| PHONE: | 517-819-0356 | P.O. # | MI001454.0003 |
| FAX: | | PROJECT # | Ford LTP |
| DATE RECEIVED: | 03/06/2019 | CONTACT: | Ausha Scott |
| DATE COMPLETED: | 03/12/2019 | | |

| <u>FRACTION #</u> | <u>NAME</u> | <u>TEST</u> | <u>RECEIPT VAC./PRES.</u> | <u>FINAL PRESSURE</u> |
|-------------------|-----------------------------|-------------|-------------------------------|---------------------------|
| 01A | SSMP-34380Capital-01_030119 | TO-15 | 5.1 "Hg | 14.9 psi |
| 02A | Lab Blank | TO-15 | NA | NA |
| 03A | CCV | TO-15 | NA | NA |
| 04A | LCS | TO-15 | NA | NA |
| 04AA | LCSD | TO-15 | NA | NA |

CERTIFIED BY: 

 Technical Director

DATE: 03/12/19

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
 TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
 Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
 Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.

Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.
 180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
 (916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15
Arcadis U.S., Inc.
Workorder# 1903145

One 1 Liter Summa Canister (100% Certified) sample was received on March 06, 2019. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

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

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per client project requirements, the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified (0.2 ppbv for compounds reported at 0.5 ppbv and 0.8 ppbv for compounds reported at 2.0 ppbv) may be false positives.

Definition of Data Qualifying Flags

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

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

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

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

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

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

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

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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

| | | | |
|-----------------------------|---|-----------------------------|--------------------|
| Client ID: | SSMP-34380Capital-01_030119 | Date/Time Analyzed: | 3/11/19 08:02 PM |
| Lab ID: | 1903145-01A | Dilution Factor: | 2.43 |
| Date/Time Collected: | 3/1/19 05:26 PM | Instrument/Filename: | msd17.i / 17031112 |
| Media: | 1 Liter Summa Canister (100% Certified) | | |

| Compound | CAS# | MDL (ug/m3) | LOD (ug/m3) | Rpt. Limit (ug/m3) | Amount (ug/m3) |
|--------------------------|----------|----------------|----------------|-----------------------|-------------------|
| 1,1-Dichloroethene | 75-35-4 | 2.1 | 3.8 | 4.8 | Not Detected |
| 1,4-Dioxane | 123-91-1 | 9.3 | 13 | 18 | Not Detected |
| cis-1,2-Dichloroethene | 156-59-2 | 1.3 | 3.8 | 4.8 | Not Detected |
| Tetrachloroethene | 127-18-4 | 3.3 | 6.6 | 8.2 | 6.0 J |
| trans-1,2-Dichloroethene | 156-60-5 | 1.4 | 3.8 | 4.8 | Not Detected |
| Trichloroethene | 79-01-6 | 2.4 | 5.2 | 6.5 | Not Detected |
| Vinyl Chloride | 75-01-4 | 1.2 | 2.5 | 3.1 | Not Detected |

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 96 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 93 |
| Toluene-d8 | 2037-26-5 | 70-130 | 104 |

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

| | | | |
|-----------------------------|---------------------|-----------------------------|---------------------|
| Client ID: | Lab Blank | Date/Time Analyzed: | 3/11/19 12:24 PM |
| Lab ID: | 1903145-02A | Dilution Factor: | 1.00 |
| Date/Time Collected: | NA - Not Applicable | Instrument/Filename: | msd17.i / 17031105a |
| Media: | NA - Not Applicable | | |

| Compound | CAS# | MDL (ug/m3) | LOD (ug/m3) | Rpt. Limit (ug/m3) | Amount (ug/m3) |
|--------------------------|----------|----------------|----------------|-----------------------|-------------------|
| 1,1-Dichloroethene | 75-35-4 | 0.87 | 1.6 | 2.0 | Not Detected |
| 1,4-Dioxane | 123-91-1 | 3.8 | 5.4 | 7.2 | Not Detected |
| cis-1,2-Dichloroethene | 156-59-2 | 0.56 | 1.6 | 2.0 | Not Detected |
| Tetrachloroethene | 127-18-4 | 1.4 | 2.7 | 3.4 | Not Detected |
| trans-1,2-Dichloroethene | 156-60-5 | 0.59 | 1.6 | 2.0 | Not Detected |
| Trichloroethene | 79-01-6 | 0.97 | 2.1 | 2.7 | Not Detected |
| Vinyl Chloride | 75-01-4 | 0.51 | 1.0 | 1.3 | Not Detected |

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 101 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 93 |
| Toluene-d8 | 2037-26-5 | 70-130 | 104 |

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

| | | | |
|-----------------------------|---------------------|-----------------------------|--------------------|
| Client ID: | CCV | Date/Time Analyzed: | 3/11/19 10:26 AM |
| Lab ID: | 1903145-03A | Dilution Factor: | 1.00 |
| Date/Time Collected: | NA - Not Applicable | Instrument/Filename: | msd17.i / 17031102 |
| Media: | NA - Not Applicable | | |

| Compound | CAS# | %Recovery |
|--------------------------|----------|-----------|
| 1,1-Dichloroethene | 75-35-4 | 103 |
| 1,4-Dioxane | 123-91-1 | 118 |
| cis-1,2-Dichloroethene | 156-59-2 | 100 |
| Tetrachloroethene | 127-18-4 | 99 |
| trans-1,2-Dichloroethene | 156-60-5 | 110 |
| Trichloroethene | 79-01-6 | 108 |
| Vinyl Chloride | 75-01-4 | 108 |

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 102 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 94 |
| Toluene-d8 | 2037-26-5 | 70-130 | 105 |

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

| | | | |
|-----------------------------|---------------------|-----------------------------|--------------------|
| Client ID: | LCS | Date/Time Analyzed: | 3/11/19 11:30 AM |
| Lab ID: | 1903145-04A | Dilution Factor: | 1.00 |
| Date/Time Collected: | NA - Not Applicable | Instrument/Filename: | msd17.i / 17031103 |
| Media: | NA - Not Applicable | | |

| Compound | CAS# | %Recovery |
|--------------------------|----------|-----------|
| 1,1-Dichloroethene | 75-35-4 | 106 |
| 1,4-Dioxane | 123-91-1 | 116 |
| cis-1,2-Dichloroethene | 156-59-2 | 110 |
| Tetrachloroethene | 127-18-4 | 99 |
| trans-1,2-Dichloroethene | 156-60-5 | 98 |
| Trichloroethene | 79-01-6 | 109 |
| Vinyl Chloride | 75-01-4 | 112 |

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 102 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 96 |
| Toluene-d8 | 2037-26-5 | 70-130 | 106 |

* % Recovery is calculated using unrounded analytical results.

