

MEMO

Project name	RACER Coldwater Road	CC: Richard Conforti – EGLE
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Client	Racer Trust	Nicole Sanabria - EGLE
Memo no.	01	David Favero - EGLE
Version	1	Kevin Schneider - Ramboll
To	Jacob Runge	
From	Clifford Yantz	
Copy to	Kevin Schneider	
Prepared by	Kevin Schneider	
Checked by	Clifford Yantz	
Approved by	Clifford Yantz	

Vapor Intrusion Sampling Event

Date November 9, 2020

This technical memorandum has been prepared on behalf of the Revitalizing Auto Communities Environmental Response Trust (RACER Trust) to document the 2019 additional vapor probe sampling event conducted in November 2019 at Coldwater Road Landfill facility located in Flint, Michigan (Site) ([Figure 1](#)).

The sampling was performed to address the Michigan Department of Environment, Great Lakes, and Energy (EGLE's formerly MDEQ) August 2019 email to confirm the analytical results from the December 2017, June 2018, and October 2018 sampling events. An additional round of vapor samples was collected from nested vapor probes VP-1 through VP-6 and groundwater samples for volatile organic compounds (VOCs) were collected in lieu of vapor samples when groundwater was encountered in any of the soil gas probes. See [Figure 2](#) for soil gas probe locations and [Figure 3](#) for geologic cross-sections of the area.

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1 Site Description

The RACER Trust Coldwater Road Landfill facility consists of the wastewater treatment sludge monofill landfill, Remaining Materials Area (RMA, where nickel impacted soils were closed in place), former WWTP (decommissioned and demolished in 1999), restored wetlands, and leachate accumulation facility.

The Site is bordered on the south and east by the RACER Trust Coldwater Road Industrial Land, which formerly contained several manufacturing buildings and support facilities. The buildings on the Coldwater Road Industrial Land were decommissioned and demolished between 1999 and 2001.

2 Sampling & Analysis

Sample collection activities were completed on November 19, 2019 and November 20, 2019, in accordance with the work plan submitted to EGLE on August 31, 2018.

A more detailed description of the procedures used during the sampling event can be found in Ramboll's response letter, dated November 16, 2017, to EGLE's Comments on Per- and Polyfluorinated Substances Sampling Event – Letter Dated October 12, 2017.

Soil gas grab samples were attempted from vapor probes VP-1S, VP-1D, VP-2S, VP-2D, VP-3S, VP-3M, VP-3D, VP-4S, VP-4M, VP-4D, VP-5S, VP-5M, VP-5D, VP-6S, VP-6M, and VP-6D.

Successful soil gas grab samples were collected from vapor probes VP-1S, VP-2S, VP-2D, VP-3S, VP-5S, VP-5M, and VP-5D. VP-6D stalled during sampling due to interference from groundwater. A groundwater sample was attempted twice from VP-6D, but no sample could be collected.

Groundwater samples were collected for VOCs in lieu of soil gas samples at vapor probes VP-1D, VP-3M, VP-3D, VP-4S, VP-4M, VP-4D, VP-6S, and VP-6M due to groundwater preventing collection of soil gas samples.

2.1 Sample Procedure

Prior to the collection of the soil vapor samples, the sample tubing was purged of ambient air. A minimum of three volumes of air within the sample probe and tubing were purged prior to sample collection. In addition, helium tracer gas screening was used during sampling of the soil vapor probes to evaluate the adequacy of the sampling technique and identify potential short-circuiting from the ground surface during sample collection.

A MGD 2002 gas leak detector was used to screen the extracted vapor stream for helium prior to and after sample collection. No olfactory observations were recognized during probe installation and sampling. Short-circuiting was not observed during initial or final screening. See [Appendix A](#) for Soil Vapor (Bottle Vac®) Sample Collection Field Forms.

The soil gas samples were collected in Bottle Vacs® and transported to the laboratory under appropriate chain-of-custody (COC) protocols. The soil gas samples were submitted to Merit Laboratories in East Lansing, Michigan a National Environmental Laboratory Accreditation Conference (NELAC)-certified laboratory for analysis by USEPA Method TO-15. For quality control purposes, a field duplicate sample (DUP-1) was collected from the VP-1S vapor probe location.

2.2 Analytical Results

The analytical results for the samples collected at the Coldwater Road Landfill facility are presented in [Table 1](#) and [Table 2](#) and discussed below. The complete analytical laboratory report is contained in [Appendix B](#).

To establish a more accurate criteria for comparison at the Site, a site-specific volatilization to indoor air criteria (SSVIAC) under Part 201 or site-specific screening levels (SSTLs) under Part 201 of the Natural Resources and Environmental Protection Act, 1994 PA 451 as amended were calculated and provided by EGLE in a October 22, 2020 email. The site-specific criteria and transmittal letter are provided in [Appendix C](#).

From the seven soil gas samples and one duplicate collected (VP-1S, VP-2S, VP-2D, VP-3S, VP-5S, VP-5M, VP-5D, and DUP-1 [VP-1S]) no VOCs were detected above the EGLE Residential SSVIAC Criteria - Table 1 (crawlpace with a dirt floor) which is the most stringent set of criteria.

From the eight groundwater samples collected (VP-1D, VP-3M, VP-3D, VP-4S, VP-4M, VP-4D, VP-6S, and VP-6M) no VOCs were detected above the laboratory reporting limit. See [Table 2](#) for groundwater VOCs analytical results.

3 Summary

The most recent sampling results at the sixteen soil gas probes located at the Site showed that VOC concentrations were less than SSVIAC. However, as shown on [Table 1](#), there were some exceedances of SSVIAC criteria during previous sampling events, but even these exceedances were not consistently detected. As can be seen in the cross-sections in [Figure 3](#), most VI sampling points are installed near a water line that supplies the on-site building. The water line is above the groundwater table and runs north and south and does not provide for offsite migration.

The probes, VP-1M/D and VP-4M/D, installed by the sanitary sewer leaving the Site, which is below the groundwater level and should not provide a migration pathway because the backfill of the sewers are flooded and should not allow migration of vapors along them. Furthermore, the groundwater results for flooded vapor probes indicate that VOCs are not leaving the Site via groundwater within these locations, on- or off-site and so groundwater volatilization does not appear to be a complete pathway based on these results.

In conclusion, there were no exceedances identified in the most recent sampling results for probes near the property boundary, so there is no apparent off-site risk. Based on these findings, we propose collection of another round of VI sample in December 2020 to confirm the recent results and support whether further vapor intrusion sampling is necessary.

If you have any questions regarding this technical memorandum, please contact Cliff Yantz at (313) 333-0211.

Very truly yours,

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

A handwritten signature in blue ink that reads "Clifford Scott Yantz".

Clifford S. Yantz

Senior Hydrogeologist
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Enclosures:

Tables

Table 1 – Vapor Intrusion Analytical Results – December 2017, June 2018, October 2018, November 2019

Table 2 – Groundwater VOCs Analytical Results – November 2019

Figures

Figure 1 – Site Location Map

Figure 2 – Sample Location Map

Figure 3 – Cross Sections

Appendices

Appendix A – Soil Vapor (Bottle Vac®) Sample Collection Field Forms

Appendix B – Analytical Laboratory Results

Appendix C – Site-specific VIAC Criteria & Transmittal Letter

TABLES

TABLE 1
RACER Trust - Coldwater Road
Vapor Intrusion Sampling - Detections

Coldwater Road - Soil Vapor Results

Compound	Sample ID: Units:	EGLE Site-Specific Residential Volatilization to Indoor Air (VIAC) Criteria- Table 1 (crawlspcace with a dirt floor) µg/m ³	EGLE Site-Specific Residential Volatilization to Indoor Air (VIAC) Criteria- Table 2 & 3 (slab-on-grade & basement) µg/m ³	VP-1S µg/m ³	VP-1S µg/m ³	VP-1S (DUP-1) µg/m ³	VP-1S µg/m ³	VP-1S (VP- DUP-1) µg/m ³	VP-1D µg/m ³	VP-2S µg/m ³	VP-2S (VP- DUP-1) µg/m ³	VP-2S µg/m ³	VP-2S µg/m ³	VP-2D µg/m ³
		Sample Date:		12/8/2017	6/29/2018	6/29/2018	11/19/2019	11/19/2019	12/8/2017	12/8/2017	12/8/2017	6/29/2018	11/18/2019	11/18/2019
Acetone		NA	NA	<48	48	<48	<48	<48	95	<48	<48	<48	<48	<48
Benzene		3.3 ca	110 ca	<6.4	9.6	<6.4	<6.4	<6.4	13	<6.4	<6.4	<6.4	<6.4	<6.4
Carbon Disulfide		NA	NA	<16	37	22	<16	<16	<16	<16	<16	<16	<16	<16
Chloroform		NA	NA	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8
Cyclohexane		6,300 nc	2.1E+05 nc	<6.9	14	10	<6.9	<6.9	17	<6.9	<6.9	<6.9	<6.9	<6.9
1,2-Dichloroethane		0.98 ca	33 ca	85	<8.1	<8.1	<8.1	<8.1	130	8.1	12	<8.1	<8.1	<8.1
Ethanol		19,000 (EE) st	6.3E+05 (EE) st	<64 X	<57 X	<47	<47	<47	<130 X	<47	<47	<47	<47	<47
Ethylbenzene		10 ca	340 ca	<8.7	13	<8.7	<8.7	<8.7	<8.7	<8.7	<8.7	8.7	<8.7	<8.7
Heptane		3,700 nc	1.2E+05 nc	<8.2	25	<8.2	<8.2	<8.2	12	<8.2	<8.2	12	<8.2	<8.2
Hexane		730 nc	24,000 nc	56	74	49	11	7	130	<7.0	<7.0	14	<7.0	<7.0
Isopropyl Alcohol		210 nc	7,000 nc	370	<49	<49	<49	<49	590	49	74	<49	<49	<49
Methylene Chloride		NA	NA	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17
2-Butanone (MEK)		5,000 (DD) dev	1.7E+05 (DD) dev	<29	<29	<29	<29	<29	<29	<29	<29	<29	<29	<29
Propylene		NA	NA	618	<262 X	<186 X	<6.9 X	<6.9 X	303	<3.4	<3.4	<3.4	<3.4	<3.4
1,2,4-Trimethylbenzene		63 (JT) nc	2,100 (JT) nc	<37	25	15	<9.8	<9.8	<9.8	<9.8	<9.8	15	<9.8	<9.8
2,2,4-Trimethylpentane		3,700 nc	1.2E+05 nc	9.3	47	28	<9.3	<9.3	37	<9.3	<9.3	14	<9.3	<9.3
Tert-butyl Alcohol		NA	NA	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Tetrachloroethene		41 (EE) st	1,400 (EE) st	27	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14
Tetrahydrofuran		2,100 nc	70,000 nc	<5.9	27	18	8.8	8.8	<5.9	<5.9	<5.9	24	18	12
Toluene		5,200 nc	1.7E+05 nc	34	57	41	11	11	57	<7.5	<7.5	41	<7.5	<7.5
Trichloroethene		2.0 (DD) dev	67 (DD) dev	<11	43	91	<11	<11	<11	<11	<11	32	<11	<11
p,m-Xylene		NA	NA	<17	39	22	<17	<17	22	<17	<17	30	<17	<17
o-Xylene		NA	NA	<8.7	17	8.7	<8.7	<8.7	<8.7	<8.7	<8.7	13	<8.7	<8.7
Total Xylene		230 (J)	7,600 (J) nc	<26	56	30	<26	<26	<26	<26	<26	43	<26	<26

- Notes
- 1) Concentrations above the EGLE Site-Specific Residential Volatilization to Indoor Air (VIAC) Criteria Table 1 (crawlspcace with a dirt floor) are highlighted in yellow.
- 2) Concentrations above both the EGLE Site-Specific Residential Volatilization to Indoor Air (VIAC) Criteria Table 1 (crawlspcace with a dirt floor) and Table 2 & 3 (slab-on-grade & basement) are highlighted in orange.
- 3) Concentrations in µg/m³ as noted
- 4) Detections highlighted in bold.
- 5) < = Not detected at specified reporting limit.
- 6) DUP = Duplicate sample.
- 7) NA = means not available.
- 8) Light gray header is most recent sampling event result.
- 9) Acceptable Air Values (AAV) endpoint basis used for site-specific criterion: (ca) = Carcinogenetic; (nc) = Non-Carcinogenetic; (dev) = Developmental; (mut) = Mutagenic cancer; (st) = Short-term (i.e., less than chronic exposure): Agency for Toxic Substances and Disease Registry Inhalation Minimum Risk Level for Acute Inhalation or Intermediate exposure durations; U.S. Environmental Protection Agency Integrated Risk Information System Reference Concentration for short-term exposure; of Air Quality Division Acute Initial Threshold Screening Level.
- 10) DD = 'Hazardous substance causes developmental effects. Residential SSVIAC are protective of both prenatal exposure using a pregnant female receptor and postnatal exposure using a child receptor. Nonresidential SSVIAC are protective of prenatal exposure using a pregnant female receptor. Prenatal developmental effects may occur after an acute (i.e. short-term) or full-term exposure.
- 11) E = Concentration exceeds calibration range.
- 12) EE = The acceptable air concentration (AAC) for the volatile hazardous substances is not derived using standard equations. The hazardous substance may cause adverse human health effects for less than chronic exposures (i.e. short-term or acute). The AAC for these hazardous substances is the acute or intermediate minimum risk level (MRL) developed by the Agency for Toxic Substances and Disease Registry (ATSDR), a United States Environmental Protection Agency Integrated Risk Information System (IRIS) acute reference concentration, or an acute initial threshold screening level (ITSL) by the EGLE's Air Quality Division.
- 13) J = Hazardous substance may be present in several isomer forms. Isomer-specific concentrations must be added together for comparison to criteria.
- 14) JT = Hazardous substance may be present in several isomer forms. The health-based SSVIAC may be used for the individual isomer provided that it is the sole isomer detected; however, when multiple isomers are detected in a medium, the isomer-specific concentrations must be added together and compared to the most restrictive health-based SSVIAC of the detected isomers.
- 15) X = Elevated reporting limit due to matrix interference.
- 16) Sample was not collected during 12/8/17 event from vapor point VP-2D due to interference with groundwater.
- 17) Samples were not collected during 6/29/18 event from vapor points VP-1D, VP-2D, and VP-3M due to interference with groundwater.
- 18) Samples were not collected during 10/25/18 event from vapor points VP-4S, VP-4M, VP-4D, and VP-5D due to interference with groundwater.
- 19) During the 11/18/19 event groundwater samples were collected from (VP-1D, VP-3M, VP-3D, VP-4S, VP-4M, VP-4D, VP-6S, & VP-6M) where groundwater interference was encountered.

Coldwater Road - Soil Vapor Results

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TABLE 2
RACER Trust - Coldwater Road
Volatile Organics (VOCs) Groundwater Analytical Results
Collected from Vapor Probes - November 2019

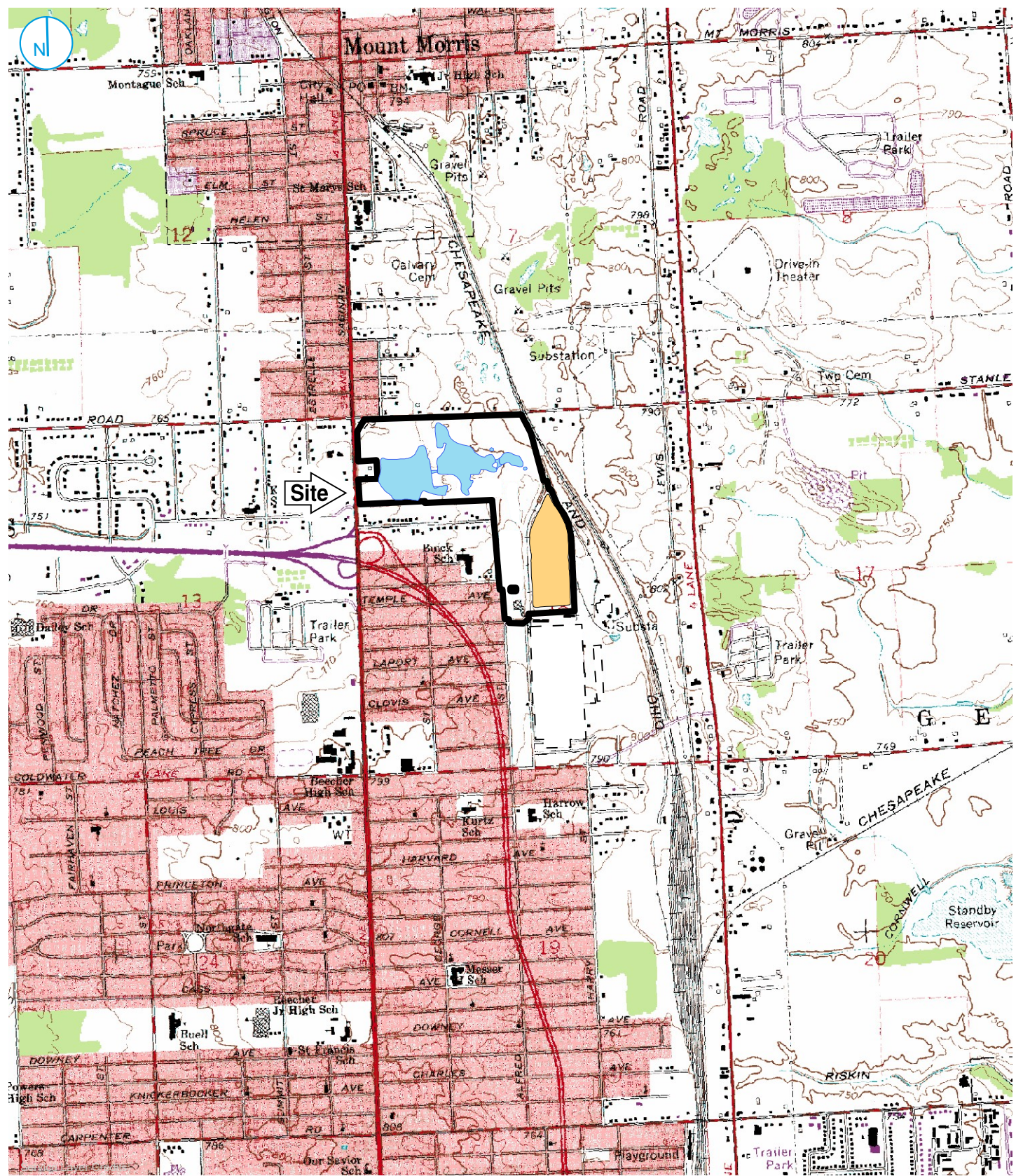
Well ID	VP-1D-GW	VP-3M-GW	VP-3D-GW	VP-4S-GW	VP-4M-GW	VP-4D-GW	VP-6S-GW	VP-6M-GW	Trip Blank-111919
Sample Date	11/19/2019	11/19/2019	11/19/2019	11/19/2019	11/19/2019	11/19/2019	11/18/2019	11/18/2019	11/19/2019
Diethyl ether	<10	<10	<10	<10	<10	<10	<10	<10	<10
Acetone	<50	<50	<50	<50	<50	<50	<50	<50	<50
Methyl iodide	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon Disulfide	<5	<5	<5	<5	<5	<5	<5	<5	<5
tert-Methyl butyl ether (MTBE)	<5	<5	<5	<5	<5	<5	<5	<5	<5
Acrylonitrile	<2	<2	<2	<2	<2	<2	<2	<2	<2
2-Butanone	<25	<25	<25	<25	<25	<25	<25	<25	<25
Dichlorodifluoromethane	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloromethane	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroethane	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichlorofluoromethane	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methylene chloride	<5	<5	<5	<5	<5	<5	<5	<5	<5
trans-1,2-Dichloroethene	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrahydrofuran	<90	<90	<90	<90	<90	<90	<90	<90	<90
Chloroform	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	<1	<1	<1	<1	<1	<1	<1	<1	<1
4-Methyl-2-pentanone	<50	<50	<50	<50	<50	<50	<50	<50	<50
2-Hexanone	<50	<50	<50	<50	<50	<50	<50	<50	<50
Carbon tetrachloride	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromomethane	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans-1,4-Dichloro-2-butene	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dibromoethane	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
p,m-Xylene	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene	<1	<1	<1	<1	<1	<1	<1	<1	<1
Styrene	<1	<1	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromoform	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromobenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,3-Dichlorobenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trimethylbenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hexachloroethane	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dibromo-3-chloropropane	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2,4-Trichlorobenzene	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2,3-Trichlorobenzene	<5	<5	<5	<5	<5	<5	<5	<5	<5
Napthalene	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Methylnapthalene	<5	<5	<5	<5	<5	<5	<5	<5	<5

EPA Method 8260 used for analysis.