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

| | | | |
|-----------------------------|---------------------|-----------------------------|--------------------|
| Client ID: | LCSD | Date/Time Analyzed: | 3/11/19 11:56 AM |
| Lab ID: | 1903145-04AA | Dilution Factor: | 1.00 |
| Date/Time Collected: | NA - Not Applicable | Instrument/Filename: | msd17.i / 17031104 |
| Media: | NA - Not Applicable | | |

| Compound | CAS# | %Recovery |
|--------------------------|----------|-----------|
| 1,1-Dichloroethene | 75-35-4 | 104 |
| 1,4-Dioxane | 123-91-1 | 115 |
| cis-1,2-Dichloroethene | 156-59-2 | 110 |
| Tetrachloroethene | 127-18-4 | 99 |
| trans-1,2-Dichloroethene | 156-60-5 | 96 |
| Trichloroethene | 79-01-6 | 110 |
| Vinyl Chloride | 75-01-4 | 110 |

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 102 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 95 |
| Toluene-d8 | 2037-26-5 | 70-130 | 104 |

* % Recovery is calculated using unrounded analytical results.



March 12, 2019

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

CADENA project ID: E203631
Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater
Project number: MI001454.0002/3/4.00002/2B/3B
Client project scope reference: Sample COC only was used to define project analytical requirements.
Laboratory: Eurofins Air Toxics - Folsom
Laboratory submittal: 1903145
Sample date: 2019-03-01
Report received by CADENA: 2019-03-12
Initial Data Verification completed by CADENA: 2019-03-12

1 Air sample was analyzed for TO-15 parameters.

There were no significant QC anomalies or exceptions to report.

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

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

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

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

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

CADENA Valid Qualifiers

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

Ford Motor Company – Livonia Transmission Project

DATA REVIEW

Livonia, Michigan

Volatile Organic Compounds (VOC) TO-15 Analysis

SDG #1903145

CADENA Verification Report: 2019-03-12

Analyses Performed By:
Eurofins Air Toxics
Folsom, California

Report #32202R
Review Level: Tier III
Project: MI001454.0003.00002



DATA REVIEW

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 1903145 for samples collected in association with the Ford – Livonia, Michigan site. The review was conducted as a Tier III validation in addition to a verification/Tier II validation review performed by CADENA Inc. and included review of level IV laboratory data package completeness. Only elements of a Tier III validation effort (Tier III includes a detailed review of laboratory raw data to check for errors in calculation, calibration review, internal standard review and compound identification) and omitted deviations from the CADENA verification/Tier II report are documented in this report. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

| SDG | Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | |
|---------|-----------------------------|-------------|--------|------------------------|---------------|-------------------|-------------|------|
| | | | | | | TO-15 (Full Scan) | TO-15 (SIM) | MISC |
| 1903145 | SSMP-34380CAPITAL-01_030119 | 1903145-01A | Air | 3/1/2019 | | X | | |

DATA REVIEW

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

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

DATA REVIEW

ORGANIC ANALYSIS INTRODUCTION

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

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

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

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

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

DATA REVIEW

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

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

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

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

2. Mass Spectrometer Tuning

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

System performance and column resolution were acceptable.

3. Calibration

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

3.1 Initial Calibration

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

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

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

3.2 Continuing Calibration

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

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

4. Internal Standard Performance

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

All internal standard responses were within control limits.

DATA REVIEW

5. Compound Identification

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

All identified compounds met the specified criteria.

6. System Performance and Overall Assessment

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

DATA REVIEW

DATA VALIDATION CHECKLIST FOR VOCs

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

Notes:

%RSD Relative standard deviation

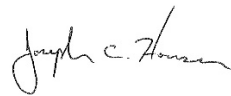
%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Joseph C. Houser

SIGNATURE:



DATE: April 2, 2019

PEER REVIEW: Dennis Capria

DATE: April 2, 2019



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



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

| | | | |
|-----------------------------|---|-----------------------------|--------------------|
| Client ID: | SSMP-34380Capital-01_030119 | Date/Time Analyzed: | 3/11/19 08:02 PM |
| Lab ID: | 1903145-01A | Dilution Factor: | 2.43 |
| Date/Time Collected: | 3/1/19 05:26 PM | Instrument/Filename: | msd17.i / 17031112 |
| Media: | 1 Liter Summa Canister (100% Certified) | | |

| Compound | CAS# | MDL (ug/m3) | LOD (ug/m3) | Rpt. Limit (ug/m3) | Amount (ug/m3) |
|--------------------------|----------|----------------|----------------|-----------------------|-------------------|
| 1,1-Dichloroethene | 75-35-4 | 2.1 | 3.8 | 4.8 | Not Detected |
| 1,4-Dioxane | 123-91-1 | 9.3 | 13 | 18 | Not Detected |
| cis-1,2-Dichloroethene | 156-59-2 | 1.3 | 3.8 | 4.8 | Not Detected |
| Tetrachloroethene | 127-18-4 | 3.3 | 6.6 | 8.2 | 6.0 J |
| trans-1,2-Dichloroethene | 156-60-5 | 1.4 | 3.8 | 4.8 | Not Detected |
| Trichloroethene | 79-01-6 | 2.4 | 5.2 | 6.5 | Not Detected |
| Vinyl Chloride | 75-01-4 | 1.2 | 2.5 | 3.1 | Not Detected |

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 96 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 93 |
| Toluene-d8 | 2037-26-5 | 70-130 | 104 |

3/12/2019

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

Project Name: Ford LTP
Project #:
Workorder #: 1903148

Dear Mr. Jim Tomalia

The following report includes the data for the above referenced project for sample(s) received on 3/6/2019 at Air Toxics Ltd.

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

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

Regards,



Ausha Scott
Project Manager

WORK ORDER #: 1903148

Work Order Summary

| | | | |
|------------------------|---|------------------|---|
| CLIENT: | Mr. Jim Tomalia Arcadis U.S., Inc. 28550 Cabot Dr. Suite 500 Novi, MI 48377 | BILL TO: | Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129 |
| PHONE: | 517-819-0356 | P.O. # | MI001454.0003 |
| FAX: | | PROJECT # | Ford LTP |
| DATE RECEIVED: | 03/06/2019 | CONTACT: | Ausha Scott |
| DATE COMPLETED: | 03/12/2019 | | |

| <u>FRACTION #</u> | <u>NAME</u> | <u>TEST</u> | <u>RECEIPT VAC./PRES.</u> | <u>FINAL PRESSURE</u> |
|-------------------|----------------------------|----------------|-------------------------------|---------------------------|
| 01A | IAF-34380Capital-02_022819 | Modified TO-15 | 6.5 "Hg | 5 psi |
| 02A | IAB-34380Capital-03_022819 | Modified TO-15 | 6.5 "Hg | 5 psi |
| 03A | IAG-34380Capital-01_022819 | Modified TO-15 | 6.5 "Hg | 5 psi |
| 04A | Lab Blank | Modified TO-15 | NA | NA |
| 05A | CCV | Modified TO-15 | NA | NA |
| 06A | LCS | Modified TO-15 | NA | NA |
| 06AA | LCSD | Modified TO-15 | NA | NA |

CERTIFIED BY: 

 Technical Director

DATE: 03/12/19

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
 TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
 Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
 Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.

Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

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LABORATORY NARRATIVE
Modified TO-15
Arcadis U.S., Inc.
Workorder# 1903148

Three 6 Liter Summa Canister (100% Certified) samples were received on March 06, 2019. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

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

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

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

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. All The canisters used for this project have been certified to the Reporting Limit for the target analytes included in this workorder. Concentrations that are below the level at which the canister was certified may be false positives.

Definition of Data Qualifying Flags

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

- B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
- J - Estimated value.
- E - Exceeds instrument calibration range.
- S - Saturated peak.
- Q - Exceeds quality control limits.
- U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.
- UJ- Non-detected compound associated with low bias in the CCV
- N - The identification is based on presumptive evidence.

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

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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

| | | | |
|-----------------------------|---|-----------------------------|--------------------|
| Client ID: | IAF-34380Capital-02_022819 | Date/Time Analyzed: | 3/10/19 08:52 AM |
| Lab ID: | 1903148-01A | Dilution Factor: | 1.71 |
| Date/Time Collected: | 3/1/19 06:02 PM | Instrument/Filename: | msd22.i / 22030913 |
| Media: | 6 Liter Summa Canister (100% Certified) | | |

| Compound | CAS# | MDL (ug/m3) | LOD (ug/m3) | Rpt. Limit (ug/m3) | Amount (ug/m3) |
|--------------------------|----------|----------------|----------------|-----------------------|-------------------|
| 1,1-Dichloroethene | 75-35-4 | 0.13 | 0.34 | 0.68 | Not Detected |
| 1,4-Dioxane | 123-91-1 | 0.14 | 0.31 | 0.62 | Not Detected |
| cis-1,2-Dichloroethene | 156-59-2 | 0.15 | 0.34 | 0.68 | Not Detected |
| Tetrachloroethene | 127-18-4 | 0.070 | 0.58 | 1.2 | 0.20 J |
| trans-1,2-Dichloroethene | 156-60-5 | 0.11 | 0.34 | 0.68 | Not Detected |
| Trichloroethene | 79-01-6 | 0.099 | 0.46 | 0.92 | Not Detected |
| Vinyl Chloride | 75-01-4 | 0.062 | 0.22 | 0.44 | Not Detected |

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 103 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 94 |
| Toluene-d8 | 2037-26-5 | 70-130 | 96 |

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

| | | | |
|-----------------------------|---|-----------------------------|--------------------|
| Client ID: | IAB-34380Capital-03_022819 | Date/Time Analyzed: | 3/10/19 09:29 AM |
| Lab ID: | 1903148-02A | Dilution Factor: | 1.71 |
| Date/Time Collected: | 3/1/19 06:06 PM | Instrument/Filename: | msd22.i / 22030914 |
| Media: | 6 Liter Summa Canister (100% Certified) | | |

| Compound | CAS# | MDL (ug/m3) | LOD (ug/m3) | Rpt. Limit (ug/m3) | Amount (ug/m3) |
|--------------------------|----------|----------------|----------------|-----------------------|-------------------|
| 1,1-Dichloroethene | 75-35-4 | 0.13 | 0.34 | 0.68 | Not Detected |
| 1,4-Dioxane | 123-91-1 | 0.14 | 0.31 | 0.62 | Not Detected |
| cis-1,2-Dichloroethene | 156-59-2 | 0.15 | 0.34 | 0.68 | Not Detected |
| Tetrachloroethene | 127-18-4 | 0.070 | 0.58 | 1.2 | 0.20 J |
| trans-1,2-Dichloroethene | 156-60-5 | 0.11 | 0.34 | 0.68 | Not Detected |
| Trichloroethene | 79-01-6 | 0.099 | 0.46 | 0.92 | Not Detected |
| Vinyl Chloride | 75-01-4 | 0.062 | 0.22 | 0.44 | Not Detected |

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 103 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 91 |
| Toluene-d8 | 2037-26-5 | 70-130 | 95 |

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

| | | | |
|-----------------------------|---|-----------------------------|--------------------|
| Client ID: | IAG-34380Capital-01_022819 | Date/Time Analyzed: | 3/10/19 10:04 AM |
| Lab ID: | 1903148-03A | Dilution Factor: | 1.71 |
| Date/Time Collected: | 3/1/19 05:01 PM | Instrument/Filename: | msd22.i / 22030915 |
| Media: | 6 Liter Summa Canister (100% Certified) | | |

| Compound | CAS# | MDL (ug/m3) | LOD (ug/m3) | Rpt. Limit (ug/m3) | Amount (ug/m3) |
|--------------------------|----------|----------------|----------------|-----------------------|-------------------|
| 1,1-Dichloroethene | 75-35-4 | 0.13 | 0.34 | 0.68 | Not Detected |
| 1,4-Dioxane | 123-91-1 | 0.14 | 0.31 | 0.62 | 1.6 |
| cis-1,2-Dichloroethene | 156-59-2 | 0.15 | 0.34 | 0.68 | Not Detected |
| Tetrachloroethene | 127-18-4 | 0.070 | 0.58 | 1.2 | 1.8 |
| trans-1,2-Dichloroethene | 156-60-5 | 0.11 | 0.34 | 0.68 | Not Detected |
| Trichloroethene | 79-01-6 | 0.099 | 0.46 | 0.92 | Not Detected |
| Vinyl Chloride | 75-01-4 | 0.062 | 0.22 | 0.44 | Not Detected |

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 99 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 92 |
| Toluene-d8 | 2037-26-5 | 70-130 | 99 |

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

| | | | |
|-----------------------------|---------------------|-----------------------------|---------------------|
| Client ID: | Lab Blank | Date/Time Analyzed: | 3/9/19 07:34 PM |
| Lab ID: | 1903148-04A | Dilution Factor: | 1.00 |
| Date/Time Collected: | NA - Not Applicable | Instrument/Filename: | msd22.i / 22030906a |
| Media: | NA - Not Applicable | | |

| Compound | CAS# | MDL (ug/m3) | LOD (ug/m3) | Rpt. Limit (ug/m3) | Amount (ug/m3) |
|--------------------------|----------|----------------|----------------|-----------------------|-------------------|
| 1,1-Dichloroethene | 75-35-4 | 0.075 | 0.20 | 0.40 | Not Detected |
| 1,4-Dioxane | 123-91-1 | 0.084 | 0.18 | 0.36 | Not Detected |
| cis-1,2-Dichloroethene | 156-59-2 | 0.088 | 0.20 | 0.40 | Not Detected |
| Tetrachloroethene | 127-18-4 | 0.041 | 0.34 | 0.68 | Not Detected |
| trans-1,2-Dichloroethene | 156-60-5 | 0.062 | 0.20 | 0.40 | Not Detected |
| Trichloroethene | 79-01-6 | 0.058 | 0.27 | 0.54 | Not Detected |
| Vinyl Chloride | 75-01-4 | 0.036 | 0.13 | 0.26 | Not Detected |