Dup- Duplicate analysis

Analysis in µg/L

FIGURES



Map Scale: 1:124,000;
Map Center: 83°41'9"W 43°5'51"N

0 1,000 2,000
Feet

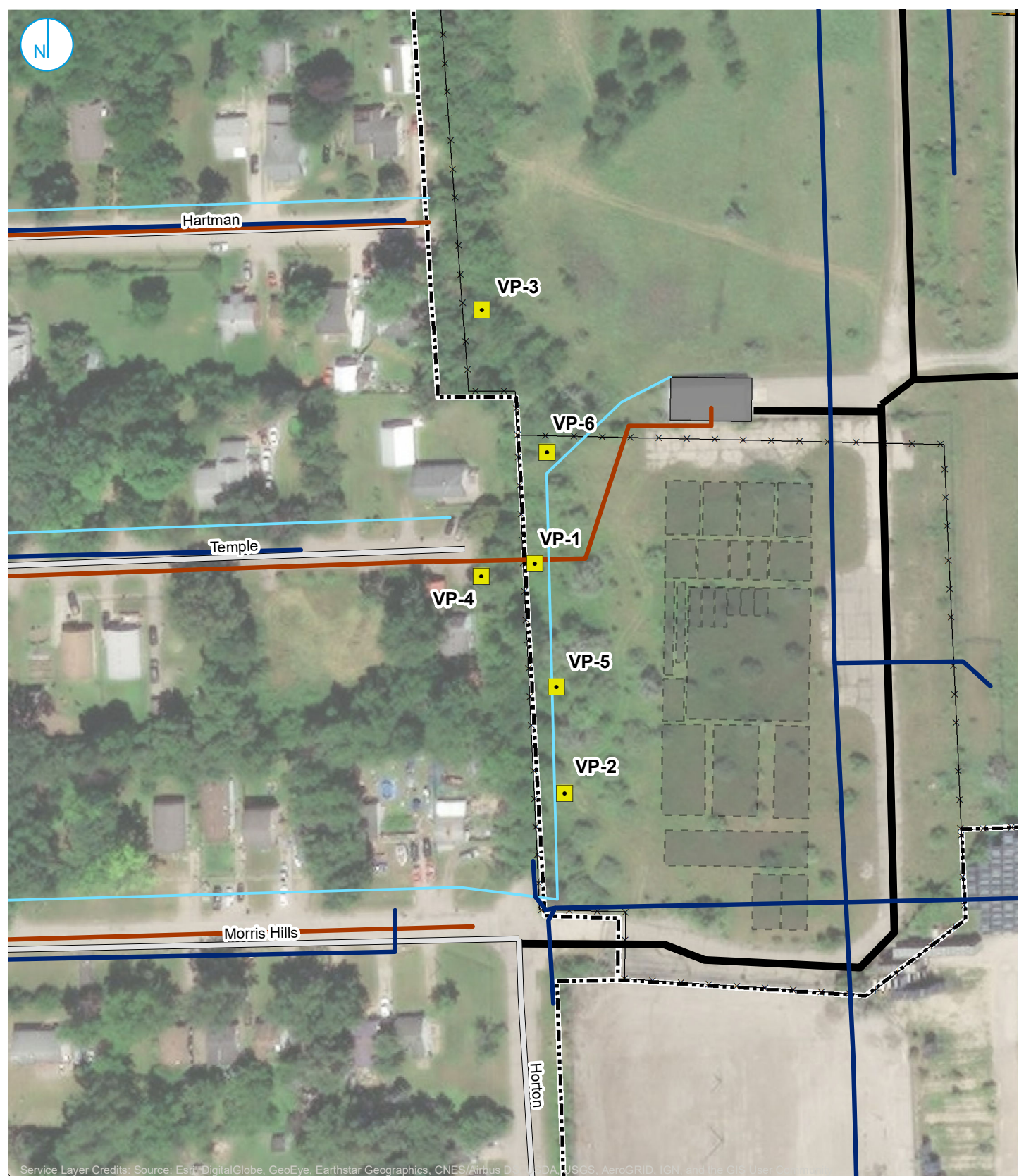
SITE LOCATION

FIGURE 01

RACER TRUST
COLDWATER ROAD
FLINT, MICHIGAN

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus D... DA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

-  VAPOR POINT LOCATION
-  FORMER BUILDING
-  WATER LINE
-  SANITARY SEWER LINE
-  STORM SEWER LINE
-  PROPERTY BOUNDARY

0 50 100 Feet

VAPOR POINT LOCATIONS

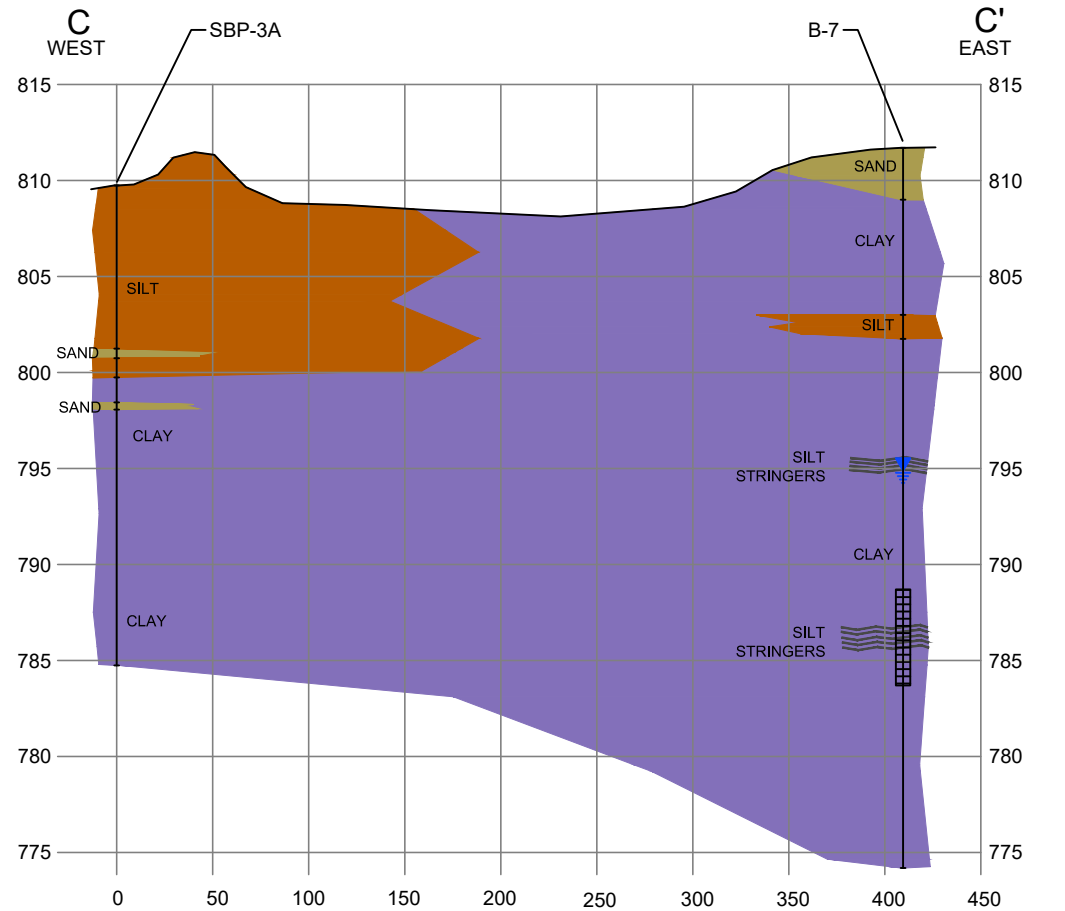
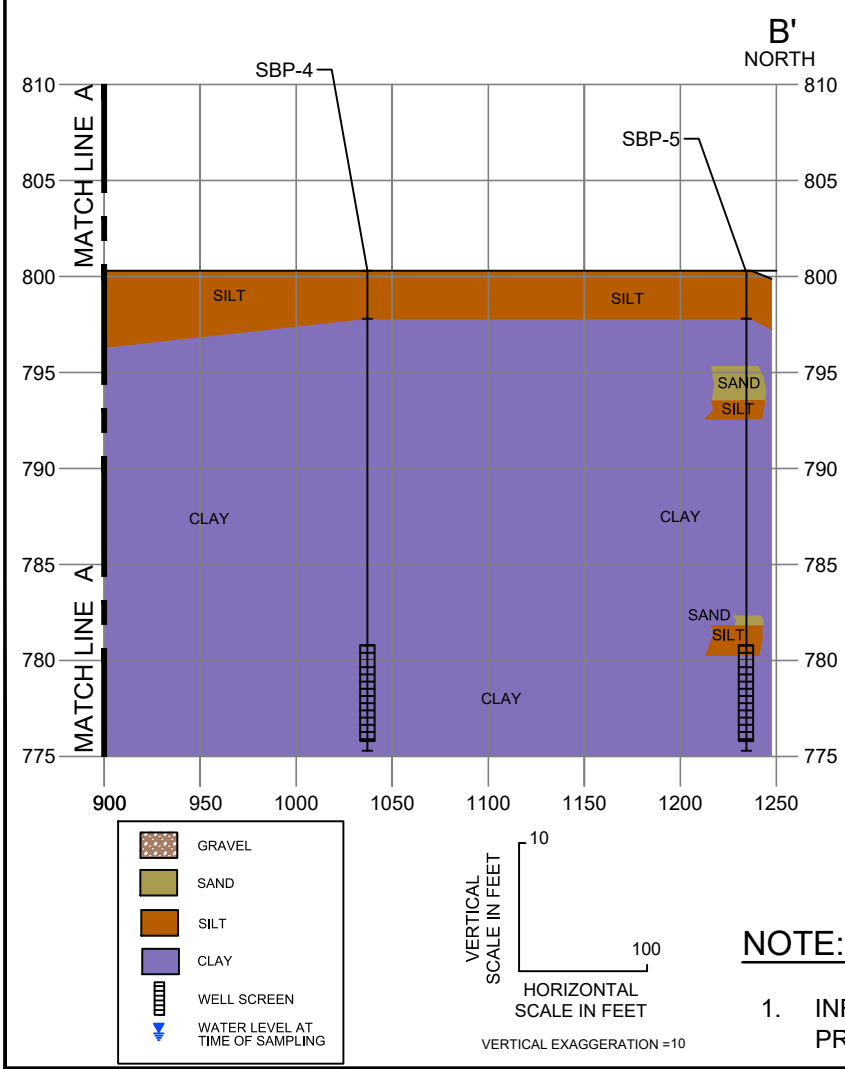
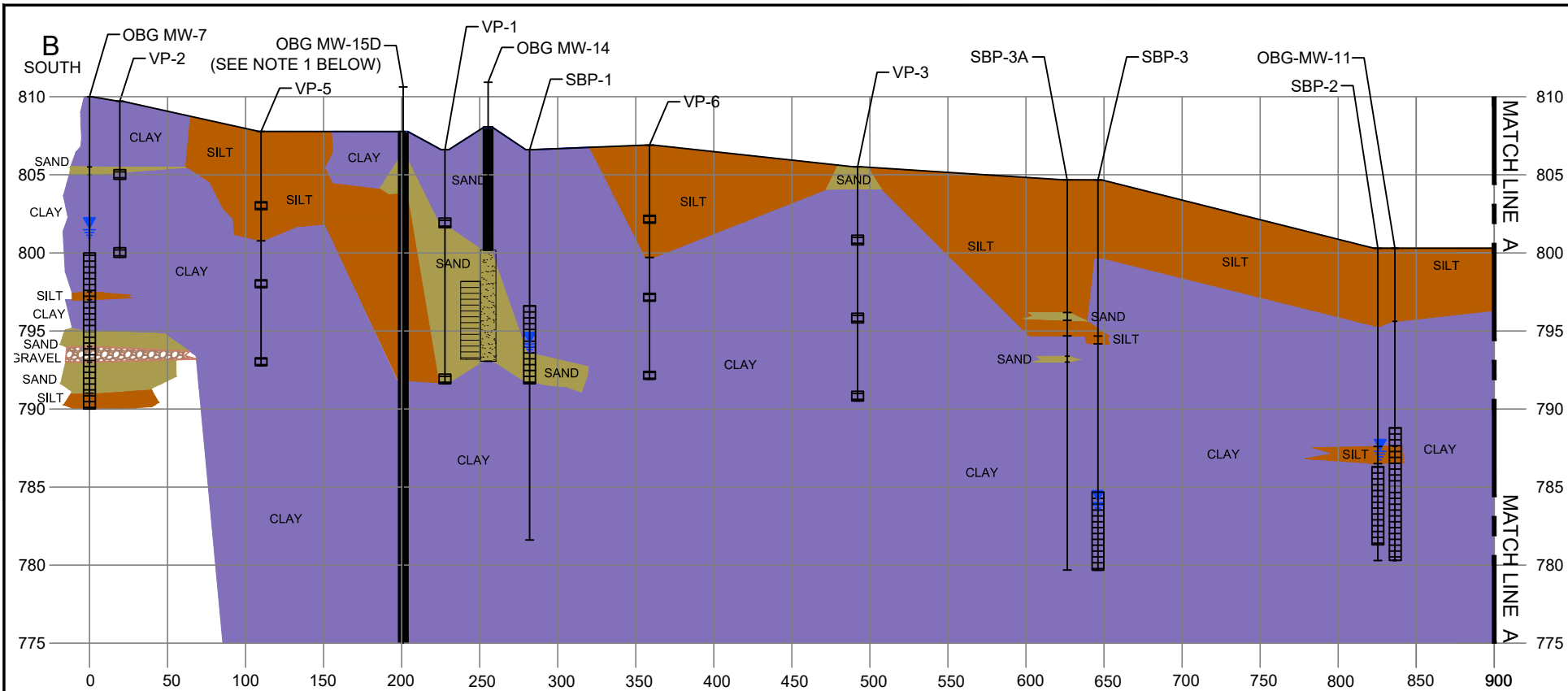
FIGURE 02

RACER TRUST
COLDWATER ROAD
FLINT, MICHIGAN

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

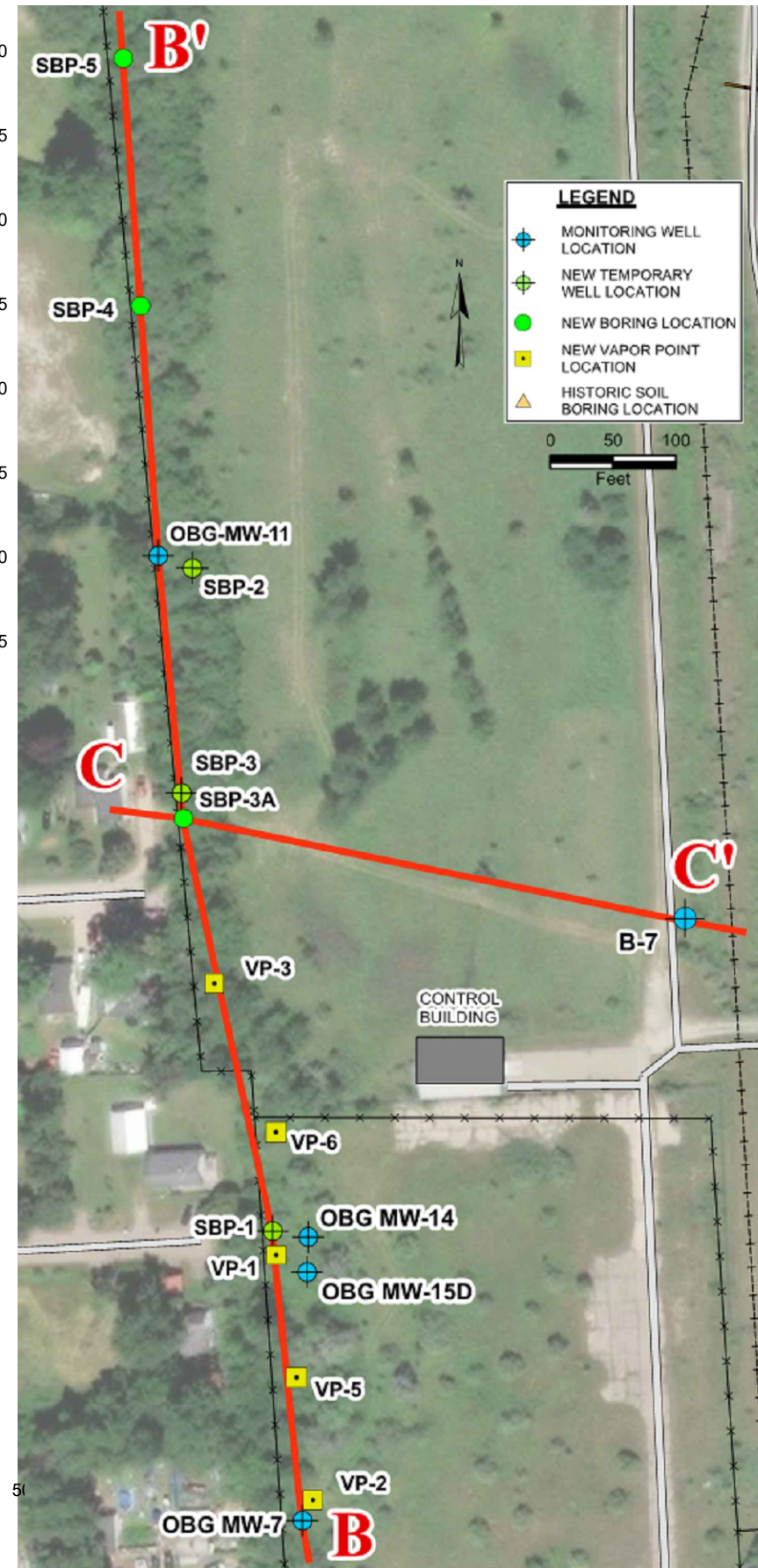


Aug 08, 2019 3:31pm PLOTTED BY: JOHNSOSL SAVED BY: JOHNSOSL
I:\Racer-Truist\68545\Coldwater-Rd-LIN-D\Cross Sections\Figure 5 - Geologic Cross-Section B-B'-C-C'.dwg Layout1
XREFS:



NOTE:

1. INFORMATION SHOWN BELOW 775 FT MSL IS NOT PROVIDED AS IT IS NOT PERTINENT TO THE VI STUDY.



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APPENDIX A
Soil Vapor (Bottle Vac®)
Sample Collection Field Forms

Soil Vapor (Bottle Vac®) Sample Collection Field Form

Project #	<u>72202</u>		Date	<u>11/19/19</u>	
Project Name	<u>Coldwater</u>		Collector	<u>KBS / WHL</u>	
Sample ID	<u>VP-15</u>	<u>DUP-1</u>	Vacuum gauge "zero" ("Hg)	<u>yes</u>	
Start Date/Time	<u>946</u>		Start Pressure ("Hg)	<u>-26</u>	
End Date/Time	<u>958</u>		End Pressure ("Hg)	<u>-2</u>	
Bottle/Canister ID	<u>18336</u>	<u>12447</u>	End pressure = "zero"?	<u>yes</u>	
Flow controller ID	<u>145</u>	<u>N/A</u>	Sampling duration (intended)	<u>10 min</u>	
Associated ambient air sample ID	<u>N/A</u>		Depth of sample point below grade	<u>5'</u>	
Analytical method required	<u>TO-15</u>		Laboratory used	<u>Ment</u>	
Tubing type/inside dia. used <u>3/8 OD</u> Length of tubing <u>8'</u> cm Tubing volume <u>77+</u> cc					
Volume purged <u>030</u> cc @ <u>0.1 l/min (100cc/min)</u> 3 volumes purged @ < 200cc/min? <u>yes</u>					
Shroud tracer gas conc. Beginning: <u>35.9</u> End of purging: <u>22.8</u> End of sampling: _____					
Gas Analyzer Readings %O ₂ <u>N/A</u> %CO ₂ <u>N/A</u> %CH ₄ <u>N/A</u> PID/FID reading <u>0/0</u> (ppmv)					
Noticeable odor <u>NONE</u> Soil type <u>clay</u>					