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 104 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 96 |
| Toluene-d8 | 2037-26-5 | 70-130 | 95 |

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

| | | | |
|-----------------------------|---------------------|-----------------------------|--------------------|
| Client ID: | CCV | Date/Time Analyzed: | 3/9/19 04:34 PM |
| Lab ID: | 1903148-05A | Dilution Factor: | 1.00 |
| Date/Time Collected: | NA - Not Applicable | Instrument/Filename: | msd22.i / 22030902 |
| Media: | NA - Not Applicable | | |

| Compound | CAS# | %Recovery |
|--------------------------|----------|-----------|
| 1,1-Dichloroethene | 75-35-4 | 97 |
| 1,4-Dioxane | 123-91-1 | 127 |
| cis-1,2-Dichloroethene | 156-59-2 | 100 |
| Tetrachloroethene | 127-18-4 | 100 |
| trans-1,2-Dichloroethene | 156-60-5 | 98 |
| Trichloroethene | 79-01-6 | 103 |
| Vinyl Chloride | 75-01-4 | 99 |

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 93 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 103 |
| Toluene-d8 | 2037-26-5 | 70-130 | 109 |

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

| | | | |
|-----------------------------|---------------------|-----------------------------|--------------------|
| Client ID: | LCS | Date/Time Analyzed: | 3/9/19 05:14 PM |
| Lab ID: | 1903148-06A | Dilution Factor: | 1.00 |
| Date/Time Collected: | NA - Not Applicable | Instrument/Filename: | msd22.i / 22030903 |
| Media: | NA - Not Applicable | | |

| Compound | CAS# | %Recovery |
|--------------------------|----------|-----------|
| 1,1-Dichloroethene | 75-35-4 | 98 |
| 1,4-Dioxane | 123-91-1 | 120 |
| cis-1,2-Dichloroethene | 156-59-2 | 110 |
| Tetrachloroethene | 127-18-4 | 100 |
| trans-1,2-Dichloroethene | 156-60-5 | 86 |
| Trichloroethene | 79-01-6 | 102 |
| Vinyl Chloride | 75-01-4 | 106 |

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 93 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 101 |
| Toluene-d8 | 2037-26-5 | 70-130 | 105 |

* % Recovery is calculated using unrounded analytical results.

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

| | | | |
|-----------------------------|---------------------|-----------------------------|--------------------|
| Client ID: | LCSD | Date/Time Analyzed: | 3/9/19 05:54 PM |
| Lab ID: | 1903148-06AA | Dilution Factor: | 1.00 |
| Date/Time Collected: | NA - Not Applicable | Instrument/Filename: | msd22.i / 22030904 |
| Media: | NA - Not Applicable | | |

| Compound | CAS# | %Recovery |
|--------------------------|----------|-----------|
| 1,1-Dichloroethene | 75-35-4 | 101 |
| 1,4-Dioxane | 123-91-1 | 120 |
| cis-1,2-Dichloroethene | 156-59-2 | 113 |
| Tetrachloroethene | 127-18-4 | 98 |
| trans-1,2-Dichloroethene | 156-60-5 | 87 |
| Trichloroethene | 79-01-6 | 101 |
| Vinyl Chloride | 75-01-4 | 109 |

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 93 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 100 |
| Toluene-d8 | 2037-26-5 | 70-130 | 105 |

* % Recovery is calculated using unrounded analytical results.



March 12, 2019

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

CADENA project ID: E203631
Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater
Project number: MI001454.0002/3/4.00002/2B/3B
Client project scope reference: Sample COC only was used to define project analytical requirements.
Laboratory: Eurofins Air Toxics - Folsom
Laboratory submittal: 1903148
Sample date: 2019-03-01
Report received by CADENA: 2019-03-12
Initial Data Verification completed by CADENA: 2019-03-12

3 Air samples were analyzed for TO-15 parameters.

There were no significant QC anomalies or exceptions to report.

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

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

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

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

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

CADENA Valid Qualifiers

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

Ford Motor Company – Livonia Transmission Project

DATA REVIEW

Livonia, Michigan

Volatile Organic Compounds (VOC) TO-15 Analysis

SDG #1903148

CADENA Verification Report: 2019-03-12

Analyses Performed By:
Eurofins Air Toxics
Folsom, California

Report #32203R
Review Level: Tier III
Project: MI001454.0003.00002



DATA REVIEW

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 1903148 for samples collected in association with the Ford – Livonia, Michigan site. The review was conducted as a Tier III validation in addition to a verification/Tier II validation review performed by CADENA Inc. and included review of level IV laboratory data package completeness. Only elements of a Tier III validation effort (Tier III includes a detailed review of laboratory raw data to check for errors in calculation, calibration review, internal standard review and compound identification) and omitted deviations from the CADENA verification/Tier II report are documented in this report. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

| SDG | Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | |
|---------|----------------------------|-------------|--------|------------------------|---------------|-------------------|-------------|------|
| | | | | | | TO-15 (Full Scan) | TO-15 (SIM) | MISC |
| 1903148 | IAF-34380CAPITAL-02_022819 | 1903148-01A | Air | 3/1/2019 | | X | | |
| | IAB-34380CAPITAL-03_022819 | 1903148-02A | Air | 3/1/2019 | | X | | |
| | IAG-34380CAPITAL-01_022819 | 1903148-03A | Air | 3/1/2019 | | X | | |

DATA REVIEW

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

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

DATA REVIEW

ORGANIC ANALYSIS INTRODUCTION

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

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

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

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

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

DATA REVIEW

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

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

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

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

2. Mass Spectrometer Tuning

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

System performance and column resolution were acceptable.

3. Calibration

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

3.1 Initial Calibration

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

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

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

3.2 Continuing Calibration

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

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

4. Internal Standard Performance

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

All internal standard responses were within control limits.

DATA REVIEW

5. Compound Identification

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

All identified compounds met the specified criteria.

6. System Performance and Overall Assessment

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

DATA REVIEW

DATA VALIDATION CHECKLIST FOR VOCs

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

Notes:

%RSD Relative standard deviation

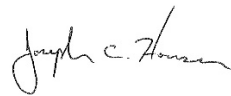
%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Joseph C. Houser

SIGNATURE:



DATE: April 2, 2019

PEER REVIEW: Dennis Capria

DATE: April 2, 2019



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



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

| | | | |
|-----------------------------|---|-----------------------------|--------------------|
| Client ID: | IAF-34380Capital-02_022819 | Date/Time Analyzed: | 3/10/19 08:52 AM |
| Lab ID: | 1903148-01A | Dilution Factor: | 1.71 |
| Date/Time Collected: | 3/1/19 06:02 PM | Instrument/Filename: | msd22.i / 22030913 |
| Media: | 6 Liter Summa Canister (100% Certified) | | |

| Compound | CAS# | MDL (ug/m3) | LOD (ug/m3) | Rpt. Limit (ug/m3) | Amount (ug/m3) |
|--------------------------|----------|----------------|----------------|-----------------------|-------------------|
| 1,1-Dichloroethene | 75-35-4 | 0.13 | 0.34 | 0.68 | Not Detected |
| 1,4-Dioxane | 123-91-1 | 0.14 | 0.31 | 0.62 | Not Detected |
| cis-1,2-Dichloroethene | 156-59-2 | 0.15 | 0.34 | 0.68 | Not Detected |
| Tetrachloroethene | 127-18-4 | 0.070 | 0.58 | 1.2 | 0.20 J |
| trans-1,2-Dichloroethene | 156-60-5 | 0.11 | 0.34 | 0.68 | Not Detected |
| Trichloroethene | 79-01-6 | 0.099 | 0.46 | 0.92 | Not Detected |
| Vinyl Chloride | 75-01-4 | 0.062 | 0.22 | 0.44 | Not Detected |