Weather Conditions during Probe Installation:

Air temperature (°F) _____ Rainfall _____ Wind direction _____
Barometric pressure _____ Wind speed (mph) _____

Substantial changes in weather conditions during sampling or over the past 24 to 48 hrs:

Weather Conditions at Start of Sampling:

Air temperature (°F) 33 Rainfall NONE Wind direction N
Barometric pressure 29.79 Wind speed (mph) 1

Substantial changes in weather conditions during sampling or over the past 24 to 48 hrs:

Site Plan showing sample location, buildings, landmarks, potential soil vapor and outdoor air sources, preferential pathways

Comments: collected VP-DUP-1 = VP-15
collected groundwater sample from VP-1D
DUP Tee #2

Soil Vapor (Bottle Vac®) Sample Collection Field Form

Project # 72202 Date 11/18/19
 Project Name colowater Collector KBS, WHL

Sample ID	VP-25	VP-2D	Vacuum gauge "zero" ("Hg)	VP-25 -3	VP-2D -2
Start Date/Time	11/18 1622	1623	Start Pressure ("Hg)	-22	-27
End Date/Time	11/18 1635	1635	End Pressure ("Hg)	-5	-4
Bottle/Canister ID	12417	23671	End pressure = "zero"?	No	No
Flow controller ID	198	28	Sampling duration (intended)	10 min	10 min
Associated ambient air sample ID	N/A		Depth of sample point below grade	5'	10'
Analytical method required	TO-15		Laboratory used		

Tubing type/inside dia. used 3/8 OD Length of tubing 8'13" cm Tubing volume 77 173 cc
 Volume purged 230 520 cc @ 0.1 l/min (100cc/min) 3 volumes purged @ < 200cc/min? yes
 Shroud tracer gas conc. Beginning: 39.4% End of purging: _____ End of sampling: _____
 Gas Analyzer Readings %O₂ N/A %CO₂ N/A %CH₄ N/A PID/FID reading 5.0 5.0 (ppmv)
 Noticeable odor No Soil type clay

Weather Conditions during Probe Installation:

Air temperature (°F) _____ Rainfall _____ Wind direction _____
 Barometric pressure _____ Wind speed (mph) _____

Substantial changes in weather conditions during sampling or over the past 24 to 48 hrs:

Weather Conditions at Start of Sampling:

Air temperature (°F) 43 Rainfall No Wind direction NNW
 Barometric pressure 29.74 Wind speed (mph) 2

Substantial changes in weather conditions during sampling or over the past 24 to 48 hrs:

Site Plan showing sample location, buildings, landmarks, potential soil vapor and outdoor air sources, preferential pathways

Comments: _____

Soil Vapor (Bottle Vac®) Sample Collection Field Form

Project #	<u>72202</u>	Date	<u>11/19/19</u>
Project Name	<u>coldwater</u>	Collector	<u>KBS, WTL</u>
Sample ID	<u>VP-35</u>	Vacuum gauge "zero" ("Hg)	<u>-4</u>
Start Date/Time	<u>11/19 1057</u>	Start Pressure ("Hg)	<u>-30</u>
End Date/Time	<u>11/19 1108</u>	End Pressure ("Hg)	<u>-6</u>
Bottle/Canister ID	<u>12449</u>	End pressure = "zero"?	<u>-4</u>
Flow controller ID	<u>144</u>	Sampling duration (intended)	<u>10 min</u>
Associated ambient air sample ID	<u>N/A</u>	Depth of sample point below grade	<u>5'</u>
Analytical method required	<u>TO-15</u>	Laboratory used	<u>Mesit</u>

Tubing type/inside dia. used	<u>3/800</u>	Length of tubing	<u>8'</u>	cm	Tubing volume	<u>27</u>	cc
Volume purged	<u>230</u>	cc @	<u>0.1 l/min (100cc/min)</u>	3 volumes purged @ < 200cc/min?			
Shroud tracer gas conc.	Beginning: <u>26.5%</u>	End of purging:			End of sampling:		
Gas Analyzer Readings	%O ₂ <u>N/A</u>	%CO ₂ <u>N/A</u>	%CH ₄ <u>N/A</u>	PID/FID reading	<u>0/0</u>	(ppmv)	
Noticeable odor				Soil type	<u>clay</u>		

Weather Conditions during Probe Installation:

Air temperature (°F)		Rainfall		Wind direction	
Barometric pressure				Wind speed (mph)	

Substantial changes in weather conditions during sampling or over the past 24 to 48 hrs:

Weather Conditions at Start of Sampling:

Air temperature (°F)	<u>33</u>	Rainfall	<u>No</u>	Wind direction	<u>N</u>
Barometric pressure	<u>29.8</u>			Wind speed (mph)	<u>1</u>

Substantial changes in weather conditions during sampling or over the past 24 to 48 hrs:

Site Plan showing sample location, buildings, landmarks, potential soil vapor and outdoor air sources, preferential pathways

Comments: No vapor sample from VP-3M, VP-3D
water in line collected Groundwater sample

Soil Vapor (Bottle Vac®) Sample Collection Field Form

Project #	<u>70202</u>			Date	<u>11/18/19</u>		
Project Name	<u>Coldwater</u>			Collector	<u>KBS / WHZ</u>		

Sample ID	<u>VP-5S</u>	<u>VP-5M</u>	<u>VP-5D</u>	Vacuum gauge "zero" ("Hg)	<u>5</u> <u>yes</u>	<u>M</u> <u>yes</u>	<u>D</u> <u>-2</u>
Start Date/Time	<u>11/18</u> <u>1519</u>	<u>1502</u>	<u>1525</u>	Start Pressure ("Hg)	<u>-27</u>	<u>-27</u>	<u>-27</u>
End Date/Time	<u>11/18</u> <u>1547</u>	<u>1530</u>	<u>1535</u>	End Pressure ("Hg)	<u>-14</u>	<u>-2</u>	<u>-4</u>
Bottle/Canister ID	<u>18357</u>	<u>18360</u>	<u>13717</u>	End pressure = "zero"?	<u>yes</u>	<u>yes</u>	<u>No</u>
Flow controller ID	<u>106</u>	<u>4</u>	<u>178</u>	Sampling duration (intended)	<u>10 min</u>		
Associated ambient air sample ID	<u>N/A</u>			Depth of sample point below grade	<u>5'</u>	<u>10'</u>	<u>15'</u>
Analytical method required	<u>TO-15</u>			Laboratory used	<u>Merit</u>		

Tubing type/inside dia. used	<u>3/8 OD</u>	Length of tubing	<u>5'</u> <u>8'</u> <u>13'</u> <u>18'</u>	Tubing volume	<u>5</u> <u>77</u> <u>125</u> <u>173</u> cc	
Volume purged	<u>330</u> <u>315</u> <u>500</u> cc @ 0.1 l/min (100cc/min)	3 volumes purged @ < 200cc/min?		<u>yes</u>		
Shroud tracer gas conc.	Beginning: <u>42.4 %</u>	End of purging: <u>11.5 %</u>	End of sampling: _____			
Gas Analyzer Readings	%O ₂ <u>N/A</u>	%CO ₂ <u>N/A</u>	%CH ₄ <u>N/A</u>	PID/FID reading <u>0</u> <u>0</u> <u>0</u> / <u>0</u> <u>0</u> <u>0</u> (ppmv)		
Noticeable odor	<u>No</u>			Soil type	<u>clay</u>	

Weather Conditions during Probe Installation:

Air temperature (°F)	_____	Rainfall	_____	Wind direction	_____
Barometric pressure	_____			Wind speed (mph)	_____

Substantial changes in weather conditions during sampling or over the past 24 to 48 hrs:

Weather Conditions at Start of Sampling:

Air temperature (°F)	<u>44</u>	Rainfall	<u>NONE</u>	Wind direction	<u>NNW</u>
Barometric pressure	<u>29.75</u>			Wind speed (mph)	<u>2</u>

Substantial changes in weather conditions during sampling or over the past 24 to 48 hrs:

Site Plan showing sample location, buildings, landmarks, potential soil vapor and outdoor air sources, preferential pathways

Comments: _____

Soil Vapor (Bottle Vac®) Sample Collection Field Form

Project #	<u>72202</u>	Date	<u>11/18/19</u>
Project Name	<u>coldwater</u>	Collector	<u>KBS, wtl</u>
Sample ID	<u>VP-6D</u>	Vacuum gauge "zero" ("Hg)	<u>-4</u>
Start Date/Time	<u>11/18 1228</u>	Start Pressure ("Hg)	<u>-28.5</u>
End Date/Time	<u>11/18 1245</u>	End Pressure ("Hg)	<u>-27</u>
Bottle/Canister ID	<u>23680</u>	End pressure = "zero"?	<u>-4</u>
Flow controller ID	<u>182</u>	Sampling duration (intended)	<u>10 min</u>
Associated ambient air sample ID	<u>N/A</u>	Depth of sample point below grade	<u>15'</u>
Analytical method required	<u>TO-15</u>	Laboratory used	<u>Merit</u>

Tubing type/inside dia. used	<u>3/80D</u>	Length of tubing	<u>15'</u>	cm	Tubing volume	<u>173</u>	cc
Volume purged	<u>520</u>	cc @	<u>0.1 l/min (100cc/min)</u>	3 volumes purged @ < 200cc/min?	<u>yes</u>		
Shroud tracer gas conc.	Beginning: <u>38.9%</u>	End of purging:		End of sampling:	<u>17.4%</u>		
Gas Analyzer Readings	%O ₂ <u>N/A</u>	%CO ₂ <u>N/A</u>	%CH ₄ <u>N/A</u>	PID/FID reading	<u>0/0</u>	(ppmv)	
Noticeable odor	<u>NO</u>	Soil type	<u>clay</u>				

Weather Conditions during Probe Installation:

Air temperature (°F)		Rainfall		Wind direction	
Barometric pressure				Wind speed (mph)	

Substantial changes in weather conditions during sampling or over the past 24 to 48 hrs:

Weather Conditions at Start of Sampling:

Air temperature (°F)	<u>41</u>	Rainfall	<u>NO</u>	Wind direction	<u>N</u>
Barometric pressure	<u>29.82</u>			Wind speed (mph)	<u>1 mph</u>

Substantial changes in weather conditions during sampling or over the past 24 to 48 hrs:

Site Plan showing sample location, buildings, landmarks, potential soil vapor and outdoor air sources, preferential pathways

Comments: NO vapor sample from VP-6S, VP-6M water in line collected
groundwater sample
VP-6D stalled attempted twice to collect groundwater
no sample collected

APPENDIX B

Analytical Laboratory Reports



Analytical Laboratory Report

Report ID: S09506.01(01)
Generated on 11/22/2019

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 East Saginaw Street
East Lansing, MI 48823

Phone: 313-333-0211 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
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Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S09506.01-S09506.09
Project: RACER Coldwater Rd
Collected Date(s): 11/18/2019 - 11/19/2019
Submitted Date/Time: 11/20/2019 08:15
Sampled by: Kevin Schneider
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
TO-15	EPA TO-15 Second Edition January 1999



Analytical Laboratory Report

Sample Summary (9 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S09506.01	VP-6D	Air	11/18/19 12:28 - 11/18/19 12:45
S09506.02	VP-5M	Air	11/18/19 15:22 - 11/18/19 15:32
S09506.03	VP-5D	Air	11/18/19 15:25 - 11/18/19 15:35
S09506.04	VP-5S	Air	11/18/19 15:19 - 11/18/19 15:47
S09506.05	VP-2S	Air	11/18/19 16:22 - 11/18/19 16:35
S09506.06	VP-2D	Air	11/18/19 16:23 - 11/18/19 16:35
S09506.07	VP-DUP-1	Air	11/19/19 00:01 - 11/19/19 00:02
S09506.08	VP-1S	Air	11/19/19 09:46 - 11/19/19 09:58
S09506.09	VP-3S	Air	11/19/19 10:57 - 11/19/19 11:08



Analytical Laboratory Report

Lab Sample ID: S09506.01

Sample Tag: VP-6D

Collected Date/Time: 11/18/2019 12:28 - 11/18/2019 12:45

Matrix: Air

COC Reference: A4765

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Air Canister	None	No	RT	n/a

Organics - Volatiles

TO-15, Method: TO-15, Run Date: 11/21/19 01:33, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	40	20		ppbv	10	67-64-1	
1,3-Butadiene	Not detected	2		ppbv	10	106-99-0	
Benzene	Not detected	2		ppbv	10	71-43-2	
Bromodichloromethane	Not detected	2		ppbv	10	75-27-4	
Bromoform	Not detected	2		ppbv	10	75-25-2	
Bromomethane	Not detected	2		ppbv	10	74-83-9	
Vinyl bromide	Not detected	2		ppbv	10	593-60-2	
Benzyl chloride	Not detected	2		ppbv	10	100-44-7	
Carbon disulfide	Not detected	5		ppbv	10	75-15-0	
Chlorobenzene	Not detected	2		ppbv	10	108-90-7	
Chloroethane	Not detected	2		ppbv	10	75-00-3	
Chloroform	Not detected	2		ppbv	10	67-66-3	
Chloromethane	Not detected	2		ppbv	10	74-87-3	
3-Chloropropene	Not detected	2		ppbv	10	107-05-1	
2-Chlorotoluene	Not detected	2		ppbv	10	95-49-8	
Carbon tetrachloride	Not detected	2		ppbv	10	56-23-5	
Cyclohexane	Not detected	2		ppbv	10	110-82-7	
1,1-Dichloroethane	Not detected	2		ppbv	10	75-34-3	
1,1-Dichloroethene	Not detected	2		ppbv	10	75-35-4	
1,2-Dibromoethane	Not detected	2		ppbv	10	106-93-4	
1,2-Dichloroethane	Not detected	2		ppbv	10	107-06-2	
1,2-Dichloropropane	Not detected	2		ppbv	10	78-87-5	
1,4-Dioxane	Not detected	25		ppbv	10	123-91-1	
Dichlorodifluoromethane	Not detected	2		ppbv	10	75-71-8	
Dibromochloromethane	Not detected	2		ppbv	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	2		ppbv	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	2		ppbv	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	2		ppbv	10	541-73-1	
1,2-Dichlorobenzene	Not detected	2		ppbv	10	95-50-1	
1,4-Dichlorobenzene	Not detected	2		ppbv	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-02-6	
Ethanol*	45	25		ppbv	10	64-17-5	
Ethylbenzene	Not detected	2		ppbv	10	100-41-4	
Ethyl Acetate*	Not detected	10		ppbv	10	141-78-6	
4-Ethyltoluene	Not detected	2		ppbv	10	622-96-8	
Freon 113	Not detected	2		ppbv	10	76-13-1	
Freon 114	Not detected	2		ppbv	10	76-14-2	
Heptane	Not detected	2		ppbv	10	142-82-5	
Hexachlorobutadiene	Not detected	2		ppbv	10	87-68-3	
Hexane	14	2		ppbv	10	110-54-3	



Analytical Laboratory Report

Lab Sample ID: S09506.01 (continued)

Sample Tag: VP-6D

TO-15, Method: TO-15, Run Date: 11/21/19 01:33, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
2-Hexanone*	Not detected	5		ppbv	10	591-78-6	
Isopropyl Alcohol*	Not detected	20		ppbv	10	67-63-0	
Methylene chloride	8	5		ppbv	10	75-09-2	
2-Butanone (MEK)	Not detected	10		ppbv	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	5		ppbv	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	2		ppbv	10	1634-04-4	
Methyl methacrylate	Not detected	2		ppbv	10	80-62-6	
Naphthalene	Not detected	2		ppbv	10	91-20-3	
Propylene*	7	2		ppbv	10	115-07-1	
Styrene	Not detected	2		ppbv	10	100-42-5	
1,1,1-Trichloroethane	Not detected	2		ppbv	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	2		ppbv	10	79-34-5	
1,1,2-Trichloroethane	Not detected	2		ppbv	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ppbv	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	2		ppbv	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	2		ppbv	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	2		ppbv	10	540-84-1	
Tert-butyl Alcohol	Not detected	10		ppbv	10	75-65-0	
Tetrachloroethene	Not detected	2		ppbv	10	127-18-4	
Tetrahydrofuran*	10	2		ppbv	10	109-99-9	
Toluene	6	2		ppbv	10	108-88-3	
Trichloroethene	Not detected	2		ppbv	10	79-01-6	
Trichlorofluoromethane	Not detected	2		ppbv	10	75-69-4	
Vinyl chloride	Not detected	2		ppbv	10	75-01-4	
Vinyl acetate	Not detected	2		ppbv	10	108-05-4	
p,m-Xylene	Not detected	4		ppbv	10		
o-Xylene	Not detected	2		ppbv	10	95-47-6	
Total Xylenes	Not detected	6		ppbv	10	1330-20-7	

TO-15, Method: TO-15, Run Date: 11/21/19 01:33, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	95	48		ug/m3	10	67-64-1	
1,3-Butadiene	Not detected	4.4		ug/m3	10	106-99-0	
Benzene	Not detected	6.4		ug/m3	10	71-43-2	
Bromodichloromethane	Not detected	13		ug/m3	10	75-27-4	
Bromoform	Not detected	21		ug/m3	10	75-25-2	
Bromomethane	Not detected	7.8		ug/m3	10	74-83-9	
Vinyl bromide	Not detected	8.7		ug/m3	10	593-60-2	
Benzyl chloride	Not detected	10		ug/m3	10	100-44-7	
Carbon disulfide	Not detected	16		ug/m3	10	75-15-0	
Chlorobenzene	Not detected	9.2		ug/m3	10	108-90-7	
Chloroethane	Not detected	5.3		ug/m3	10	75-00-3	
Chloroform	Not detected	9.8		ug/m3	10	67-66-3	
Chloromethane	Not detected	4.1		ug/m3	10	74-87-3	
3-Chloropropene	Not detected	6.3		ug/m3	10	107-05-1	
2-Chlorotoluene	Not detected	10		ug/m3	10	95-49-8	
Carbon tetrachloride	Not detected	13		ug/m3	10	56-23-5	
Cyclohexane	Not detected	6.9		ug/m3	10	110-82-7	
1,1-Dichloroethane	Not detected	8.1		ug/m3	10	75-34-3	
1,1-Dichloroethene	Not detected	7.9		ug/m3	10	75-35-4	



Analytical Laboratory Report

Lab Sample ID: S09506.01 (continued)

Sample Tag: VP-6D

TO-15, Method: TO-15, Run Date: 11/21/19 01:33, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2-Dibromoethane	Not detected	15		ug/m3	10	106-93-4	
1,2-Dichloroethane	Not detected	8.1		ug/m3	10	107-06-2	
1,2-Dichloropropane	Not detected	9.2		ug/m3	10	78-87-5	
1,4-Dioxane	Not detected	90		ug/m3	10	123-91-1	
Dichlorodifluoromethane	Not detected	9.9		ug/m3	10	75-71-8	
Dibromochloromethane	Not detected	17		ug/m3	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	12		ug/m3	10	541-73-1	
1,2-Dichlorobenzene	Not detected	12		ug/m3	10	95-50-1	
1,4-Dichlorobenzene	Not detected	12		ug/m3	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-02-6	
Ethanol*	85	47		ug/m3	10	64-17-5	
Ethylbenzene	Not detected	8.7		ug/m3	10	100-41-4	
Ethyl Acetate*	Not detected	36		ug/m3	10	141-78-6	
4-Ethyltoluene	Not detected	9.8		ug/m3	10	622-96-8	
Freon 113	Not detected	15		ug/m3	10	76-13-1	
Freon 114	Not detected	14		ug/m3	10	76-14-2	
Heptane	Not detected	8.2		ug/m3	10	142-82-5	
Hexachlorobutadiene	Not detected	21		ug/m3	10	87-68-3	
Hexane	49	7.0		ug/m3	10	110-54-3	
2-Hexanone*	Not detected	20		ug/m3	10	591-78-6	
Isopropyl Alcohol*	Not detected	49		ug/m3	10	67-63-0	
Methylene chloride	28	17		ug/m3	10	75-09-2	
2-Butanone (MEK)	Not detected	29		ug/m3	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	20		ug/m3	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	7.2		ug/m3	10	1634-04-4	
Methyl methacrylate	Not detected	8.2		ug/m3	10	80-62-6	
Naphthalene	Not detected	10		ug/m3	10	91-20-3	
Propylene*	12	3.4		ug/m3	10	115-07-1	
Styrene	Not detected	8.5		ug/m3	10	100-42-5	
1,1,1-Trichloroethane	Not detected	11		ug/m3	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	14		ug/m3	10	79-34-5	
1,1,2-Trichloroethane	Not detected	11		ug/m3	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	37		ug/m3	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	9.8		ug/m3	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	9.8		ug/m3	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	9.3		ug/m3	10	540-84-1	
Tert-butyl Alcohol	Not detected	30		ug/m3	10	75-65-0	
Tetrachloroethene	Not detected	14		ug/m3	10	127-18-4	
Tetrahydrofuran*	29	5.9		ug/m3	10	109-99-9	
Toluene	23	7.5		ug/m3	10	108-88-3	
Trichloroethene	Not detected	11		ug/m3	10	79-01-6	
Trichlorofluoromethane	Not detected	11		ug/m3	10	75-69-4	
Vinyl chloride	Not detected	5.1		ug/m3	10	75-01-4	
Vinyl acetate	Not detected	7.0		ug/m3	10	108-05-4	
p,m-Xylene	Not detected	17		ug/m3	10		
o-Xylene	Not detected	8.7		ug/m3	10	95-47-6	
Total Xylenes	Not detected	26		ug/m3	10	1330-20-7	



Analytical Laboratory Report

Lab Sample ID: S09506.02

Sample Tag: VP-5M

Collected Date/Time: 11/18/2019 15:22 - 11/18/2019 15:32

Matrix: Air

COC Reference: A4765

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Air Canister	None	No	RT	n/a

Organics - Volatiles

TO-15, Method: TO-15, Run Date: 11/21/19 02:05, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	20		ppbv	10	67-64-1	
1,3-Butadiene	Not detected	2		ppbv	10	106-99-0	
Benzene	Not detected	2		ppbv	10	71-43-2	
Bromodichloromethane	Not detected	2		ppbv	10	75-27-4	
Bromoform	Not detected	2		ppbv	10	75-25-2	
Bromomethane	Not detected	2		ppbv	10	74-83-9	
Vinyl bromide	Not detected	2		ppbv	10	593-60-2	
Benzyl chloride	Not detected	2		ppbv	10	100-44-7	
Carbon disulfide	Not detected	5		ppbv	10	75-15-0	
Chlorobenzene	Not detected	2		ppbv	10	108-90-7	
Chloroethane	Not detected	2		ppbv	10	75-00-3	
Chloroform	Not detected	2		ppbv	10	67-66-3	
Chloromethane	Not detected	2		ppbv	10	74-87-3	
3-Chloropropene	Not detected	2		ppbv	10	107-05-1	
2-Chlorotoluene	Not detected	2		ppbv	10	95-49-8	
Carbon tetrachloride	Not detected	2		ppbv	10	56-23-5	
Cyclohexane	Not detected	2		ppbv	10	110-82-7	
1,1-Dichloroethane	Not detected	2		ppbv	10	75-34-3	
1,1-Dichloroethene	Not detected	2		ppbv	10	75-35-4	
1,2-Dibromoethane	Not detected	2		ppbv	10	106-93-4	
1,2-Dichloroethane	Not detected	2		ppbv	10	107-06-2	
1,2-Dichloropropane	Not detected	2		ppbv	10	78-87-5	
1,4-Dioxane	Not detected	25		ppbv	10	123-91-1	
Dichlorodifluoromethane	Not detected	2		ppbv	10	75-71-8	
Dibromochloromethane	Not detected	2		ppbv	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	2		ppbv	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	2		ppbv	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	2		ppbv	10	541-73-1	
1,2-Dichlorobenzene	Not detected	2		ppbv	10	95-50-1	
1,4-Dichlorobenzene	Not detected	2		ppbv	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-02-6	
Ethanol*	Not detected	25		ppbv	10	64-17-5	
Ethylbenzene	Not detected	2		ppbv	10	100-41-4	
Ethyl Acetate*	Not detected	10		ppbv	10	141-78-6	
4-Ethyltoluene	Not detected	2		ppbv	10	622-96-8	
Freon 113	Not detected	2		ppbv	10	76-13-1	
Freon 114	Not detected	2		ppbv	10	76-14-2	
Heptane	Not detected	2		ppbv	10	142-82-5	
Hexachlorobutadiene	Not detected	2		ppbv	10	87-68-3	
Hexane	Not detected	2		ppbv	10	110-54-3	

Lab Sample ID: S09506.02 (continued)

Sample Tag: VP-5M

TO-15, Method: TO-15, Run Date: 11/21/19 02:05, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
2-Hexanone*	Not detected	5		ppbv	10	591-78-6	
Isopropyl Alcohol*	Not detected	20		ppbv	10	67-63-0	
Methylene chloride	Not detected	5		ppbv	10	75-09-2	
2-Butanone (MEK)	Not detected	10		ppbv	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	5		ppbv	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	2		ppbv	10	1634-04-4	
Methyl methacrylate	Not detected	2		ppbv	10	80-62-6	
Naphthalene	Not detected	2		ppbv	10	91-20-3	
Propylene*	Not detected	4		ppbv	10	115-07-1	X
Styrene	Not detected	2		ppbv	10	100-42-5	
1,1,1-Trichloroethane	Not detected	2		ppbv	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	2		ppbv	10	79-34-5	
1,1,2-Trichloroethane	Not detected	2		ppbv	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ppbv	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	2		ppbv	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	2		ppbv	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	2		ppbv	10	540-84-1	
Tert-butyl Alcohol	Not detected	10		ppbv	10	75-65-0	
Tetrachloroethene	Not detected	2		ppbv	10	127-18-4	
Tetrahydrofuran*	9	2		ppbv	10	109-99-9	
Toluene	Not detected	2		ppbv	10	108-88-3	
Trichloroethene	Not detected	2		ppbv	10	79-01-6	
Trichlorofluoromethane	Not detected	2		ppbv	10	75-69-4	
Vinyl chloride	Not detected	2		ppbv	10	75-01-4	
Vinyl acetate	Not detected	2		ppbv	10	108-05-4	
p,m-Xylene	Not detected	4		ppbv	10		
o-Xylene	Not detected	2		ppbv	10	95-47-6	
Total Xylenes	Not detected	6		ppbv	10	1330-20-7	

TO-15, Method: TO-15, Run Date: 11/21/19 02:05, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	48		ug/m3	10	67-64-1	
1,3-Butadiene	Not detected	4.4		ug/m3	10	106-99-0	
Benzene	Not detected	6.4		ug/m3	10	71-43-2	
Bromodichloromethane	Not detected	13		ug/m3	10	75-27-4	
Bromoform	Not detected	21		ug/m3	10	75-25-2	
Bromomethane	Not detected	7.8		ug/m3	10	74-83-9	
Vinyl bromide	Not detected	8.7		ug/m3	10	593-60-2	
Benzyl chloride	Not detected	10		ug/m3	10	100-44-7	
Carbon disulfide	Not detected	16		ug/m3	10	75-15-0	
Chlorobenzene	Not detected	9.2		ug/m3	10	108-90-7	
Chloroethane	Not detected	5.3		ug/m3	10	75-00-3	
Chloroform	Not detected	9.8		ug/m3	10	67-66-3	
Chloromethane	Not detected	4.1		ug/m3	10	74-87-3	
3-Chloropropene	Not detected	6.3		ug/m3	10	107-05-1	
2-Chlorotoluene	Not detected	10		ug/m3	10	95-49-8	
Carbon tetrachloride	Not detected	13		ug/m3	10	56-23-5	
Cyclohexane	Not detected	6.9		ug/m3	10	110-82-7	
1,1-Dichloroethane	Not detected	8.1		ug/m3	10	75-34-3	

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S09506.02 (continued)

Sample Tag: VP-5M

TO-15, Method: TO-15, Run Date: 11/21/19 02:05, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,1-Dichloroethene	Not detected	7.9		ug/m3	10	75-35-4	
1,2-Dibromoethane	Not detected	15		ug/m3	10	106-93-4	
1,2-Dichloroethane	Not detected	8.1		ug/m3	10	107-06-2	
1,2-Dichloropropane	Not detected	9.2		ug/m3	10	78-87-5	
1,4-Dioxane	Not detected	90		ug/m3	10	123-91-1	
Dichlorodifluoromethane	Not detected	9.9		ug/m3	10	75-71-8	
Dibromochloromethane	Not detected	17		ug/m3	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	12		ug/m3	10	541-73-1	
1,2-Dichlorobenzene	Not detected	12		ug/m3	10	95-50-1	
1,4-Dichlorobenzene	Not detected	12		ug/m3	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-02-6	
Ethanol*	Not detected	47		ug/m3	10	64-17-5	
Ethylbenzene	Not detected	8.7		ug/m3	10	100-41-4	
Ethyl Acetate*	Not detected	36		ug/m3	10	141-78-6	
4-Ethyltoluene	Not detected	9.8		ug/m3	10	622-96-8	
Freon 113	Not detected	15		ug/m3	10	76-13-1	
Freon 114	Not detected	14		ug/m3	10	76-14-2	
Heptane	Not detected	8.2		ug/m3	10	142-82-5	
Hexachlorobutadiene	Not detected	21		ug/m3	10	87-68-3	
Hexane	Not detected	7.0		ug/m3	10	110-54-3	
2-Hexanone*	Not detected	20		ug/m3	10	591-78-6	
Isopropyl Alcohol*	Not detected	49		ug/m3	10	67-63-0	
Methylene chloride	Not detected	17		ug/m3	10	75-09-2	
2-Butanone (MEK)	Not detected	29		ug/m3	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	20		ug/m3	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	7.2		ug/m3	10	1634-04-4	
Methyl methacrylate	Not detected	8.2		ug/m3	10	80-62-6	
Naphthalene	Not detected	10		ug/m3	10	91-20-3	
Propylene*	Not detected	6.9		ug/m3	10	115-07-1	X
Styrene	Not detected	8.5		ug/m3	10	100-42-5	
1,1,1-Trichloroethane	Not detected	11		ug/m3	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	14		ug/m3	10	79-34-5	
1,1,2-Trichloroethane	Not detected	11		ug/m3	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	37		ug/m3	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	9.8		ug/m3	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	9.8		ug/m3	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	9.3		ug/m3	10	540-84-1	
Tert-butyl Alcohol	Not detected	30		ug/m3	10	75-65-0	
Tetrachloroethene	Not detected	14		ug/m3	10	127-18-4	
Tetrahydrofuran*	27	5.9		ug/m3	10	109-99-9	
Toluene	Not detected	7.5		ug/m3	10	108-88-3	
Trichloroethene	Not detected	11		ug/m3	10	79-01-6	
Trichlorofluoromethane	Not detected	11		ug/m3	10	75-69-4	
Vinyl chloride	Not detected	5.1		ug/m3	10	75-01-4	
Vinyl acetate	Not detected	7.0		ug/m3	10	108-05-4	
p,m-Xylene	Not detected	17		ug/m3	10		

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S09506.02 (continued)

Sample Tag: VP-5M

TO-15, Method: TO-15, Run Date: 11/21/19 02:05, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
o-Xylene	Not detected	8.7		ug/m3	10	95-47-6	
Total Xylenes	Not detected	26		ug/m3	10	1330-20-7	



Analytical Laboratory Report

Lab Sample ID: S09506.03

Sample Tag: VP-5D

Collected Date/Time: 11/18/2019 15:25 - 11/18/2019 15:35

Matrix: Air

COC Reference: A4765

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Air Canister	None	No	RT	n/a

Organics - Volatiles

TO-15, Method: TO-15, Run Date: 11/21/19 02:37, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	20		ppbv	10	67-64-1	
1,3-Butadiene	Not detected	2		ppbv	10	106-99-0	
Benzene	Not detected	2		ppbv	10	71-43-2	
Bromodichloromethane	Not detected	2		ppbv	10	75-27-4	
Bromoform	Not detected	2		ppbv	10	75-25-2	
Bromomethane	Not detected	2		ppbv	10	74-83-9	
Vinyl bromide	Not detected	2		ppbv	10	593-60-2	
Benzyl chloride	Not detected	2		ppbv	10	100-44-7	
Carbon disulfide	Not detected	5		ppbv	10	75-15-0	
Chlorobenzene	Not detected	2		ppbv	10	108-90-7	
Chloroethane	Not detected	2		ppbv	10	75-00-3	
Chloroform	Not detected	2		ppbv	10	67-66-3	
Chloromethane	Not detected	2		ppbv	10	74-87-3	
3-Chloropropene	Not detected	2		ppbv	10	107-05-1	
2-Chlorotoluene	Not detected	2		ppbv	10	95-49-8	
Carbon tetrachloride	Not detected	2		ppbv	10	56-23-5	
Cyclohexane	Not detected	2		ppbv	10	110-82-7	
1,1-Dichloroethane	Not detected	2		ppbv	10	75-34-3	
1,1-Dichloroethene	Not detected	2		ppbv	10	75-35-4	
1,2-Dibromoethane	Not detected	2		ppbv	10	106-93-4	
1,2-Dichloroethane	Not detected	2		ppbv	10	107-06-2	
1,2-Dichloropropane	Not detected	2		ppbv	10	78-87-5	
1,4-Dioxane	Not detected	25		ppbv	10	123-91-1	
Dichlorodifluoromethane	Not detected	2		ppbv	10	75-71-8	
Dibromochloromethane	Not detected	2		ppbv	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	2		ppbv	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	2		ppbv	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	2		ppbv	10	541-73-1	
1,2-Dichlorobenzene	Not detected	2		ppbv	10	95-50-1	
1,4-Dichlorobenzene	Not detected	2		ppbv	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-02-6	
Ethanol*	Not detected	25		ppbv	10	64-17-5	
Ethylbenzene	Not detected	2		ppbv	10	100-41-4	
Ethyl Acetate*	Not detected	10		ppbv	10	141-78-6	
4-Ethyltoluene	Not detected	2		ppbv	10	622-96-8	
Freon 113	Not detected	2		ppbv	10	76-13-1	
Freon 114	Not detected	2		ppbv	10	76-14-2	
Heptane	Not detected	2		ppbv	10	142-82-5	
Hexachlorobutadiene	Not detected	2		ppbv	10	87-68-3	
Hexane	Not detected	2		ppbv	10	110-54-3	



Analytical Laboratory Report

Lab Sample ID: S09506.03 (continued)

Sample Tag: VP-5D

TO-15, Method: TO-15, Run Date: 11/21/19 02:37, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
2-Hexanone*	Not detected	5		ppbv	10	591-78-6	
Isopropyl Alcohol*	Not detected	20		ppbv	10	67-63-0	
Methylene chloride	Not detected	5		ppbv	10	75-09-2	
2-Butanone (MEK)	Not detected	10		ppbv	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	5		ppbv	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	2		ppbv	10	1634-04-4	
Methyl methacrylate	Not detected	2		ppbv	10	80-62-6	
Naphthalene	Not detected	2		ppbv	10	91-20-3	
Propylene*	Not detected	2		ppbv	10	115-07-1	
Styrene	Not detected	2		ppbv	10	100-42-5	
1,1,1-Trichloroethane	Not detected	2		ppbv	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	2		ppbv	10	79-34-5	
1,1,2-Trichloroethane	Not detected	2		ppbv	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ppbv	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	2		ppbv	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	2		ppbv	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	2		ppbv	10	540-84-1	
Tert-butyl Alcohol	Not detected	10		ppbv	10	75-65-0	
Tetrachloroethene	Not detected	2		ppbv	10	127-18-4	
Tetrahydrofuran*	5	2		ppbv	10	109-99-9	
Toluene	Not detected	2		ppbv	10	108-88-3	
Trichloroethene	Not detected	2		ppbv	10	79-01-6	
Trichlorofluoromethane	Not detected	2		ppbv	10	75-69-4	
Vinyl chloride	Not detected	2		ppbv	10	75-01-4	
Vinyl acetate	Not detected	2		ppbv	10	108-05-4	
p,m-Xylene	Not detected	4		ppbv	10		
o-Xylene	Not detected	2		ppbv	10	95-47-6	
Total Xylenes	Not detected	6		ppbv	10	1330-20-7	

TO-15, Method: TO-15, Run Date: 11/21/19 02:37, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	48		ug/m3	10	67-64-1	
1,3-Butadiene	Not detected	4.4		ug/m3	10	106-99-0	
Benzene	Not detected	6.4		ug/m3	10	71-43-2	
Bromodichloromethane	Not detected	13		ug/m3	10	75-27-4	
Bromoform	Not detected	21		ug/m3	10	75-25-2	
Bromomethane	Not detected	7.8		ug/m3	10	74-83-9	
Vinyl bromide	Not detected	8.7		ug/m3	10	593-60-2	
Benzyl chloride	Not detected	10		ug/m3	10	100-44-7	
Carbon disulfide	Not detected	16		ug/m3	10	75-15-0	
Chlorobenzene	Not detected	9.2		ug/m3	10	108-90-7	
Chloroethane	Not detected	5.3		ug/m3	10	75-00-3	
Chloroform	Not detected	9.8		ug/m3	10	67-66-3	
Chloromethane	Not detected	4.1		ug/m3	10	74-87-3	
3-Chloropropene	Not detected	6.3		ug/m3	10	107-05-1	
2-Chlorotoluene	Not detected	10		ug/m3	10	95-49-8	
Carbon tetrachloride	Not detected	13		ug/m3	10	56-23-5	
Cyclohexane	Not detected	6.9		ug/m3	10	110-82-7	
1,1-Dichloroethane	Not detected	8.1		ug/m3	10	75-34-3	
1,1-Dichloroethene	Not detected	7.9		ug/m3	10	75-35-4	



Analytical Laboratory Report

Lab Sample ID: S09506.03 (continued)