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 103 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 94 |
| Toluene-d8 | 2037-26-5 | 70-130 | 96 |

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

| | | | |
|-----------------------------|---|-----------------------------|--------------------|
| Client ID: | IAB-34380Capital-03_022819 | Date/Time Analyzed: | 3/10/19 09:29 AM |
| Lab ID: | 1903148-02A | Dilution Factor: | 1.71 |
| Date/Time Collected: | 3/1/19 06:06 PM | Instrument/Filename: | msd22.i / 22030914 |
| Media: | 6 Liter Summa Canister (100% Certified) | | |

| Compound | CAS# | MDL (ug/m3) | LOD (ug/m3) | Rpt. Limit (ug/m3) | Amount (ug/m3) |
|--------------------------|----------|----------------|----------------|-----------------------|-------------------|
| 1,1-Dichloroethene | 75-35-4 | 0.13 | 0.34 | 0.68 | Not Detected |
| 1,4-Dioxane | 123-91-1 | 0.14 | 0.31 | 0.62 | Not Detected |
| cis-1,2-Dichloroethene | 156-59-2 | 0.15 | 0.34 | 0.68 | Not Detected |
| Tetrachloroethene | 127-18-4 | 0.070 | 0.58 | 1.2 | 0.20 J |
| trans-1,2-Dichloroethene | 156-60-5 | 0.11 | 0.34 | 0.68 | Not Detected |
| Trichloroethene | 79-01-6 | 0.099 | 0.46 | 0.92 | Not Detected |
| Vinyl Chloride | 75-01-4 | 0.062 | 0.22 | 0.44 | Not Detected |

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 103 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 91 |
| Toluene-d8 | 2037-26-5 | 70-130 | 95 |

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

| | | | |
|-----------------------------|---|-----------------------------|--------------------|
| Client ID: | IAG-34380Capital-01_022819 | Date/Time Analyzed: | 3/10/19 10:04 AM |
| Lab ID: | 1903148-03A | Dilution Factor: | 1.71 |
| Date/Time Collected: | 3/1/19 05:01 PM | Instrument/Filename: | msd22.i / 22030915 |
| Media: | 6 Liter Summa Canister (100% Certified) | | |

| Compound | CAS# | MDL (ug/m3) | LOD (ug/m3) | Rpt. Limit (ug/m3) | Amount (ug/m3) |
|--------------------------|----------|----------------|----------------|-----------------------|-------------------|
| 1,1-Dichloroethene | 75-35-4 | 0.13 | 0.34 | 0.68 | Not Detected |
| 1,4-Dioxane | 123-91-1 | 0.14 | 0.31 | 0.62 | 1.6 |
| cis-1,2-Dichloroethene | 156-59-2 | 0.15 | 0.34 | 0.68 | Not Detected |
| Tetrachloroethene | 127-18-4 | 0.070 | 0.58 | 1.2 | 1.8 |
| trans-1,2-Dichloroethene | 156-60-5 | 0.11 | 0.34 | 0.68 | Not Detected |
| Trichloroethene | 79-01-6 | 0.099 | 0.46 | 0.92 | Not Detected |
| Vinyl Chloride | 75-01-4 | 0.062 | 0.22 | 0.44 | Not Detected |

D: Analyte not within the DoD scope of accreditation.

| Surrogates | CAS# | Limits | %Recovery |
|-----------------------|------------|--------|-----------|
| 1,2-Dichloroethane-d4 | 17060-07-0 | 70-130 | 99 |
| 4-Bromofluorobenzene | 460-00-4 | 70-130 | 92 |
| Toluene-d8 | 2037-26-5 | 70-130 | 99 |

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

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

TestAmerica Job ID: 240-108817-1

Client Project/Site: Ford LTP Livonia MI - E203631

For:

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

Attn: Kristoffer Hinskey



Authorized for release by:
3/11/2019 4:45:37 PM

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

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results through
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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.



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 | 12 |
| Lab Chronicle | 13 |
| Certification Summary | 14 |
| Chain of Custody | 15 |

Definitions/Glossary

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

TestAmerica Job ID: 240-108817-1

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. |
|----------------|---|
| ▫ | 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: 240-108817-1

Job ID: 240-108817-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-108817-1

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.

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 sample was received on 3/2/2019 9:45 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.2° C and 2.0° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Sample SUMP-34380CAPITOL-01-022819 (240-108817-1) was analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The sample was analyzed on 03/06/2019.

The continuing calibration verification (CCV) associated with batch 370483 recovered above the upper control limit for Vinyl Chloride and/or 1,2-Dichloropropane. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following sample is impacted: SUMP-34380CAPITOL-01-022819 (240-108817-1).

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

VOLATILE ORGANIC COMPOUNDS (GCMS SIM)

Sample SUMP-34380CAPITOL-01-022819 (240-108817-1) was analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The sample was analyzed on 03/04/2019.

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: 240-108817-1

| 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: 240-108817-1

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---------------|-----------------------------|--------|----------------|----------------|
| 240-108817-1 | SUMP-34380CAPITOL-01-022819 | Water | 02/28/19 18:15 | 03/02/19 09:45 |

- 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: 240-108817-1

Client Sample ID: SUMP-34380CAPITOL-01-022819

Lab Sample ID: 240-108817-1

No Detections.