Sample Tag: VP-5D

TO-15, Method: TO-15, Run Date: 11/21/19 02:37, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2-Dibromoethane	Not detected	15		ug/m3	10	106-93-4	
1,2-Dichloroethane	Not detected	8.1		ug/m3	10	107-06-2	
1,2-Dichloropropane	Not detected	9.2		ug/m3	10	78-87-5	
1,4-Dioxane	Not detected	90		ug/m3	10	123-91-1	
Dichlorodifluoromethane	Not detected	9.9		ug/m3	10	75-71-8	
Dibromochloromethane	Not detected	17		ug/m3	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	12		ug/m3	10	541-73-1	
1,2-Dichlorobenzene	Not detected	12		ug/m3	10	95-50-1	
1,4-Dichlorobenzene	Not detected	12		ug/m3	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-02-6	
Ethanol*	Not detected	47		ug/m3	10	64-17-5	
Ethylbenzene	Not detected	8.7		ug/m3	10	100-41-4	
Ethyl Acetate*	Not detected	36		ug/m3	10	141-78-6	
4-Ethyltoluene	Not detected	9.8		ug/m3	10	622-96-8	
Freon 113	Not detected	15		ug/m3	10	76-13-1	
Freon 114	Not detected	14		ug/m3	10	76-14-2	
Heptane	Not detected	8.2		ug/m3	10	142-82-5	
Hexachlorobutadiene	Not detected	21		ug/m3	10	87-68-3	
Hexane	Not detected	7.0		ug/m3	10	110-54-3	
2-Hexanone*	Not detected	20		ug/m3	10	591-78-6	
Isopropyl Alcohol*	Not detected	49		ug/m3	10	67-63-0	
Methylene chloride	Not detected	17		ug/m3	10	75-09-2	
2-Butanone (MEK)	Not detected	29		ug/m3	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	20		ug/m3	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	7.2		ug/m3	10	1634-04-4	
Methyl methacrylate	Not detected	8.2		ug/m3	10	80-62-6	
Naphthalene	Not detected	10		ug/m3	10	91-20-3	
Propylene*	Not detected	3.4		ug/m3	10	115-07-1	
Styrene	Not detected	8.5		ug/m3	10	100-42-5	
1,1,1-Trichloroethane	Not detected	11		ug/m3	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	14		ug/m3	10	79-34-5	
1,1,2-Trichloroethane	Not detected	11		ug/m3	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	37		ug/m3	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	9.8		ug/m3	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	9.8		ug/m3	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	9.3		ug/m3	10	540-84-1	
Tert-butyl Alcohol	Not detected	30		ug/m3	10	75-65-0	
Tetrachloroethene	Not detected	14		ug/m3	10	127-18-4	
Tetrahydrofuran*	15	5.9		ug/m3	10	109-99-9	
Toluene	Not detected	7.5		ug/m3	10	108-88-3	
Trichloroethene	Not detected	11		ug/m3	10	79-01-6	
Trichlorofluoromethane	Not detected	11		ug/m3	10	75-69-4	
Vinyl chloride	Not detected	5.1		ug/m3	10	75-01-4	
Vinyl acetate	Not detected	7.0		ug/m3	10	108-05-4	
p,m-Xylene	Not detected	17		ug/m3	10		
o-Xylene	Not detected	8.7		ug/m3	10	95-47-6	
Total Xylenes	Not detected	26		ug/m3	10	1330-20-7	



Analytical Laboratory Report

Lab Sample ID: S09506.04

Sample Tag: VP-5S

Collected Date/Time: 11/18/2019 15:19 - 11/18/2019 15:47

Matrix: Air

COC Reference: A4765

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Air Canister	None	No	RT	n/a

Organics - Volatiles

TO-15, Method: TO-15, Run Date: 11/21/19 03:09, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	30	20		ppbv	10	67-64-1	
1,3-Butadiene	Not detected	2		ppbv	10	106-99-0	
Benzene	Not detected	2		ppbv	10	71-43-2	
Bromodichloromethane	Not detected	2		ppbv	10	75-27-4	
Bromoform	Not detected	2		ppbv	10	75-25-2	
Bromomethane	Not detected	2		ppbv	10	74-83-9	
Vinyl bromide	Not detected	2		ppbv	10	593-60-2	
Benzyl chloride	Not detected	2		ppbv	10	100-44-7	
Carbon disulfide	Not detected	5		ppbv	10	75-15-0	
Chlorobenzene	Not detected	2		ppbv	10	108-90-7	
Chloroethane	Not detected	2		ppbv	10	75-00-3	
Chloroform	Not detected	2		ppbv	10	67-66-3	
Chloromethane	Not detected	2		ppbv	10	74-87-3	
3-Chloropropene	Not detected	2		ppbv	10	107-05-1	
2-Chlorotoluene	Not detected	2		ppbv	10	95-49-8	
Carbon tetrachloride	Not detected	2		ppbv	10	56-23-5	
Cyclohexane	Not detected	2		ppbv	10	110-82-7	
1,1-Dichloroethane	Not detected	2		ppbv	10	75-34-3	
1,1-Dichloroethene	Not detected	2		ppbv	10	75-35-4	
1,2-Dibromoethane	Not detected	2		ppbv	10	106-93-4	
1,2-Dichloroethane	Not detected	2		ppbv	10	107-06-2	
1,2-Dichloropropane	Not detected	2		ppbv	10	78-87-5	
1,4-Dioxane	Not detected	25		ppbv	10	123-91-1	
Dichlorodifluoromethane	Not detected	2		ppbv	10	75-71-8	
Dibromochloromethane	Not detected	2		ppbv	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	2		ppbv	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	2		ppbv	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	2		ppbv	10	541-73-1	
1,2-Dichlorobenzene	Not detected	2		ppbv	10	95-50-1	
1,4-Dichlorobenzene	Not detected	2		ppbv	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-02-6	
Ethanol*	47	25		ppbv	10	64-17-5	
Ethylbenzene	Not detected	2		ppbv	10	100-41-4	
Ethyl Acetate*	Not detected	10		ppbv	10	141-78-6	
4-Ethyltoluene	Not detected	2		ppbv	10	622-96-8	
Freon 113	Not detected	2		ppbv	10	76-13-1	
Freon 114	Not detected	2		ppbv	10	76-14-2	
Heptane	Not detected	2		ppbv	10	142-82-5	
Hexachlorobutadiene	Not detected	2		ppbv	10	87-68-3	
Hexane	Not detected	2		ppbv	10	110-54-3	



Analytical Laboratory Report

Lab Sample ID: S09506.04 (continued)

Sample Tag: VP-5S

TO-15, Method: TO-15, Run Date: 11/21/19 03:09, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
2-Hexanone*	Not detected	5		ppbv	10	591-78-6	
Isopropyl Alcohol*	Not detected	20		ppbv	10	67-63-0	
Methylene chloride	Not detected	5		ppbv	10	75-09-2	
2-Butanone (MEK)	Not detected	10		ppbv	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	5		ppbv	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	2		ppbv	10	1634-04-4	
Methyl methacrylate	Not detected	2		ppbv	10	80-62-6	
Naphthalene	Not detected	2		ppbv	10	91-20-3	
Propylene*	Not detected	53		ppbv	10	115-07-1	X
Styrene	Not detected	2		ppbv	10	100-42-5	
1,1,1-Trichloroethane	Not detected	2		ppbv	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	2		ppbv	10	79-34-5	
1,1,2-Trichloroethane	Not detected	2		ppbv	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ppbv	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	2		ppbv	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	2		ppbv	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	2		ppbv	10	540-84-1	
Tert-butyl Alcohol	Not detected	10		ppbv	10	75-65-0	
Tetrachloroethene	Not detected	2		ppbv	10	127-18-4	
Tetrahydrofuran*	15	2		ppbv	10	109-99-9	
Toluene	3	2		ppbv	10	108-88-3	
Trichloroethene	Not detected	2		ppbv	10	79-01-6	
Trichlorofluoromethane	Not detected	2		ppbv	10	75-69-4	
Vinyl chloride	Not detected	2		ppbv	10	75-01-4	
Vinyl acetate	Not detected	2		ppbv	10	108-05-4	
p,m-Xylene	Not detected	4		ppbv	10		
o-Xylene	Not detected	2		ppbv	10	95-47-6	
Total Xylenes	Not detected	6		ppbv	10	1330-20-7	

TO-15, Method: TO-15, Run Date: 11/21/19 03:09, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	71	48		ug/m3	10	67-64-1	
1,3-Butadiene	Not detected	4.4		ug/m3	10	106-99-0	
Benzene	Not detected	6.4		ug/m3	10	71-43-2	
Bromodichloromethane	Not detected	13		ug/m3	10	75-27-4	
Bromoform	Not detected	21		ug/m3	10	75-25-2	
Bromomethane	Not detected	7.8		ug/m3	10	74-83-9	
Vinyl bromide	Not detected	8.7		ug/m3	10	593-60-2	
Benzyl chloride	Not detected	10		ug/m3	10	100-44-7	
Carbon disulfide	Not detected	16		ug/m3	10	75-15-0	
Chlorobenzene	Not detected	9.2		ug/m3	10	108-90-7	
Chloroethane	Not detected	5.3		ug/m3	10	75-00-3	
Chloroform	Not detected	9.8		ug/m3	10	67-66-3	
Chloromethane	Not detected	4.1		ug/m3	10	74-87-3	
3-Chloropropene	Not detected	6.3		ug/m3	10	107-05-1	
2-Chlorotoluene	Not detected	10		ug/m3	10	95-49-8	
Carbon tetrachloride	Not detected	13		ug/m3	10	56-23-5	
Cyclohexane	Not detected	6.9		ug/m3	10	110-82-7	
1,1-Dichloroethane	Not detected	8.1		ug/m3	10	75-34-3	

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S09506.04 (continued)

Sample Tag: VP-5S

TO-15, Method: TO-15, Run Date: 11/21/19 03:09, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,1-Dichloroethene	Not detected	7.9		ug/m3	10	75-35-4	
1,2-Dibromoethane	Not detected	15		ug/m3	10	106-93-4	
1,2-Dichloroethane	Not detected	8.1		ug/m3	10	107-06-2	
1,2-Dichloropropane	Not detected	9.2		ug/m3	10	78-87-5	
1,4-Dioxane	Not detected	90		ug/m3	10	123-91-1	
Dichlorodifluoromethane	Not detected	9.9		ug/m3	10	75-71-8	
Dibromochloromethane	Not detected	17		ug/m3	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	12		ug/m3	10	541-73-1	
1,2-Dichlorobenzene	Not detected	12		ug/m3	10	95-50-1	
1,4-Dichlorobenzene	Not detected	12		ug/m3	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-02-6	
Ethanol*	89	47		ug/m3	10	64-17-5	
Ethylbenzene	Not detected	8.7		ug/m3	10	100-41-4	
Ethyl Acetate*	Not detected	36		ug/m3	10	141-78-6	
4-Ethyltoluene	Not detected	9.8		ug/m3	10	622-96-8	
Freon 113	Not detected	15		ug/m3	10	76-13-1	
Freon 114	Not detected	14		ug/m3	10	76-14-2	
Heptane	Not detected	8.2		ug/m3	10	142-82-5	
Hexachlorobutadiene	Not detected	21		ug/m3	10	87-68-3	
Hexane	Not detected	7.0		ug/m3	10	110-54-3	
2-Hexanone*	Not detected	20		ug/m3	10	591-78-6	
Isopropyl Alcohol*	Not detected	49		ug/m3	10	67-63-0	
Methylene chloride	Not detected	17		ug/m3	10	75-09-2	
2-Butanone (MEK)	Not detected	29		ug/m3	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	20		ug/m3	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	7.2		ug/m3	10	1634-04-4	
Methyl methacrylate	Not detected	8.2		ug/m3	10	80-62-6	
Naphthalene	Not detected	10		ug/m3	10	91-20-3	
Propylene*	Not detected	91		ug/m3	10	115-07-1	X
Styrene	Not detected	8.5		ug/m3	10	100-42-5	
1,1,1-Trichloroethane	Not detected	11		ug/m3	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	14		ug/m3	10	79-34-5	
1,1,2-Trichloroethane	Not detected	11		ug/m3	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	37		ug/m3	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	9.8		ug/m3	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	9.8		ug/m3	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	9.3		ug/m3	10	540-84-1	
Tert-butyl Alcohol	Not detected	30		ug/m3	10	75-65-0	
Tetrachloroethene	Not detected	14		ug/m3	10	127-18-4	
Tetrahydrofuran*	44	5.9		ug/m3	10	109-99-9	
Toluene	11	7.5		ug/m3	10	108-88-3	
Trichloroethene	Not detected	11		ug/m3	10	79-01-6	
Trichlorofluoromethane	Not detected	11		ug/m3	10	75-69-4	
Vinyl chloride	Not detected	5.1		ug/m3	10	75-01-4	
Vinyl acetate	Not detected	7.0		ug/m3	10	108-05-4	
p,m-Xylene	Not detected	17		ug/m3	10		

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S09506.04 (continued)

Sample Tag: VP-5S

TO-15, Method: TO-15, Run Date: 11/21/19 03:09, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
o-Xylene	Not detected	8.7		ug/m3	10	95-47-6	
Total Xylenes	Not detected	26		ug/m3	10	1330-20-7	



Analytical Laboratory Report

Lab Sample ID: S09506.05

Sample Tag: VP-2S

Collected Date/Time: 11/18/2019 16:22 - 11/18/2019 16:35

Matrix: Air

COC Reference: A4765

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Air Canister	None	No	RT	n/a

Organics - Volatiles

TO-15, Method: TO-15, Run Date: 11/21/19 03:41, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	20		ppbv	10	67-64-1	
1,3-Butadiene	Not detected	2		ppbv	10	106-99-0	
Benzene	Not detected	2		ppbv	10	71-43-2	
Bromodichloromethane	Not detected	2		ppbv	10	75-27-4	
Bromoform	Not detected	2		ppbv	10	75-25-2	
Bromomethane	Not detected	2		ppbv	10	74-83-9	
Vinyl bromide	Not detected	2		ppbv	10	593-60-2	
Benzyl chloride	Not detected	2		ppbv	10	100-44-7	
Carbon disulfide	Not detected	5		ppbv	10	75-15-0	
Chlorobenzene	Not detected	2		ppbv	10	108-90-7	
Chloroethane	Not detected	2		ppbv	10	75-00-3	
Chloroform	Not detected	2		ppbv	10	67-66-3	
Chloromethane	Not detected	2		ppbv	10	74-87-3	
3-Chloropropene	Not detected	2		ppbv	10	107-05-1	
2-Chlorotoluene	Not detected	2		ppbv	10	95-49-8	
Carbon tetrachloride	Not detected	2		ppbv	10	56-23-5	
Cyclohexane	Not detected	2		ppbv	10	110-82-7	
1,1-Dichloroethane	Not detected	2		ppbv	10	75-34-3	
1,1-Dichloroethene	Not detected	2		ppbv	10	75-35-4	
1,2-Dibromoethane	Not detected	2		ppbv	10	106-93-4	
1,2-Dichloroethane	Not detected	2		ppbv	10	107-06-2	
1,2-Dichloropropane	Not detected	2		ppbv	10	78-87-5	
1,4-Dioxane	Not detected	25		ppbv	10	123-91-1	
Dichlorodifluoromethane	Not detected	2		ppbv	10	75-71-8	
Dibromochloromethane	Not detected	2		ppbv	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	2		ppbv	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	2		ppbv	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	2		ppbv	10	541-73-1	
1,2-Dichlorobenzene	Not detected	2		ppbv	10	95-50-1	
1,4-Dichlorobenzene	Not detected	2		ppbv	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-02-6	
Ethanol*	Not detected	25		ppbv	10	64-17-5	
Ethylbenzene	Not detected	2		ppbv	10	100-41-4	
Ethyl Acetate*	Not detected	10		ppbv	10	141-78-6	
4-Ethyltoluene	Not detected	2		ppbv	10	622-96-8	
Freon 113	Not detected	2		ppbv	10	76-13-1	
Freon 114	Not detected	2		ppbv	10	76-14-2	
Heptane	Not detected	2		ppbv	10	142-82-5	
Hexachlorobutadiene	Not detected	2		ppbv	10	87-68-3	
Hexane	Not detected	2		ppbv	10	110-54-3	



Analytical Laboratory Report

Lab Sample ID: S09506.05 (continued)

Sample Tag: VP-2S

TO-15, Method: TO-15, Run Date: 11/21/19 03:41, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
2-Hexanone*	Not detected	5		ppbv	10	591-78-6	
Isopropyl Alcohol*	Not detected	20		ppbv	10	67-63-0	
Methylene chloride	Not detected	5		ppbv	10	75-09-2	
2-Butanone (MEK)	Not detected	10		ppbv	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	5		ppbv	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	2		ppbv	10	1634-04-4	
Methyl methacrylate	Not detected	2		ppbv	10	80-62-6	
Naphthalene	Not detected	2		ppbv	10	91-20-3	
Propylene*	Not detected	2		ppbv	10	115-07-1	
Styrene	Not detected	2		ppbv	10	100-42-5	
1,1,1-Trichloroethane	Not detected	2		ppbv	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	2		ppbv	10	79-34-5	
1,1,2-Trichloroethane	Not detected	2		ppbv	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ppbv	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	2		ppbv	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	2		ppbv	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	2		ppbv	10	540-84-1	
Tert-butyl Alcohol	Not detected	10		ppbv	10	75-65-0	
Tetrachloroethene	Not detected	2		ppbv	10	127-18-4	
Tetrahydrofuran*	6	2		ppbv	10	109-99-9	
Toluene	Not detected	2		ppbv	10	108-88-3	
Trichloroethene	Not detected	2		ppbv	10	79-01-6	
Trichlorofluoromethane	Not detected	2		ppbv	10	75-69-4	
Vinyl chloride	Not detected	2		ppbv	10	75-01-4	
Vinyl acetate	Not detected	2		ppbv	10	108-05-4	
p,m-Xylene	Not detected	4		ppbv	10		
o-Xylene	Not detected	2		ppbv	10	95-47-6	
Total Xylenes	Not detected	6		ppbv	10	1330-20-7	

TO-15, Method: TO-15, Run Date: 11/21/19 03:41, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	48		ug/m3	10	67-64-1	
1,3-Butadiene	Not detected	4.4		ug/m3	10	106-99-0	
Benzene	Not detected	6.4		ug/m3	10	71-43-2	
Bromodichloromethane	Not detected	13		ug/m3	10	75-27-4	
Bromoform	Not detected	21		ug/m3	10	75-25-2	
Bromomethane	Not detected	7.8		ug/m3	10	74-83-9	
Vinyl bromide	Not detected	8.7		ug/m3	10	593-60-2	
Benzyl chloride	Not detected	10		ug/m3	10	100-44-7	
Carbon disulfide	Not detected	16		ug/m3	10	75-15-0	
Chlorobenzene	Not detected	9.2		ug/m3	10	108-90-7	
Chloroethane	Not detected	5.3		ug/m3	10	75-00-3	
Chloroform	Not detected	9.8		ug/m3	10	67-66-3	
Chloromethane	Not detected	4.1		ug/m3	10	74-87-3	
3-Chloropropene	Not detected	6.3		ug/m3	10	107-05-1	
2-Chlorotoluene	Not detected	10		ug/m3	10	95-49-8	
Carbon tetrachloride	Not detected	13		ug/m3	10	56-23-5	
Cyclohexane	Not detected	6.9		ug/m3	10	110-82-7	
1,1-Dichloroethane	Not detected	8.1		ug/m3	10	75-34-3	
1,1-Dichloroethene	Not detected	7.9		ug/m3	10	75-35-4	



Analytical Laboratory Report

Lab Sample ID: S09506.05 (continued)

Sample Tag: VP-2S

TO-15, Method: TO-15, Run Date: 11/21/19 03:41, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2-Dibromoethane	Not detected	15		ug/m3	10	106-93-4	
1,2-Dichloroethane	Not detected	8.1		ug/m3	10	107-06-2	
1,2-Dichloropropane	Not detected	9.2		ug/m3	10	78-87-5	
1,4-Dioxane	Not detected	90		ug/m3	10	123-91-1	
Dichlorodifluoromethane	Not detected	9.9		ug/m3	10	75-71-8	
Dibromochloromethane	Not detected	17		ug/m3	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	12		ug/m3	10	541-73-1	
1,2-Dichlorobenzene	Not detected	12		ug/m3	10	95-50-1	
1,4-Dichlorobenzene	Not detected	12		ug/m3	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-02-6	
Ethanol*	Not detected	47		ug/m3	10	64-17-5	
Ethylbenzene	Not detected	8.7		ug/m3	10	100-41-4	
Ethyl Acetate*	Not detected	36		ug/m3	10	141-78-6	
4-Ethyltoluene	Not detected	9.8		ug/m3	10	622-96-8	
Freon 113	Not detected	15		ug/m3	10	76-13-1	
Freon 114	Not detected	14		ug/m3	10	76-14-2	
Heptane	Not detected	8.2		ug/m3	10	142-82-5	
Hexachlorobutadiene	Not detected	21		ug/m3	10	87-68-3	
Hexane	Not detected	7.0		ug/m3	10	110-54-3	
2-Hexanone*	Not detected	20		ug/m3	10	591-78-6	
Isopropyl Alcohol*	Not detected	49		ug/m3	10	67-63-0	
Methylene chloride	Not detected	17		ug/m3	10	75-09-2	
2-Butanone (MEK)	Not detected	29		ug/m3	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	20		ug/m3	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	7.2		ug/m3	10	1634-04-4	
Methyl methacrylate	Not detected	8.2		ug/m3	10	80-62-6	
Naphthalene	Not detected	10		ug/m3	10	91-20-3	
Propylene*	Not detected	3.4		ug/m3	10	115-07-1	
Styrene	Not detected	8.5		ug/m3	10	100-42-5	
1,1,1-Trichloroethane	Not detected	11		ug/m3	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	14		ug/m3	10	79-34-5	
1,1,2-Trichloroethane	Not detected	11		ug/m3	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	37		ug/m3	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	9.8		ug/m3	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	9.8		ug/m3	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	9.3		ug/m3	10	540-84-1	
Tert-butyl Alcohol	Not detected	30		ug/m3	10	75-65-0	
Tetrachloroethene	Not detected	14		ug/m3	10	127-18-4	
Tetrahydrofuran*	18	5.9		ug/m3	10	109-99-9	
Toluene	Not detected	7.5		ug/m3	10	108-88-3	
Trichloroethene	Not detected	11		ug/m3	10	79-01-6	
Trichlorofluoromethane	Not detected	11		ug/m3	10	75-69-4	
Vinyl chloride	Not detected	5.1		ug/m3	10	75-01-4	
Vinyl acetate	Not detected	7.0		ug/m3	10	108-05-4	
p,m-Xylene	Not detected	17		ug/m3	10		
o-Xylene	Not detected	8.7		ug/m3	10	95-47-6	
Total Xylenes	Not detected	26		ug/m3	10	1330-20-7	



Analytical Laboratory Report

Lab Sample ID: S09506.06

Sample Tag: VP-2D

Collected Date/Time: 11/18/2019 16:23 - 11/18/2019 16:35

Matrix: Air

COC Reference: A4765

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Air Canister	None	No	RT	n/a

Organics - Volatiles

TO-15, Method: TO-15, Run Date: 11/21/19 04:12, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	20		ppbv	10	67-64-1	
1,3-Butadiene	Not detected	2		ppbv	10	106-99-0	
Benzene	Not detected	2		ppbv	10	71-43-2	
Bromodichloromethane	Not detected	2		ppbv	10	75-27-4	
Bromoform	Not detected	2		ppbv	10	75-25-2	
Bromomethane	Not detected	2		ppbv	10	74-83-9	
Vinyl bromide	Not detected	2		ppbv	10	593-60-2	
Benzyl chloride	Not detected	2		ppbv	10	100-44-7	
Carbon disulfide	Not detected	5		ppbv	10	75-15-0	
Chlorobenzene	Not detected	2		ppbv	10	108-90-7	
Chloroethane	Not detected	2		ppbv	10	75-00-3	
Chloroform	Not detected	2		ppbv	10	67-66-3	
Chloromethane	Not detected	2		ppbv	10	74-87-3	
3-Chloropropene	Not detected	2		ppbv	10	107-05-1	
2-Chlorotoluene	Not detected	2		ppbv	10	95-49-8	
Carbon tetrachloride	Not detected	2		ppbv	10	56-23-5	
Cyclohexane	Not detected	2		ppbv	10	110-82-7	
1,1-Dichloroethane	Not detected	2		ppbv	10	75-34-3	
1,1-Dichloroethene	Not detected	2		ppbv	10	75-35-4	
1,2-Dibromoethane	Not detected	2		ppbv	10	106-93-4	
1,2-Dichloroethane	Not detected	2		ppbv	10	107-06-2	
1,2-Dichloropropane	Not detected	2		ppbv	10	78-87-5	
1,4-Dioxane	Not detected	25		ppbv	10	123-91-1	
Dichlorodifluoromethane	Not detected	2		ppbv	10	75-71-8	
Dibromochloromethane	Not detected	2		ppbv	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	2		ppbv	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	2		ppbv	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	2		ppbv	10	541-73-1	
1,2-Dichlorobenzene	Not detected	2		ppbv	10	95-50-1	
1,4-Dichlorobenzene	Not detected	2		ppbv	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-02-6	
Ethanol*	Not detected	25		ppbv	10	64-17-5	
Ethylbenzene	Not detected	2		ppbv	10	100-41-4	
Ethyl Acetate*	Not detected	10		ppbv	10	141-78-6	
4-Ethyltoluene	Not detected	2		ppbv	10	622-96-8	
Freon 113	Not detected	2		ppbv	10	76-13-1	
Freon 114	Not detected	2		ppbv	10	76-14-2	
Heptane	Not detected	2		ppbv	10	142-82-5	
Hexachlorobutadiene	Not detected	2		ppbv	10	87-68-3	
Hexane	Not detected	2		ppbv	10	110-54-3	



Analytical Laboratory Report

Lab Sample ID: S09506.06 (continued)

Sample Tag: VP-2D

TO-15, Method: TO-15, Run Date: 11/21/19 04:12, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
2-Hexanone*	Not detected	5		ppbv	10	591-78-6	
Isopropyl Alcohol*	Not detected	20		ppbv	10	67-63-0	
Methylene chloride	Not detected	5		ppbv	10	75-09-2	
2-Butanone (MEK)	Not detected	10		ppbv	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	5		ppbv	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	2		ppbv	10	1634-04-4	
Methyl methacrylate	Not detected	2		ppbv	10	80-62-6	
Naphthalene	Not detected	2		ppbv	10	91-20-3	
Propylene*	Not detected	2		ppbv	10	115-07-1	
Styrene	Not detected	2		ppbv	10	100-42-5	
1,1,1-Trichloroethane	Not detected	2		ppbv	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	2		ppbv	10	79-34-5	
1,1,2-Trichloroethane	Not detected	2		ppbv	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ppbv	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	2		ppbv	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	2		ppbv	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	2		ppbv	10	540-84-1	
Tert-butyl Alcohol	Not detected	10		ppbv	10	75-65-0	
Tetrachloroethene	Not detected	2		ppbv	10	127-18-4	
Tetrahydrofuran*	4	2		ppbv	10	109-99-9	
Toluene	Not detected	2		ppbv	10	108-88-3	
Trichloroethene	Not detected	2		ppbv	10	79-01-6	
Trichlorofluoromethane	Not detected	2		ppbv	10	75-69-4	
Vinyl chloride	Not detected	2		ppbv	10	75-01-4	
Vinyl acetate	Not detected	2		ppbv	10	108-05-4	
p,m-Xylene	Not detected	4		ppbv	10		
o-Xylene	Not detected	2		ppbv	10	95-47-6	
Total Xylenes	Not detected	6		ppbv	10	1330-20-7	

TO-15, Method: TO-15, Run Date: 11/21/19 04:12, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	48		ug/m3	10	67-64-1	
1,3-Butadiene	Not detected	4.4		ug/m3	10	106-99-0	
Benzene	Not detected	6.4		ug/m3	10	71-43-2	
Bromodichloromethane	Not detected	13		ug/m3	10	75-27-4	
Bromoform	Not detected	21		ug/m3	10	75-25-2	
Bromomethane	Not detected	7.8		ug/m3	10	74-83-9	
Vinyl bromide	Not detected	8.7		ug/m3	10	593-60-2	
Benzyl chloride	Not detected	10		ug/m3	10	100-44-7	
Carbon disulfide	Not detected	16		ug/m3	10	75-15-0	
Chlorobenzene	Not detected	9.2		ug/m3	10	108-90-7	
Chloroethane	Not detected	5.3		ug/m3	10	75-00-3	
Chloroform	Not detected	9.8		ug/m3	10	67-66-3	
Chloromethane	Not detected	4.1		ug/m3	10	74-87-3	
3-Chloropropene	Not detected	6.3		ug/m3	10	107-05-1	
2-Chlorotoluene	Not detected	10		ug/m3	10	95-49-8	
Carbon tetrachloride	Not detected	13		ug/m3	10	56-23-5	
Cyclohexane	Not detected	6.9		ug/m3	10	110-82-7	
1,1-Dichloroethane	Not detected	8.1		ug/m3	10	75-34-3	
1,1-Dichloroethene	Not detected	7.9		ug/m3	10	75-35-4	



Analytical Laboratory Report

Lab Sample ID: S09506.06 (continued)

Sample Tag: VP-2D

TO-15, Method: TO-15, Run Date: 11/21/19 04:12, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2-Dibromoethane	Not detected	15		ug/m3	10	106-93-4	
1,2-Dichloroethane	Not detected	8.1		ug/m3	10	107-06-2	
1,2-Dichloropropane	Not detected	9.2		ug/m3	10	78-87-5	
1,4-Dioxane	Not detected	90		ug/m3	10	123-91-1	
Dichlorodifluoromethane	Not detected	9.9		ug/m3	10	75-71-8	
Dibromochloromethane	Not detected	17		ug/m3	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	12		ug/m3	10	541-73-1	
1,2-Dichlorobenzene	Not detected	12		ug/m3	10	95-50-1	
1,4-Dichlorobenzene	Not detected	12		ug/m3	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-02-6	
Ethanol*	Not detected	47		ug/m3	10	64-17-5	
Ethylbenzene	Not detected	8.7		ug/m3	10	100-41-4	
Ethyl Acetate*	Not detected	36		ug/m3	10	141-78-6	
4-Ethyltoluene	Not detected	9.8		ug/m3	10	622-96-8	
Freon 113	Not detected	15		ug/m3	10	76-13-1	
Freon 114	Not detected	14		ug/m3	10	76-14-2	
Heptane	Not detected	8.2		ug/m3	10	142-82-5	
Hexachlorobutadiene	Not detected	21		ug/m3	10	87-68-3	
Hexane	Not detected	7.0		ug/m3	10	110-54-3	
2-Hexanone*	Not detected	20		ug/m3	10	591-78-6	
Isopropyl Alcohol*	Not detected	49		ug/m3	10	67-63-0	
Methylene chloride	Not detected	17		ug/m3	10	75-09-2	
2-Butanone (MEK)	Not detected	29		ug/m3	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	20		ug/m3	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	7.2		ug/m3	10	1634-04-4	
Methyl methacrylate	Not detected	8.2		ug/m3	10	80-62-6	
Naphthalene	Not detected	10		ug/m3	10	91-20-3	
Propylene*	Not detected	3.4		ug/m3	10	115-07-1	
Styrene	Not detected	8.5		ug/m3	10	100-42-5	
1,1,1-Trichloroethane	Not detected	11		ug/m3	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	14		ug/m3	10	79-34-5	
1,1,2-Trichloroethane	Not detected	11		ug/m3	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	37		ug/m3	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	9.8		ug/m3	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	9.8		ug/m3	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	9.3		ug/m3	10	540-84-1	
Tert-butyl Alcohol	Not detected	30		ug/m3	10	75-65-0	
Tetrachloroethene	Not detected	14		ug/m3	10	127-18-4	
Tetrahydrofuran*	12	5.9		ug/m3	10	109-99-9	
Toluene	Not detected	7.5		ug/m3	10	108-88-3	
Trichloroethene	Not detected	11		ug/m3	10	79-01-6	
Trichlorofluoromethane	Not detected	11		ug/m3	10	75-69-4	
Vinyl chloride	Not detected	5.1		ug/m3	10	75-01-4	
Vinyl acetate	Not detected	7.0		ug/m3	10	108-05-4	
p,m-Xylene	Not detected	17		ug/m3	10		
o-Xylene	Not detected	8.7		ug/m3	10	95-47-6	
Total Xylenes	Not detected	26		ug/m3	10	1330-20-7	



Analytical Laboratory Report

Lab Sample ID: S09506.07

Sample Tag: VP-DUP-1

Collected Date/Time: 11/19/2019 00:01 - 11/19/2019 00:02

Matrix: Air

COC Reference: A4765

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Air Canister	None	No	RT	n/a

Organics - Volatiles

TO-15, Method: TO-15, Run Date: 11/21/19 04:43, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	20		ppbv	10	67-64-1	
1,3-Butadiene	Not detected	2		ppbv	10	106-99-0	
Benzene	Not detected	2		ppbv	10	71-43-2	
Bromodichloromethane	Not detected	2		ppbv	10	75-27-4	
Bromoform	Not detected	2		ppbv	10	75-25-2	
Bromomethane	Not detected	2		ppbv	10	74-83-9	
Vinyl bromide	Not detected	2		ppbv	10	593-60-2	
Benzyl chloride	Not detected	2		ppbv	10	100-44-7	
Carbon disulfide	Not detected	5		ppbv	10	75-15-0	
Chlorobenzene	Not detected	2		ppbv	10	108-90-7	
Chloroethane	Not detected	2		ppbv	10	75-00-3	
Chloroform	Not detected	2		ppbv	10	67-66-3	
Chloromethane	Not detected	2		ppbv	10	74-87-3	
3-Chloropropene	Not detected	2		ppbv	10	107-05-1	
2-Chlorotoluene	Not detected	2		ppbv	10	95-49-8	
Carbon tetrachloride	Not detected	2		ppbv	10	56-23-5	
Cyclohexane	Not detected	2		ppbv	10	110-82-7	
1,1-Dichloroethane	Not detected	2		ppbv	10	75-34-3	
1,1-Dichloroethene	Not detected	2		ppbv	10	75-35-4	
1,2-Dibromoethane	Not detected	2		ppbv	10	106-93-4	
1,2-Dichloroethane	Not detected	2		ppbv	10	107-06-2	
1,2-Dichloropropane	Not detected	2		ppbv	10	78-87-5	
1,4-Dioxane	Not detected	25		ppbv	10	123-91-1	
Dichlorodifluoromethane	Not detected	2		ppbv	10	75-71-8	
Dibromochloromethane	Not detected	2		ppbv	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	2		ppbv	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	2		ppbv	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	2		ppbv	10	541-73-1	
1,2-Dichlorobenzene	Not detected	2		ppbv	10	95-50-1	
1,4-Dichlorobenzene	Not detected	2		ppbv	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-02-6	
Ethanol*	Not detected	25		ppbv	10	64-17-5	
Ethylbenzene	Not detected	2		ppbv	10	100-41-4	
Ethyl Acetate*	Not detected	10		ppbv	10	141-78-6	
4-Ethyltoluene	Not detected	2		ppbv	10	622-96-8	
Freon 113	Not detected	2		ppbv	10	76-13-1	
Freon 114	Not detected	2		ppbv	10	76-14-2	
Heptane	Not detected	2		ppbv	10	142-82-5	
Hexachlorobutadiene	Not detected	2		ppbv	10	87-68-3	
Hexane	2	2		ppbv	10	110-54-3	



Analytical Laboratory Report

Lab Sample ID: S09506.07 (continued)

Sample Tag: VP-DUP-1

TO-15, Method: TO-15, Run Date: 11/21/19 04:43, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
2-Hexanone*	Not detected	5		ppbv	10	591-78-6	
Isopropyl Alcohol*	Not detected	20		ppbv	10	67-63-0	
Methylene chloride	Not detected	5		ppbv	10	75-09-2	
2-Butanone (MEK)	Not detected	10		ppbv	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	5		ppbv	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	2		ppbv	10	1634-04-4	
Methyl methacrylate	Not detected	2		ppbv	10	80-62-6	
Naphthalene	Not detected	2		ppbv	10	91-20-3	
Propylene*	Not detected	4		ppbv	10	115-07-1	X
Styrene	Not detected	2		ppbv	10	100-42-5	
1,1,1-Trichloroethane	Not detected	2		ppbv	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	2		ppbv	10	79-34-5	
1,1,2-Trichloroethane	Not detected	2		ppbv	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ppbv	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	2		ppbv	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	2		ppbv	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	2		ppbv	10	540-84-1	
Tert-butyl Alcohol	Not detected	10		ppbv	10	75-65-0	
Tetrachloroethene	Not detected	2		ppbv	10	127-18-4	
Tetrahydrofuran*	3	2		ppbv	10	109-99-9	
Toluene	3	2		ppbv	10	108-88-3	
Trichloroethene	Not detected	2		ppbv	10	79-01-6	
Trichlorofluoromethane	Not detected	2		ppbv	10	75-69-4	
Vinyl chloride	Not detected	2		ppbv	10	75-01-4	
Vinyl acetate	Not detected	2		ppbv	10	108-05-4	
p,m-Xylene	Not detected	4		ppbv	10		
o-Xylene	Not detected	2		ppbv	10	95-47-6	
Total Xylenes	Not detected	6		ppbv	10	1330-20-7	

TO-15, Method: TO-15, Run Date: 11/21/19 04:43, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	48		ug/m3	10	67-64-1	
1,3-Butadiene	Not detected	4.4		ug/m3	10	106-99-0	
Benzene	Not detected	6.4		ug/m3	10	71-43-2	
Bromodichloromethane	Not detected	13		ug/m3	10	75-27-4	
Bromoform	Not detected	21		ug/m3	10	75-25-2	
Bromomethane	Not detected	7.8		ug/m3	10	74-83-9	
Vinyl bromide	Not detected	8.7		ug/m3	10	593-60-2	
Benzyl chloride	Not detected	10		ug/m3	10	100-44-7	
Carbon disulfide	Not detected	16		ug/m3	10	75-15-0	
Chlorobenzene	Not detected	9.2		ug/m3	10	108-90-7	
Chloroethane	Not detected	5.3		ug/m3	10	75-00-3	
Chloroform	Not detected	9.8		ug/m3	10	67-66-3	
Chloromethane	Not detected	4.1		ug/m3	10	74-87-3	
3-Chloropropene	Not detected	6.3		ug/m3	10	107-05-1	
2-Chlorotoluene	Not detected	10		ug/m3	10	95-49-8	
Carbon tetrachloride	Not detected	13		ug/m3	10	56-23-5	
Cyclohexane	Not detected	6.9		ug/m3	10	110-82-7	
1,1-Dichloroethane	Not detected	8.1		ug/m3	10	75-34-3	

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S09506.07 (continued)

Sample Tag: VP-DUP-1

TO-15, Method: TO-15, Run Date: 11/21/19 04:43, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,1-Dichloroethene	Not detected	7.9		ug/m3	10	75-35-4	
1,2-Dibromoethane	Not detected	15		ug/m3	10	106-93-4	
1,2-Dichloroethane	Not detected	8.1		ug/m3	10	107-06-2	
1,2-Dichloropropane	Not detected	9.2		ug/m3	10	78-87-5	
1,4-Dioxane	Not detected	90		ug/m3	10	123-91-1	
Dichlorodifluoromethane	Not detected	9.9		ug/m3	10	75-71-8	
Dibromochloromethane	Not detected	17		ug/m3	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	12		ug/m3	10	541-73-1	
1,2-Dichlorobenzene	Not detected	12		ug/m3	10	95-50-1	
1,4-Dichlorobenzene	Not detected	12		ug/m3	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-02-6	
Ethanol*	Not detected	47		ug/m3	10	64-17-5	
Ethylbenzene	Not detected	8.7		ug/m3	10	100-41-4	
Ethyl Acetate*	Not detected	36		ug/m3	10	141-78-6	
4-Ethyltoluene	Not detected	9.8		ug/m3	10	622-96-8	
Freon 113	Not detected	15		ug/m3	10	76-13-1	
Freon 114	Not detected	14		ug/m3	10	76-14-2	
Heptane	Not detected	8.2		ug/m3	10	142-82-5	
Hexachlorobutadiene	Not detected	21		ug/m3	10	87-68-3	
Hexane	7.0	7.0		ug/m3	10	110-54-3	
2-Hexanone*	Not detected	20		ug/m3	10	591-78-6	
Isopropyl Alcohol*	Not detected	49		ug/m3	10	67-63-0	
Methylene chloride	Not detected	17		ug/m3	10	75-09-2	
2-Butanone (MEK)	Not detected	29		ug/m3	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	20		ug/m3	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	7.2		ug/m3	10	1634-04-4	
Methyl methacrylate	Not detected	8.2		ug/m3	10	80-62-6	
Naphthalene	Not detected	10		ug/m3	10	91-20-3	
Propylene*	Not detected	6.9		ug/m3	10	115-07-1	X
Styrene	Not detected	8.5		ug/m3	10	100-42-5	
1,1,1-Trichloroethane	Not detected	11		ug/m3	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	14		ug/m3	10	79-34-5	
1,1,2-Trichloroethane	Not detected	11		ug/m3	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	37		ug/m3	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	9.8		ug/m3	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	9.8		ug/m3	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	9.3		ug/m3	10	540-84-1	
Tert-butyl Alcohol	Not detected	30		ug/m3	10	75-65-0	
Tetrachloroethene	Not detected	14		ug/m3	10	127-18-4	
Tetrahydrofuran*	8.8	5.9		ug/m3	10	109-99-9	
Toluene	11	7.5		ug/m3	10	108-88-3	
Trichloroethene	Not detected	11		ug/m3	10	79-01-6	
Trichlorofluoromethane	Not detected	11		ug/m3	10	75-69-4	
Vinyl chloride	Not detected	5.1		ug/m3	10	75-01-4	
Vinyl acetate	Not detected	7.0		ug/m3	10	108-05-4	
p,m-Xylene	Not detected	17		ug/m3	10		