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

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: 240-108817-1

Client Sample ID: SUMP-34380CAPITOL-01-022819

Lab Sample ID: 240-108817-1

Date Collected: 02/28/19 18:15

Matrix: Water

Date Received: 03/02/19 09:45

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 | | | 03/04/19 19:38 | 1 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 1,2-Dichloroethane-d4 (Surr) | 86 | | 63 - 125 | | | | | 03/04/19 19:38 | 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 | | | 03/06/19 19:40 | 1 |
| cis-1,2-Dichloroethene | 1.0 | U | 1.0 | 0.16 | ug/L | | | 03/06/19 19:40 | 1 |
| Tetrachloroethene | 1.0 | U | 1.0 | 0.15 | ug/L | | | 03/06/19 19:40 | 1 |
| trans-1,2-Dichloroethene | 1.0 | U | 1.0 | 0.19 | ug/L | | | 03/06/19 19:40 | 1 |
| Trichloroethene | 1.0 | U | 1.0 | 0.10 | ug/L | | | 03/06/19 19:40 | 1 |
| Vinyl chloride | 1.0 | U | 1.0 | 0.20 | ug/L | | | 03/06/19 19:40 | 1 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 1,2-Dichloroethane-d4 (Surr) | 111 | | 70 - 121 | | | | | 03/06/19 19:40 | 1 |
| 4-Bromofluorobenzene (Surr) | 97 | | 59 - 120 | | | | | 03/06/19 19:40 | 1 |
| Toluene-d8 (Surr) | 106 | | 70 - 123 | | | | | 03/06/19 19:40 | 1 |
| Dibromofluoromethane (Surr) | 105 | | 75 - 128 | | | | | 03/06/19 19:40 | 1 |

Surrogate Summary

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

TestAmerica Job ID: 240-108817-1

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) |
|------------------|---------------------------|-----------------|-----------------|-----------------|------------------|
| 240-108817-1 | SUMP-34380CAPITOL-01-0228 | 111 | 97 | 106 | 105 |
| LCS 240-370483/4 | Lab Control Sample | 107 | 110 | 123 | 103 |
| MB 240-370483/6 | Method Blank | 114 | 99 | 112 | 111 |

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) |
|--------------------|---------------------------|-----------------|
| 240-108804-B-1 MS | Matrix Spike | 83 |
| 240-108804-B-1 MSD | Matrix Spike Duplicate | 84 |
| 240-108817-1 | SUMP-34380CAPITOL-01-0228 | 86 |
| | 19 | |
| LCS 240-370124/4 | Lab Control Sample | 86 |
| MB 240-370124/5 | Method Blank | 86 |

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: 240-108817-1

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

Lab Sample ID: MB 240-370483/6

Matrix: Water

Analysis Batch: 370483

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 | | | 03/06/19 11:39 | 1 |
| cis-1,2-Dichloroethene | 1.0 | U | 1.0 | 0.16 | ug/L | | | 03/06/19 11:39 | 1 |
| Tetrachloroethene | 1.0 | U | 1.0 | 0.15 | ug/L | | | 03/06/19 11:39 | 1 |
| trans-1,2-Dichloroethene | 1.0 | U | 1.0 | 0.19 | ug/L | | | 03/06/19 11:39 | 1 |
| Trichloroethene | 1.0 | U | 1.0 | 0.10 | ug/L | | | 03/06/19 11:39 | 1 |
| Vinyl chloride | 1.0 | U | 1.0 | 0.20 | ug/L | | | 03/06/19 11:39 | 1 |

| Surrogate | MB %Recovery | MB Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|------------------------------|--------------|--------------|----------|----------|----------------|---------|
| 1,2-Dichloroethane-d4 (Surr) | 114 | | 70 - 121 | | 03/06/19 11:39 | 1 |
| 4-Bromofluorobenzene (Surr) | 99 | | 59 - 120 | | 03/06/19 11:39 | 1 |
| Toluene-d8 (Surr) | 112 | | 70 - 123 | | 03/06/19 11:39 | 1 |
| Dibromofluoromethane (Surr) | 111 | | 75 - 128 | | 03/06/19 11:39 | 1 |

Lab Sample ID: LCS 240-370483/4

Matrix: Water

Analysis Batch: 370483

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 | 10.6 | | ug/L | | 106 | 65 - 139 |
| cis-1,2-Dichloroethene | 10.0 | 10.4 | | ug/L | | 104 | 76 - 128 |
| Tetrachloroethene | 10.0 | 7.81 | | ug/L | | 78 | 74 - 130 |
| trans-1,2-Dichloroethene | 10.0 | 10.8 | | ug/L | | 108 | 78 - 133 |
| Trichloroethene | 10.0 | 8.44 | | ug/L | | 84 | 76 - 125 |
| Vinyl chloride | 10.0 | 13.5 | | ug/L | | 135 | 58 - 143 |

| Surrogate | LCS %Recovery | LCS Qualifier | Limits |
|------------------------------|---------------|---------------|----------|
| 1,2-Dichloroethane-d4 (Surr) | 107 | | 70 - 121 |
| 4-Bromofluorobenzene (Surr) | 110 | | 59 - 120 |
| Toluene-d8 (Surr) | 123 | | 70 - 123 |
| Dibromofluoromethane (Surr) | 103 | | 75 - 128 |

Lab Sample ID: MRL 240-370483/5

Matrix: Water

Analysis Batch: 370483

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

| Analyte | Spike Added | MRL Result | MRL Qualifier | Unit | D | %Rec | %Rec. Limits |
|----------------|-------------|------------|---------------|-------|---|------|--------------|
| Vinyl chloride | 0.00100 | 0.00143 | | ng/uL | | 143 | 10 - 150 |

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

Lab Sample ID: MB 240-370124/5

Matrix: Water

Analysis Batch: 370124

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 | | | 03/04/19 13:45 | 1 |

TestAmerica Canton

QC Sample Results

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

TestAmerica Job ID: 240-108817-1

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

Lab Sample ID: MB 240-370124/5
Matrix: Water
Analysis Batch: 370124

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

| Surrogate | MB MB | | Limits | Prepared | Analyzed | Dil Fac |
|------------------------------|-----------|-----------|----------|----------|----------------|---------|
| | %Recovery | Qualifier | | | | |
| 1,2-Dichloroethane-d4 (Surr) | 86 | | 63 - 125 | | 03/04/19 13:45 | 1 |

Lab Sample ID: LCS 240-370124/4
Matrix: Water
Analysis Batch: 370124

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

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---------|-------------|------------|---------------|------|---|------|--------------|
| | | | | | | | |

| Surrogate | LCS LCS | | Limits |
|------------------------------|-----------|-----------|----------|
| | %Recovery | Qualifier | |
| 1,2-Dichloroethane-d4 (Surr) | 86 | | 63 - 125 |

Lab Sample ID: 240-108804-B-1 MS
Matrix: Water
Analysis Batch: 370124

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 |
|---------|---------------|------------------|-------------|-----------|--------------|------|---|------|--------------|
| | | | | | | | | | |

| Surrogate | MS MS | | Limits |
|------------------------------|-----------|-----------|----------|
| | %Recovery | Qualifier | |
| 1,2-Dichloroethane-d4 (Surr) | 83 | | 63 - 125 |

Lab Sample ID: 240-108804-B-1 MSD
Matrix: Water
Analysis Batch: 370124

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 |
|---------|---------------|------------------|-------------|------------|---------------|------|---|------|--------------|-----|-------|
| | | | | | | | | | | | |

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

QC Association Summary

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

TestAmerica Job ID: 240-108817-1

GC/MS VOA

Analysis Batch: 370124

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|--------------------|-----------------------------|-----------|--------|-----------|------------|
| 240-108817-1 | SUMP-34380CAPITOL-01-022819 | Total/NA | Water | 8260B SIM | |
| MB 240-370124/5 | Method Blank | Total/NA | Water | 8260B SIM | |
| LCS 240-370124/4 | Lab Control Sample | Total/NA | Water | 8260B SIM | |
| 240-108804-B-1 MS | Matrix Spike | Total/NA | Water | 8260B SIM | |
| 240-108804-B-1 MSD | Matrix Spike Duplicate | Total/NA | Water | 8260B SIM | |