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S09506.07 (continued)
Sample Tag: VP-DUP-1

TO-15, Method: TO-15, Run Date: 11/21/19 04:43, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
o-Xylene	Not detected	8.7		ug/m3	10	95-47-6	
Total Xylenes	Not detected	26		ug/m3	10	1330-20-7	



Analytical Laboratory Report

Lab Sample ID: S09506.08

Sample Tag: VP-1S

Collected Date/Time: 11/19/2019 09:46 - 11/19/2019 09:58

Matrix: Air

COC Reference: A4765

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Air Canister	None	No	RT	n/a

Organics - Volatiles

TO-15, Method: TO-15, Run Date: 11/21/19 05:15, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	20		ppbv	10	67-64-1	
1,3-Butadiene	Not detected	2		ppbv	10	106-99-0	
Benzene	Not detected	2		ppbv	10	71-43-2	
Bromodichloromethane	Not detected	2		ppbv	10	75-27-4	
Bromoform	Not detected	2		ppbv	10	75-25-2	
Bromomethane	Not detected	2		ppbv	10	74-83-9	
Vinyl bromide	Not detected	2		ppbv	10	593-60-2	
Benzyl chloride	Not detected	2		ppbv	10	100-44-7	
Carbon disulfide	Not detected	5		ppbv	10	75-15-0	
Chlorobenzene	Not detected	2		ppbv	10	108-90-7	
Chloroethane	Not detected	2		ppbv	10	75-00-3	
Chloroform	Not detected	2		ppbv	10	67-66-3	
Chloromethane	Not detected	2		ppbv	10	74-87-3	
3-Chloropropene	Not detected	2		ppbv	10	107-05-1	
2-Chlorotoluene	Not detected	2		ppbv	10	95-49-8	
Carbon tetrachloride	Not detected	2		ppbv	10	56-23-5	
Cyclohexane	Not detected	2		ppbv	10	110-82-7	
1,1-Dichloroethane	Not detected	2		ppbv	10	75-34-3	
1,1-Dichloroethene	Not detected	2		ppbv	10	75-35-4	
1,2-Dibromoethane	Not detected	2		ppbv	10	106-93-4	
1,2-Dichloroethane	Not detected	2		ppbv	10	107-06-2	
1,2-Dichloropropane	Not detected	2		ppbv	10	78-87-5	
1,4-Dioxane	Not detected	25		ppbv	10	123-91-1	
Dichlorodifluoromethane	Not detected	2		ppbv	10	75-71-8	
Dibromochloromethane	Not detected	2		ppbv	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	2		ppbv	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	2		ppbv	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	2		ppbv	10	541-73-1	
1,2-Dichlorobenzene	Not detected	2		ppbv	10	95-50-1	
1,4-Dichlorobenzene	Not detected	2		ppbv	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-02-6	
Ethanol*	Not detected	25		ppbv	10	64-17-5	
Ethylbenzene	Not detected	2		ppbv	10	100-41-4	
Ethyl Acetate*	Not detected	10		ppbv	10	141-78-6	
4-Ethyltoluene	Not detected	2		ppbv	10	622-96-8	
Freon 113	Not detected	2		ppbv	10	76-13-1	
Freon 114	Not detected	2		ppbv	10	76-14-2	
Heptane	Not detected	2		ppbv	10	142-82-5	
Hexachlorobutadiene	Not detected	2		ppbv	10	87-68-3	
Hexane	3	2		ppbv	10	110-54-3	

Lab Sample ID: S09506.08 (continued)

Sample Tag: VP-1S

TO-15, Method: TO-15, Run Date: 11/21/19 05:15, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
2-Hexanone*	Not detected	5		ppbv	10	591-78-6	
Isopropyl Alcohol*	Not detected	20		ppbv	10	67-63-0	
Methylene chloride	Not detected	5		ppbv	10	75-09-2	
2-Butanone (MEK)	Not detected	10		ppbv	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	5		ppbv	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	2		ppbv	10	1634-04-4	
Methyl methacrylate	Not detected	2		ppbv	10	80-62-6	
Naphthalene	Not detected	2		ppbv	10	91-20-3	
Propylene*	Not detected	4		ppbv	10	115-07-1	X
Styrene	Not detected	2		ppbv	10	100-42-5	
1,1,1-Trichloroethane	Not detected	2		ppbv	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	2		ppbv	10	79-34-5	
1,1,2-Trichloroethane	Not detected	2		ppbv	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ppbv	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	2		ppbv	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	2		ppbv	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	2		ppbv	10	540-84-1	
Tert-butyl Alcohol	Not detected	10		ppbv	10	75-65-0	
Tetrachloroethene	Not detected	2		ppbv	10	127-18-4	
Tetrahydrofuran*	3	2		ppbv	10	109-99-9	
Toluene	3	2		ppbv	10	108-88-3	
Trichloroethene	Not detected	2		ppbv	10	79-01-6	
Trichlorofluoromethane	Not detected	2		ppbv	10	75-69-4	
Vinyl chloride	Not detected	2		ppbv	10	75-01-4	
Vinyl acetate	Not detected	2		ppbv	10	108-05-4	
p,m-Xylene	Not detected	4		ppbv	10		
o-Xylene	Not detected	2		ppbv	10	95-47-6	
Total Xylenes	Not detected	6		ppbv	10	1330-20-7	

TO-15, Method: TO-15, Run Date: 11/21/19 05:15, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	48		ug/m3	10	67-64-1	
1,3-Butadiene	Not detected	4.4		ug/m3	10	106-99-0	
Benzene	Not detected	6.4		ug/m3	10	71-43-2	
Bromodichloromethane	Not detected	13		ug/m3	10	75-27-4	
Bromoform	Not detected	21		ug/m3	10	75-25-2	
Bromomethane	Not detected	7.8		ug/m3	10	74-83-9	
Vinyl bromide	Not detected	8.7		ug/m3	10	593-60-2	
Benzyl chloride	Not detected	10		ug/m3	10	100-44-7	
Carbon disulfide	Not detected	16		ug/m3	10	75-15-0	
Chlorobenzene	Not detected	9.2		ug/m3	10	108-90-7	
Chloroethane	Not detected	5.3		ug/m3	10	75-00-3	
Chloroform	Not detected	9.8		ug/m3	10	67-66-3	
Chloromethane	Not detected	4.1		ug/m3	10	74-87-3	
3-Chloropropene	Not detected	6.3		ug/m3	10	107-05-1	
2-Chlorotoluene	Not detected	10		ug/m3	10	95-49-8	
Carbon tetrachloride	Not detected	13		ug/m3	10	56-23-5	
Cyclohexane	Not detected	6.9		ug/m3	10	110-82-7	
1,1-Dichloroethane	Not detected	8.1		ug/m3	10	75-34-3	

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S09506.08 (continued)

Sample Tag: VP-1S

TO-15, Method: TO-15, Run Date: 11/21/19 05:15, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,1-Dichloroethene	Not detected	7.9		ug/m3	10	75-35-4	
1,2-Dibromoethane	Not detected	15		ug/m3	10	106-93-4	
1,2-Dichloroethane	Not detected	8.1		ug/m3	10	107-06-2	
1,2-Dichloropropane	Not detected	9.2		ug/m3	10	78-87-5	
1,4-Dioxane	Not detected	90		ug/m3	10	123-91-1	
Dichlorodifluoromethane	Not detected	9.9		ug/m3	10	75-71-8	
Dibromochloromethane	Not detected	17		ug/m3	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	12		ug/m3	10	541-73-1	
1,2-Dichlorobenzene	Not detected	12		ug/m3	10	95-50-1	
1,4-Dichlorobenzene	Not detected	12		ug/m3	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-02-6	
Ethanol*	Not detected	47		ug/m3	10	64-17-5	
Ethylbenzene	Not detected	8.7		ug/m3	10	100-41-4	
Ethyl Acetate*	Not detected	36		ug/m3	10	141-78-6	
4-Ethyltoluene	Not detected	9.8		ug/m3	10	622-96-8	
Freon 113	Not detected	15		ug/m3	10	76-13-1	
Freon 114	Not detected	14		ug/m3	10	76-14-2	
Heptane	Not detected	8.2		ug/m3	10	142-82-5	
Hexachlorobutadiene	Not detected	21		ug/m3	10	87-68-3	
Hexane	11	7.0		ug/m3	10	110-54-3	
2-Hexanone*	Not detected	20		ug/m3	10	591-78-6	
Isopropyl Alcohol*	Not detected	49		ug/m3	10	67-63-0	
Methylene chloride	Not detected	17		ug/m3	10	75-09-2	
2-Butanone (MEK)	Not detected	29		ug/m3	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	20		ug/m3	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	7.2		ug/m3	10	1634-04-4	
Methyl methacrylate	Not detected	8.2		ug/m3	10	80-62-6	
Naphthalene	Not detected	10		ug/m3	10	91-20-3	
Propylene*	Not detected	6.9		ug/m3	10	115-07-1	X
Styrene	Not detected	8.5		ug/m3	10	100-42-5	
1,1,1-Trichloroethane	Not detected	11		ug/m3	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	14		ug/m3	10	79-34-5	
1,1,2-Trichloroethane	Not detected	11		ug/m3	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	37		ug/m3	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	9.8		ug/m3	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	9.8		ug/m3	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	9.3		ug/m3	10	540-84-1	
Tert-butyl Alcohol	Not detected	30		ug/m3	10	75-65-0	
Tetrachloroethene	Not detected	14		ug/m3	10	127-18-4	
Tetrahydrofuran*	8.8	5.9		ug/m3	10	109-99-9	
Toluene	11	7.5		ug/m3	10	108-88-3	
Trichloroethene	Not detected	11		ug/m3	10	79-01-6	
Trichlorofluoromethane	Not detected	11		ug/m3	10	75-69-4	
Vinyl chloride	Not detected	5.1		ug/m3	10	75-01-4	
Vinyl acetate	Not detected	7.0		ug/m3	10	108-05-4	
p,m-Xylene	Not detected	17		ug/m3	10		

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S09506.08 (continued)

Sample Tag: VP-1S

TO-15, Method: TO-15, Run Date: 11/21/19 05:15, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
o-Xylene	Not detected	8.7		ug/m3	10	95-47-6	
Total Xylenes	Not detected	26		ug/m3	10	1330-20-7	



Analytical Laboratory Report

Lab Sample ID: S09506.09

Sample Tag: VP-3S

Collected Date/Time: 11/19/2019 10:57 - 11/19/2019 11:08

Matrix: Air

COC Reference: A4765

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	Air Canister	None	No	RT	n/a

Organics - Volatiles

TO-15, Method: TO-15, Run Date: 11/21/19 11:10, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	20		ppbv	10	67-64-1	
1,3-Butadiene	Not detected	2		ppbv	10	106-99-0	
Benzene	Not detected	2		ppbv	10	71-43-2	
Bromodichloromethane	Not detected	2		ppbv	10	75-27-4	
Bromoform	Not detected	2		ppbv	10	75-25-2	
Bromomethane	Not detected	2		ppbv	10	74-83-9	
Vinyl bromide	Not detected	2		ppbv	10	593-60-2	
Benzyl chloride	Not detected	2		ppbv	10	100-44-7	
Carbon disulfide	Not detected	5		ppbv	10	75-15-0	
Chlorobenzene	Not detected	2		ppbv	10	108-90-7	
Chloroethane	Not detected	2		ppbv	10	75-00-3	
Chloroform	Not detected	2		ppbv	10	67-66-3	
Chloromethane	Not detected	2		ppbv	10	74-87-3	
3-Chloropropene	Not detected	2		ppbv	10	107-05-1	
2-Chlorotoluene	Not detected	2		ppbv	10	95-49-8	
Carbon tetrachloride	Not detected	2		ppbv	10	56-23-5	
Cyclohexane	Not detected	2		ppbv	10	110-82-7	
1,1-Dichloroethane	Not detected	2		ppbv	10	75-34-3	
1,1-Dichloroethene	Not detected	2		ppbv	10	75-35-4	
1,2-Dibromoethane	Not detected	2		ppbv	10	106-93-4	
1,2-Dichloroethane	Not detected	2		ppbv	10	107-06-2	
1,2-Dichloropropane	Not detected	2		ppbv	10	78-87-5	
1,4-Dioxane	Not detected	25		ppbv	10	123-91-1	
Dichlorodifluoromethane	Not detected	2		ppbv	10	75-71-8	
Dibromochloromethane	Not detected	2		ppbv	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	2		ppbv	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	2		ppbv	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	2		ppbv	10	541-73-1	
1,2-Dichlorobenzene	Not detected	2		ppbv	10	95-50-1	
1,4-Dichlorobenzene	Not detected	2		ppbv	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	2		ppbv	10	10061-02-6	
Ethanol*	Not detected	25		ppbv	10	64-17-5	
Ethylbenzene	Not detected	2		ppbv	10	100-41-4	
Ethyl Acetate*	Not detected	10		ppbv	10	141-78-6	
4-Ethyltoluene	Not detected	2		ppbv	10	622-96-8	
Freon 113	Not detected	2		ppbv	10	76-13-1	
Freon 114	Not detected	2		ppbv	10	76-14-2	
Heptane	Not detected	2		ppbv	10	142-82-5	
Hexachlorobutadiene	Not detected	2		ppbv	10	87-68-3	
Hexane	Not detected	2		ppbv	10	110-54-3	



Analytical Laboratory Report

Lab Sample ID: S09506.09 (continued)

Sample Tag: VP-3S

TO-15, Method: TO-15, Run Date: 11/21/19 11:10, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
2-Hexanone*	Not detected	5		ppbv	10	591-78-6	
Isopropyl Alcohol*	Not detected	20		ppbv	10	67-63-0	
Methylene chloride	Not detected	5		ppbv	10	75-09-2	
2-Butanone (MEK)	Not detected	10		ppbv	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	5		ppbv	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	2		ppbv	10	1634-04-4	
Methyl methacrylate	Not detected	2		ppbv	10	80-62-6	
Naphthalene	Not detected	2		ppbv	10	91-20-3	
Propylene*	Not detected	2		ppbv	10	115-07-1	
Styrene	Not detected	2		ppbv	10	100-42-5	
1,1,1-Trichloroethane	Not detected	2		ppbv	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	2		ppbv	10	79-34-5	
1,1,2-Trichloroethane	Not detected	2		ppbv	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ppbv	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	2		ppbv	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	2		ppbv	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	2		ppbv	10	540-84-1	
Tert-butyl Alcohol	Not detected	10		ppbv	10	75-65-0	
Tetrachloroethene	Not detected	2		ppbv	10	127-18-4	
Tetrahydrofuran*	3	2		ppbv	10	109-99-9	
Toluene	3	2		ppbv	10	108-88-3	
Trichloroethene	Not detected	2		ppbv	10	79-01-6	
Trichlorofluoromethane	Not detected	2		ppbv	10	75-69-4	
Vinyl chloride	Not detected	2		ppbv	10	75-01-4	
Vinyl acetate	Not detected	2		ppbv	10	108-05-4	
p,m-Xylene	Not detected	4		ppbv	10		
o-Xylene	Not detected	2		ppbv	10	95-47-6	
Total Xylenes	Not detected	6		ppbv	10	1330-20-7	

TO-15, Method: TO-15, Run Date: 11/21/19 11:10, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	48		ug/m3	10	67-64-1	
1,3-Butadiene	Not detected	4.4		ug/m3	10	106-99-0	
Benzene	Not detected	6.4		ug/m3	10	71-43-2	
Bromodichloromethane	Not detected	13		ug/m3	10	75-27-4	
Bromoform	Not detected	21		ug/m3	10	75-25-2	
Bromomethane	Not detected	7.8		ug/m3	10	74-83-9	
Vinyl bromide	Not detected	8.7		ug/m3	10	593-60-2	
Benzyl chloride	Not detected	10		ug/m3	10	100-44-7	
Carbon disulfide	Not detected	16		ug/m3	10	75-15-0	
Chlorobenzene	Not detected	9.2		ug/m3	10	108-90-7	
Chloroethane	Not detected	5.3		ug/m3	10	75-00-3	
Chloroform	Not detected	9.8		ug/m3	10	67-66-3	
Chloromethane	Not detected	4.1		ug/m3	10	74-87-3	
3-Chloropropene	Not detected	6.3		ug/m3	10	107-05-1	
2-Chlorotoluene	Not detected	10		ug/m3	10	95-49-8	
Carbon tetrachloride	Not detected	13		ug/m3	10	56-23-5	
Cyclohexane	Not detected	6.9		ug/m3	10	110-82-7	
1,1-Dichloroethane	Not detected	8.1		ug/m3	10	75-34-3	
1,1-Dichloroethene	Not detected	7.9		ug/m3	10	75-35-4	



Analytical Laboratory Report

Lab Sample ID: S09506.09 (continued)

Sample Tag: VP-3S

TO-15, Method: TO-15, Run Date: 11/21/19 11:10, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2-Dibromoethane	Not detected	15		ug/m3	10	106-93-4	
1,2-Dichloroethane	Not detected	8.1		ug/m3	10	107-06-2	
1,2-Dichloropropane	Not detected	9.2		ug/m3	10	78-87-5	
1,4-Dioxane	Not detected	90		ug/m3	10	123-91-1	
Dichlorodifluoromethane	Not detected	9.9		ug/m3	10	75-71-8	
Dibromochloromethane	Not detected	17		ug/m3	10	124-48-1	
trans-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-60-5	
cis-1,2-Dichloroethene	Not detected	7.9		ug/m3	10	156-59-2	
cis-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-01-5	
1,3-Dichlorobenzene	Not detected	12		ug/m3	10	541-73-1	
1,2-Dichlorobenzene	Not detected	12		ug/m3	10	95-50-1	
1,4-Dichlorobenzene	Not detected	12		ug/m3	10	106-46-7	
trans-1,3-Dichloropropene	Not detected	9.1		ug/m3	10	10061-02-6	
Ethanol*	Not detected	47		ug/m3	10	64-17-5	
Ethylbenzene	Not detected	8.7		ug/m3	10	100-41-4	
Ethyl Acetate*	Not detected	36		ug/m3	10	141-78-6	
4-Ethyltoluene	Not detected	9.8		ug/m3	10	622-96-8	
Freon 113	Not detected	15		ug/m3	10	76-13-1	
Freon 114	Not detected	14		ug/m3	10	76-14-2	
Heptane	Not detected	8.2		ug/m3	10	142-82-5	
Hexachlorobutadiene	Not detected	21		ug/m3	10	87-68-3	
Hexane	Not detected	7.0		ug/m3	10	110-54-3	
2-Hexanone*	Not detected	20		ug/m3	10	591-78-6	
Isopropyl Alcohol*	Not detected	49		ug/m3	10	67-63-0	
Methylene chloride	Not detected	17		ug/m3	10	75-09-2	
2-Butanone (MEK)	Not detected	29		ug/m3	10	78-93-3	
4-Methyl-2-pentanone (MIBK)	Not detected	20		ug/m3	10	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	7.2		ug/m3	10	1634-04-4	
Methyl methacrylate	Not detected	8.2		ug/m3	10	80-62-6	
Naphthalene	Not detected	10		ug/m3	10	91-20-3	
Propylene*	Not detected	3.4		ug/m3	10	115-07-1	
Styrene	Not detected	8.5		ug/m3	10	100-42-5	
1,1,1-Trichloroethane	Not detected	11		ug/m3	10	71-55-6	
1,1,2,2-Tetrachloroethane	Not detected	14		ug/m3	10	79-34-5	
1,1,2-Trichloroethane	Not detected	11		ug/m3	10	79-00-5	
1,2,4-Trichlorobenzene	Not detected	37		ug/m3	10	120-82-1	
1,2,4-Trimethylbenzene	Not detected	9.8		ug/m3	10	95-63-6	
1,3,5-Trimethylbenzene	Not detected	9.8		ug/m3	10	108-67-8	
2,2,4-Trimethylpentane	Not detected	9.3		ug/m3	10	540-84-1	
Tert-butyl Alcohol	Not detected	30		ug/m3	10	75-65-0	
Tetrachloroethene	Not detected	14		ug/m3	10	127-18-4	
Tetrahydrofuran*	8.8	5.9		ug/m3	10	109-99-9	
Toluene	11	7.5		ug/m3	10	108-88-3	
Trichloroethene	Not detected	11		ug/m3	10	79-01-6	
Trichlorofluoromethane	Not detected	11		ug/m3	10	75-69-4	
Vinyl chloride	Not detected	5.1		ug/m3	10	75-01-4	
Vinyl acetate	Not detected	7.0		ug/m3	10	108-05-4	
p,m-Xylene	Not detected	17		ug/m3	10		
o-Xylene	Not detected	8.7		ug/m3	10	95-47-6	
Total Xylenes	Not detected	26		ug/m3	10	1330-20-7	