Analysis Batch: 370483

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|------------------|-----------------------------|-----------|--------|--------|------------|
| 240-108817-1 | SUMP-34380CAPITOL-01-022819 | Total/NA | Water | 8260B | |
| MB 240-370483/6 | Method Blank | Total/NA | Water | 8260B | |
| LCS 240-370483/4 | Lab Control Sample | Total/NA | Water | 8260B | |
| MRL 240-370483/5 | Lab Control Sample | Total/NA | Water | 8260B | |

Lab Chronicle

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

TestAmerica Job ID: 240-108817-1

Client Sample ID: SUMP-34380CAPITOL-01-022819

Lab Sample ID: 240-108817-1

Date Collected: 02/28/19 18:15

Matrix: Water

Date Received: 03/02/19 09:45

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|--------------|-----|-----------------|--------------|----------------------|---------|---------|
| Total/NA | Analysis | 8260B | | 1 | 370483 | 03/06/19 19:40 | LEE | TAL CAN |
| Total/NA | Analysis | 8260B SIM | | 1 | 370124 | 03/04/19 19:38 | SAM | TAL CAN |

Laboratory References:

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

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Accreditation/Certification Summary

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

TestAmerica Job ID: 240-108817-1

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 | 02-23-20 |
| 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 | 02-23-20 |
| 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 | 03-31-19 * |
| 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.

MICHIGAN
190

2.2/C20 1.4/C1.2

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

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

| | | | |
|---|---|---|---|
| Client Contact Company Name: Arcadis Address: 28550 Cabot Drive, Suite 500 City/State/Zip: Novi, MI, 48377 Phone: 248-994-2240 Project Name: Ford LTP Project Number: MI001454.0003 PO # MI001454.0003 | | Regulatory program: <input type="checkbox"/> DW <input type="checkbox"/> NPDES <input type="checkbox"/> RCKA <input type="checkbox"/> Other | |
| Client Project Manager: Kris Hinskey Telephone: 248-994-2240 Email: kristoffer.hinskey@arcadis.com | | Lab Contact: Mike DelMonico Telephone: 330-497-9396 | |
| Site Contact: Angela DeGrandis Telephone: 734-320-0065 | | Analyses 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 | |
| Analysis Turnaround Time TAT if different from below <input type="checkbox"/> 3 weeks <input type="checkbox"/> 2 weeks <input checked="" type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day | | Containers & Preservatives H2SO4 HNO3 HCl NaOH NaOH ZnAc Other: | |
| Method of Shipment/Carrier: Shipping/Tracking No: | | Filtered Sample (Y/N) Composite C / Grab G NG | |
| Matrix Aqueous Sediment Solid Other: | | Sample Specific Notes / Special Instructions: 6 CONTAINERS | |
| Sample Identification Sump-31280 Capital-D1-022819 | Sample Date 2-28-19 | Sample Time 1815 | Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months |
| Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown | | | |
| Special Instructions/QC Requirements & Comments: 240-108817 Chain of Custody | | | |
| Submit all results through Cadena at jim.tomalia@cadena.com. Cadena #E203631 Level IV Reporting. | | | |
| Relinquished by: [Signature] | Company: Arcadis Date/Time: 2-28-19 / 1900 | Received by: Nova Cold Storage Company: Arcadis Date/Time: 3-1-19 / 1550 | Date/Time: 2-28-19 / 1900 |
| Relinquished by: [Signature] | Company: Arcadis Date/Time: 05/10/19 | Received by: Jeni Hoe Company: Arcadis Date/Time: 3-1-19 / 1550 | Date/Time: 3-1-19 / 1550 |
| Relinquished by: [Signature] | Company: Arcadis Date/Time: 3-1-19 / 1550 | Received in Laboratory by: [Signature] | Date/Time: 3-2-19 / 945 |

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TestAmerica Canton Sample Receipt Form/Narrative
Canton Facility

Login # : 108817

Client Arcadis Site Name _____ Cooler unpacked by: [Signature]
 Cooler Received on 3-2-19 Opened on 3-2-19
 FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

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

TestAmerica Cooler # 7A 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-8 (CF -0.2 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
 IR GUN #36 (CF +0.7°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity _____ Yes No NA
 -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 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# HC861525
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: [Signature]

18. SAMPLE CONDITION

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

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
 Time preserved: _____ Preservative(s) added/Lot number(s): _____
 VOA Sample Preservation - Date/Time VOAs Frozen: _____



March 11, 2019

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

CADENA project ID: E203631
Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater
Project number: MI001454.0002/3/4.00002/2B/3B
Client project scope reference: Sample COC only was used to define project analytical requirements.
Laboratory: TestAmerica - North Canton
Laboratory submittal: 108817-1
Sample date: 2019-02-28
Report received by CADENA: 2019-03-11
Initial Data Verification completed by CADENA: 2019-03-11

The following minor QC exceptions or missing information were noted:

GCMS VOC QC batch CCV response outliers as noted in the laboratory submittal case narrative were not used to qualify client sample results as part of this level 2 data package verification review.

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 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.

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

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

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

CADENA Valid Qualifiers

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

SAMPLING AND ANALYSIS SUMMARY

CADENA Project ID: E203631

Laboratory: TestAmerica-North Canton

Laboratory Submittal: 108817-1

| Lab Sample ID | Sample ID | Collection Date (mm/yy/dd) | Collection Time (hh:mm:ss) | Volatile Organics by GCMS | 8260B with Single Ion Monitoring | Comment |
|---------------|-----------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------------|---------|
| 2401088171 | SUMP-34380CAPITOL-01-022819 | 2/28/2019 | 6:15:00 | X | X | |

Analytical Results Summary

Reportable Results Only

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton

Laboratory Submittal: 108817-1

Sample Name: SUMP-34380CAPITOL-01-022819

Lab Sample ID: 2401088171

Sample Date: 2/28/2019

| 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 | ND | 1.0 | ug/l | --- | |
| Tetrachloroethene | 127-18-4 | ND | 1.0 | ug/l | --- | |
| trans-1,2-Dichloroethene | 156-60-5 | ND | 1.0 | ug/l | --- | |
| Trichloroethene | 79-01-6 | ND | 1.0 | ug/l | --- | |
| Vinyl chloride | 75-01-4 | ND | 1.0 | ug/l | --- | |
| <u>OSW-8260BBSim</u> | | | | | | |
| 1,4-Dioxane | 123-91-1 | ND | 2.0 | ug/l | --- | |

Ford Motor Company – Livonia Transmission Project

DATA REVIEW

Livonia, Michigan

Volatile Organic Compounds (VOC) Analysis

SDG #240-108817-1

CADENA Verification Report: 2019-03-11

Analyses Performed By:

TestAmerica
Canton, Ohio

Report #32498R

Review Level: Tier III

Project: MI001454.0003.00002



DATA REVIEW

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 240-108817-1 for samples collected in association with the Ford – Livonia, Michigan site. The review was conducted as a Tier III validation in addition to a verification/Tier II validation review performed by CADENA Inc. and included review of level IV laboratory data package completeness. Only elements of a Tier III validation effort (Tier III includes a detailed review of laboratory raw data to check for errors in calculation, calibration review, internal standard review and compound identification) and omitted deviations from the CADENA verification/Tier II report are documented in this report. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

| SDG | Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | |
|--------------|-----------------------------|--------------|--------|------------------------|---------------|-----------------|-----------|------|
| | | | | | | VOC (Full Scan) | VOC (SIM) | MISC |
| 240-108817-1 | SUMP-34380CAPITOL-01-022819 | 240-108817-1 | Water | 2/28/2019 | | X | X | |

DATA REVIEW

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

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

DATA REVIEW

ORGANIC ANALYSIS INTRODUCTION

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

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

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

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

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

DATA REVIEW

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

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

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

All samples were analyzed within the specified holding time criteria.

2. Mass Spectrometer Tuning

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

System performance and column resolution were acceptable.

3. Calibration

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

3.1 Initial Calibration

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

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

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

3.2 Continuing Calibration

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

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

| Sample Locations | Initial/Continuing | Compound | Criteria |
|-----------------------------|--------------------|----------------|----------|
| SUMP-34380CAPITOL-01-022819 | CCV %D | Vinyl chloride | +25.3% |
| | | 1,4-Dioxane | +22.4% |

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

DATA REVIEW

| Initial/Continuing | Criteria | Sample Result | Qualification |
|------------------------------------|---|---------------|---------------|
| Initial and Continuing Calibration | RRF <0.05 | Non-detect | R |
| | | Detect | J |
| | RRF <0.01 ¹ | Non-detect | R |
| | | Detect | J |
| | RRF >0.05 or RRF >0.01 ¹ | Non-detect | No Action |
| | | Detect | |
| Initial Calibration | %RSD > 15% or a correlation coefficient <0.99 | Non-detect | UJ |
| | | Detect | J |
| | %RSD >90% | Non-detect | R |
| | | Detect | J |
| Continuing Calibration | %D >20% (increase in sensitivity) | Non-detect | No Action |
| | | Detect | J |
| | %D >20% (decrease in sensitivity) | Non-detect | UJ |
| | | Detect | J |
| | %D >90% (increase/decrease in sensitivity) | Non-detect | R |
| | | Detect | J |

Note:

¹ RRF of 0.01 only applies to compounds which are typically poor responding compounds (i.e., ketones, 1,4-dioxane, etc.)

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.

No target compounds were detected in the sample within this SDG.

6. System Performance and Overall Assessment

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

DATA REVIEW

DATA VALIDATION CHECKLIST FOR VOCs

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

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Andrew Korycinski

SIGNATURE:



DATE: April 23, 2019

PEER REVIEW: Dennis Capria

DATE: April 23, 2019



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



MICHIGAN
190

2.2/C20 1.4/C1.2

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

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

| | | | |
|---|---|---|---|
| Client Contact Company Name: Arcadis Address: 28550 Cabot Drive, Suite 500 City/State/Zip: Novi, MI, 48377 Phone: 248-994-2240 Project Name: Ford LTP Project Number: MI001454.0003 PO # MI001454.0003 | | Regulatory program: <input type="checkbox"/> DW <input type="checkbox"/> NPDES <input type="checkbox"/> RCKA <input type="checkbox"/> Other | |
| Client Project Manager: Kris Hinskey Telephone: 248-994-2240 Email: kristoffer.hinskey@arcadis.com | | Lab Contact: Mike DelMonico Telephone: 330-497-9396 | |
| Site Contact: Angela DeGrandis Telephone: 734-320-0065 | | Analyses 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 | |
| Analysis Turnaround Time TAT if different from below <input type="checkbox"/> 3 weeks <input type="checkbox"/> 2 weeks <input checked="" type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day | | Containers & Preservatives H2SO4 HNO3 HCl NaOH NaOH ZnAc Other: | |
| Method of Shipment/Carrier: Shipping/Tracking No: | | Filtered Sample (Y/N) Composite C / Grab C NG | |
| Matrix Aqueous Sediment Solid Other: | | Sample Specific Notes / Special Instructions: 6 CONTAINERS | |
| Sample Identification Sump-31280 Capital-D1-022819 | Sample Date 2-28-19 | Sample Time 1815 | Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months |
| Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Irritable <input type="checkbox"/> Inert <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown | | Special Instructions/QC Requirements & Comments: 240-108817 Chain of Custody | |
| Submit all results through Cadena at jim.tomalia@cadena.com. Cadena #E203631 Level IV Reporting. | | | |
| Relinquished by: [Signature] | Company: Arcadis Date/Time: 2-28-19 / 1900 | Received by: [Signature] Company: Arcadis Date/Time: 3-1-19 / 1550 | Received by: [Signature] Company: Arcadis Date/Time: 3-2-19 / 945 |

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Client Sample Results

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

TestAmerica Job ID: 240-108817-1

Client Sample ID: SUMP-34380CAPITOL-01-022819

Lab Sample ID: 240-108817-1

Date Collected: 02/28/19 18:15

Matrix: Water

Date Received: 03/02/19 09:45

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 | | | 03/04/19 19:38 | 1 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 1,2-Dichloroethane-d4 (Surr) | 86 | | 63 - 125 | | | | | 03/04/19 19:38 | 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 | | | 03/06/19 19:40 | 1 |
| cis-1,2-Dichloroethene | 1.0 | U | 1.0 | 0.16 | ug/L | | | 03/06/19 19:40 | 1 |
| Tetrachloroethene | 1.0 | U | 1.0 | 0.15 | ug/L | | | 03/06/19 19:40 | 1 |
| trans-1,2-Dichloroethene | 1.0 | U | 1.0 | 0.19 | ug/L | | | 03/06/19 19:40 | 1 |
| Trichloroethene | 1.0 | U | 1.0 | 0.10 | ug/L | | | 03/06/19 19:40 | 1 |
| Vinyl chloride | 1.0 | U | 1.0 | 0.20 | ug/L | | | 03/06/19 19:40 | 1 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 1,2-Dichloroethane-d4 (Surr) | 111 | | 70 - 121 | | | | | 03/06/19 19:40 | 1 |
| 4-Bromofluorobenzene (Surr) | 97 | | 59 - 120 | | | | | 03/06/19 19:40 | 1 |
| Toluene-d8 (Surr) | 106 | | 70 - 123 | | | | | 03/06/19 19:40 | 1 |
| Dibromofluoromethane (Surr) | 105 | | 75 - 128 | | | | | 03/06/19 19:40 | 1 |