Merit Laboratories Login Checklist

Lab Set ID:S09506

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd

Submitted: 11/20/2019 08:15 Login User: MMC

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 East Saginaw Street
East Lansing, MI 48823

Phone: 313-333-0211 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
Sample Receiving		
01. ☐ Yes ☒ No ☐ N/A	Samples are received at 4C +/- 2C	Thermometer # RT
02. ☐ Yes ☒ No ☐ N/A	Received on ice/ cooling process begun	
03. ☐ Yes ☒ No ☐ N/A	Samples shipped	
04. ☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box	
05. ☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody		
06. ☒ Yes ☐ No ☐ N/A	COC adequately filled out	
07. ☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab	
08. ☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC	
09. ☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontracted to:	
Preservation		
10. ☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation	
11. ☐ Yes ☐ No ☒ N/A	Completed pH checks on preserved samples? (no VOAs)	
12. ☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions		
13. ☒ Yes ☐ No ☐ N/A	All bottles intact	
14. ☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used	
15. ☒ Yes ☐ No ☐ N/A	Merit bottles used	
16. ☒ Yes ☐ No ☐ N/A	Sufficient sample volume received	
17. ☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration	
18. ☒ Yes ☐ No ☐ N/A	Samples submitted within holding time	
19. ☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

A 4765

REPORT TO

AIR/GAS SAMPLES CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME <i>clifford Yantz</i>			
COMPANY <i>O'Brien & Gore Part of Ramboll</i>			
ADDRESS <i>2260 East Saginaw</i>			
CITY <i>East Lansing</i>	STATE <i>MI</i>	ZIP CODE <i>48823</i>	
PHONE NO. <i>313-333-0211</i>	FAX NO.	P.O. NO.	
EMAIL ADDRESS <i>clifford.Yantz@ramboll.com</i>		QUOTE NO.	

CONTACT NAME <i>X SAME</i>	
COMPANY	
ADDRESS	
CITY	STATE ZIP CODE
PHONE NO.	EMAIL ADDRESS

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME <i>RACER Coldwater Rd</i>	SAMPLER(S) - PLEASE PRINT/SIGN NAME <i>Kevin Simmonds</i>
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER	
DELIVERABLES REQUIRED ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER	

Certifications
☐ OHIO VAP ☐ NELAP
☐ DoD ☐ NPDES

Sample Type

Analyses

MERIT LAB NO. FOR LAB USE ONLY	SAMPLE TAG IDENTIFICATION-DESCRIPTION	Start		Stop		Canister Vacuum in Field, "Hg (Start)	Canister Vacuum in Field, "Hg (Stop)	Flow Controller ID	Canister ID	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (specify in notes)	TO-15	Other (specify in notes)
		Date	Time	Date	Time											
09506.01	* VP-6D	11/18/19	1228	11/18/19	1245	-28.5	-27	182	23680						X	
.02	VP-5M		1522		1532	-27	-2	4	18360						X	
.03	VP-5D		1525		1535	-27	-4	178	13717						X	
.04	VP-5S		1519		1547	-27	-14	106	18357						X	
.05	VP-2S		1622		1635	-22	-5	198	12417						X	
.06	VP-2D		1623		1635	-22	-4	28	23671						X	
.07	VP-DUP-1	11/19/19	-	11/19/19	-	-26	-2	-	12447						X	
.08	VP-1S		946		958	-26	-2	145	18336						X	
.09	VP-3S		1057		1108	-30	-6	144	12449						X	

Temperature (Fahrenheit)

Pressure (inches of Hg)

	Interior	Ambient	Notes		Interior	Ambient	Notes
Start		41°F		Start		29.82	
Stop		38°F		Stop		29.83	

Notes

* Stalled possible interference with groundwater

RELINQUISHED BY: SIGNATURE/ORGANIZATION	<i>[Signature]</i>	Sampler	DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION	<i>[Signature]</i>		DATE	TIME
RELINQUISHED BY: SIGNATURE/ORGANIZATION	<i>[Signature]</i>		DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION	<i>[Signature]</i>		DATE	TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION	DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION	DATE	TIME
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
TEMP. ON ARRIVAL		<i>RT</i>

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 06/28/19



Quality Control Report

Report ID: QC-S09506-01
Generated on 11/25/2019

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 East Saginaw Street
East Lansing, MI 48823

Phone: 313-333-0211 FAX:

Report Produced by

Merit Laboratories
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Report Summary

Lab Sample ID(s): S09506.01-S09506.09
Project: RACER Coldwater Rd
Submitted Date/Time: 11/20/2019 08:15
Sampled by: Kevin Schneider
P.O. #: PO

QC Report Sections

Cover Page (Page 1)
Analysis Summary (Pages 2-10)
Prep Batch Summary (Page 11)
Surrogates per Lab Sample (Pages 12-20)
Surrogates per QC Sample (Pages 21-22)
Batch QC Results (Pages 23-30)

Report Flag Descriptions

*: QC result is outside of indicated control limits
W: Surrogate result not applicable due to sample dilution

I certify that this data package is in compliance with the terms and conditions of the program, and project, and contractual requirements both technically and for completeness. Release of the data contained in this hardcopy data package and its computer-readable data submitted has been authorized by the Quality Assurance Manager and his/her designee, as verified by the following signature.

Barbara Ball
Quality Assurance Manager

QC Report - Analysis Summary

Lab Sample ID: S09506.01

Sample Tag: VP-6D

Collected Date/Time: 11/18/2019 12:28 - 11/18/2019 12:45

Matrix: Air

COC Reference: A4765

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
TO-15	TO-15	11/21/19 01:33	191120A8	GV191120G1	Yes	BLK/LCS

QC Report - Analysis Summary

Lab Sample ID: S09506.02

Sample Tag: VP-5M

Collected Date/Time: 11/18/2019 15:22 - 11/18/2019 15:32

Matrix: Air

COC Reference: A4765

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
TO-15	TO-15	11/21/19 02:05	191120A8	GV191120G1	Yes	BLK/LCS

QC Report - Analysis Summary

Lab Sample ID: S09506.03

Sample Tag: VP-5D

Collected Date/Time: 11/18/2019 15:25 - 11/18/2019 15:35

Matrix: Air

COC Reference: A4765

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
<i>Organics - Volatiles</i>						
TO-15	TO-15	11/21/19 02:37	191120A8	GV191120G1	Yes	BLK/LCS

QC Report - Analysis Summary

Lab Sample ID: S09506.04

Sample Tag: VP-5S

Collected Date/Time: 11/18/2019 15:19 - 11/18/2019 15:47

Matrix: Air

COC Reference: A4765

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
TO-15	TO-15	11/21/19 03:09	191120A8	GV191120G1	Yes	BLK/LCS

QC Report - Analysis Summary

Lab Sample ID: S09506.05

Sample Tag: VP-2S

Collected Date/Time: 11/18/2019 16:22 - 11/18/2019 16:35

Matrix: Air

COC Reference: A4765

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
TO-15	TO-15	11/21/19 03:41	191120A8	GV191120G1	Yes	BLK/LCS

QC Report - Analysis Summary

Lab Sample ID: S09506.06

Sample Tag: VP-2D

Collected Date/Time: 11/18/2019 16:23 - 11/18/2019 16:35

Matrix: Air

COC Reference: A4765

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
<i>Organics - Volatiles</i>						
TO-15	TO-15	11/21/19 04:12	191120A8	GV191120G1	Yes	BLK/LCS

QC Report - Analysis Summary

Lab Sample ID: S09506.07

Sample Tag: VP-DUP-1

Collected Date/Time: 11/19/2019 00:01 - 11/19/2019 00:02

Matrix: Air

COC Reference: A4765

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
TO-15	TO-15	11/21/19 04:43	191120A8	GV191120G1	Yes	BLK/LCS

QC Report - Analysis Summary

Lab Sample ID: S09506.08

Sample Tag: VP-1S

Collected Date/Time: 11/19/2019 09:46 - 11/19/2019 09:58

Matrix: Air

COC Reference: A4765

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
TO-15	TO-15	11/21/19 05:15	191120A8	GV191120G1	Yes	BLK/LCS

QC Report - Analysis Summary

Lab Sample ID: S09506.09

Sample Tag: VP-3S

Collected Date/Time: 11/19/2019 10:57 - 11/19/2019 11:08

Matrix: Air

COC Reference: A4765

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
TO-15	TO-15	11/21/19 11:10	191120A8	GV191120G2	Yes	BLK/LCS

QC Report - Prep Batch Summary

Organics - Volatiles, Prep Batch ID: GV191120G1

Surrogates: Yes, QC Types: BLK/LCS

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S09506.01	TO-15	TO-15	11/21/19 01:33	191120A8
S09506.02	TO-15	TO-15	11/21/19 02:05	191120A8
S09506.03	TO-15	TO-15	11/21/19 02:37	191120A8
S09506.04	TO-15	TO-15	11/21/19 03:09	191120A8
S09506.05	TO-15	TO-15	11/21/19 03:41	191120A8
S09506.06	TO-15	TO-15	11/21/19 04:12	191120A8
S09506.07	TO-15	TO-15	11/21/19 04:43	191120A8
S09506.08	TO-15	TO-15	11/21/19 05:15	191120A8

Organics - Volatiles, Prep Batch ID: GV191120G2

Surrogates: Yes, QC Types: BLK/LCS

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S09506.09	TO-15	TO-15	11/21/19 11:10	191120A8

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09506.01

Sample Tag: VP-6D

Collected Date/Time: 11/18/2019 12:28 - 11/18/2019 12:45

Matrix: Air

COC Reference: A4765

Organics - Volatiles, Analysis: TO-15

Run in Batch: 191120A8, Run Date: 11/21/2019 01:33, Matrix: G, Dilution: 10

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		97.1	60	140

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09506.02

Sample Tag: VP-5M

Collected Date/Time: 11/18/2019 15:22 - 11/18/2019 15:32

Matrix: Air

COC Reference: A4765

Organics - Volatiles, Analysis: TO-15

Run in Batch: 191120A8, Run Date: 11/21/2019 02:05, Matrix: G, Dilution: 10

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		95.5	60	140

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09506.03

Sample Tag: VP-5D

Collected Date/Time: 11/18/2019 15:25 - 11/18/2019 15:35

Matrix: Air

COC Reference: A4765

Organics - Volatiles, Analysis: TO-15

Run in Batch: 191120A8, Run Date: 11/21/2019 02:37, Matrix: G, Dilution: 10

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		97.7	60	140

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09506.04

Sample Tag: VP-5S

Collected Date/Time: 11/18/2019 15:19 - 11/18/2019 15:47

Matrix: Air

COC Reference: A4765

Organics - Volatiles, Analysis: TO-15

Run in Batch: 191120A8, Run Date: 11/21/2019 03:09, Matrix: G, Dilution: 10

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		95.7	60	140

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09506.05

Sample Tag: VP-2S

Collected Date/Time: 11/18/2019 16:22 - 11/18/2019 16:35

Matrix: Air

COC Reference: A4765

Organics - Volatiles, Analysis: TO-15

Run in Batch: 191120A8, Run Date: 11/21/2019 03:41, Matrix: G, Dilution: 10

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		98.1	60	140

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09506.06

Sample Tag: VP-2D

Collected Date/Time: 11/18/2019 16:23 - 11/18/2019 16:35

Matrix: Air

COC Reference: A4765

Organics - Volatiles, Analysis: TO-15

Run in Batch: 191120A8, Run Date: 11/21/2019 04:12, Matrix: G, Dilution: 10

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		97.3	60	140

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09506.07

Sample Tag: VP-DUP-1

Collected Date/Time: 11/19/2019 00:01 - 11/19/2019 00:02

Matrix: Air

COC Reference: A4765

Organics - Volatiles, Analysis: TO-15

Run in Batch: 191120A8, Run Date: 11/21/2019 04:43, Matrix: G, Dilution: 10

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		95.4	60	140

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09506.08

Sample Tag: VP-1S

Collected Date/Time: 11/19/2019 09:46 - 11/19/2019 09:58

Matrix: Air

COC Reference: A4765

Organics - Volatiles, Analysis: TO-15

Run in Batch: 191120A8, Run Date: 11/21/2019 05:15, Matrix: G, Dilution: 10

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		96.8	60	140

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09506.09

Sample Tag: VP-3S

Collected Date/Time: 11/19/2019 10:57 - 11/19/2019 11:08

Matrix: Air

COC Reference: A4765

Organics - Volatiles, Analysis: TO-15

Run in Batch: 191120A8, Run Date: 11/21/2019 11:10, Matrix: G, Dilution: 10

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		93.8	60	140

QC Report - Surrogates per QC Sample

Organics - Volatiles, Prep Batch ID: GV191120G1

QC Types: BLK/LCS

Blank (BLK)

Lab Sample ID: 191120A8.BLKG20A

Run in Batch: 191120A8, Run Date: 11/20/2019 18:12, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		95.1	60	140

Laboratory Control Sample (LCS)

Lab Sample ID: 191120A8.LCSG20A

Run in Batch: 191120A8, Run Date: 11/20/2019 17:39, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		104.9	60	140

QC Report - Surrogates per QC Sample

Organics - Volatiles, Prep Batch ID: GV191120G2

QC Types: BLK/LCS

Blank (BLK)

Lab Sample ID: 191120A8.BLKG20B

Run in Batch: 191120A8, Run Date: 11/21/2019 06:19, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		97.1	60	140

Laboratory Control Sample (LCS)

Lab Sample ID: 191120A8.LCSG20B

Run in Batch: 191120A8, Run Date: 11/21/2019 05:47, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		110.0	60	140

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: GV191120G1

Surrogates: Yes, QC Types: BLK/LCS

Blank (BLK)

Lab Sample ID: 191120A8.BLKG20A

Run in Batch: 191120A8, Run Date: 11/20/2019 18:12, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Analyte	Flags	Conc	RDL	Units
Freon 113		ND	0.20	ppbv
Propylene		ND	0.20	ppbv
Freon 114		ND	0.20	ppbv
1,3-Butadiene		ND	0.20	ppbv
Acetone		ND	2.00	ppbv
Isopropyl Alcohol		ND	2.00	ppbv
Carbon disulfide		ND	0.20	ppbv
Acrylonitrile		ND	0.20	ppbv
tert-Methyl butyl ether (MTBE)		ND	0.20	ppbv
2-Butanone (MEK)		ND	0.20	ppbv
Dichlorodifluoromethane		ND	0.20	ppbv
Chloromethane		ND	0.20	ppbv
Vinyl chloride		ND	0.20	ppbv
Bromomethane		ND	0.20	ppbv
Chloroethane		ND	0.20	ppbv
Vinyl Bromide		ND	0.20	ppbv
Acrolein		ND	2.00	ppbv
Trichlorofluoromethane		ND	0.20	ppbv
Acetonitrile		ND	2.00	ppbv
1,1-Dichloroethene		ND	0.20	ppbv
Ethanol		ND	2.00	ppbv
3-Chloropropene		ND	0.20	ppbv
Methylene chloride		ND	0.20	ppbv
tert-Butyl alcohol		ND	0.20	ppbv
trans-1,2-Dichloroethene		ND	0.20	ppbv
Hexane		ND	0.20	ppbv
1,1-Dichloroethane		ND	0.20	ppbv
cis-1,2-Dichloroethene		ND	0.20	ppbv
Vinyl acetate		ND	0.20	ppbv
ethyl acetate		ND	0.20	ppbv
Tetrahydrofuran		ND	0.20	ppbv
Chloroform		ND	0.20	ppbv
1,2-Dichloroethane		ND	0.20	ppbv
1,1,1-Trichloroethane		ND	0.20	ppbv
Cyclohexane		ND	0.20	ppbv
4-Methyl-2-pentanone (MIBK)		ND	0.20	ppbv
2-Hexanone		ND	0.20	ppbv
Carbon tetrachloride		ND	0.20	ppbv
2,2,4-Trimethylpentane		ND	0.20	ppbv
Benzene		ND	0.20	ppbv
Heptane		ND	0.20	ppbv
Trichloroethene		ND	0.20	ppbv
Methyl methacrylate		ND	0.20	ppbv
1,2-Dichloropropane		ND	0.20	ppbv
1,4-Dioxane		ND	0.20	ppbv
Bromodichloromethane		ND	0.20	ppbv

Organics - Volatiles, Prep Batch ID: GV191120G1 (continued)

Surrogates: Yes, QC Types: BLK/LCS

Blank (BLK) (continued)

Lab Sample ID: 191120A8.BLKG20A

Run in Batch: 191120A8, Run Date: 11/20/2019 18:12, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Analyte	Flags	Conc	RDL	Units
cis-1,3-Dichloropropene		ND	0.20	ppbv
Toluene		ND	0.20	ppbv
trans-1,3-Dichloropropene		ND	0.20	ppbv
1,1,2-Trichloroethane		ND	0.20	ppbv
Dibromochloromethane		ND	0.20	ppbv
1,2-Dibromoethane		ND	0.20	ppbv
Tetrachloroethene		ND	0.20	ppbv
Chlorobenzene		ND	0.20	ppbv
1,1,1,2-Tetrachloroethane		ND	0.20	ppbv
Ethylbenzene		ND	0.20	ppbv
p,m-Xylene		ND	0.20	ppbv
o-Xylene		ND	0.20	ppbv
Styrene		ND	0.20	ppbv
Bromoform		ND	0.20	ppbv
1,1,2,2-Tetrachloroethane		ND	0.20	ppbv
4-Ethyltoluene		ND	0.20	ppbv
Isopropylbenzene		ND	0.20	ppbv
n-Propylbenzene		ND	0.20	ppbv
1,3,5-Trimethylbenzene		ND	0.20	ppbv
2-Chlorotoluene		ND	0.20	ppbv
tert-Butylbenzene		ND	0.20	ppbv
1,2,4-Trimethylbenzene		ND	0.20	ppbv
sec-Butylbenzene		ND	0.20	ppbv
o-Isopropyltoluene		ND	0.20	ppbv
1,3-Dichlorobenzene		ND	0.20	ppbv
1,4-Dichlorobenzene		ND	0.20	ppbv
Benzyl chloride		ND	0.20	ppbv
1,2-Dichlorobenzene		ND	0.20	ppbv
n-Butylbenzene		ND	0.20	ppbv
1,2,4-Trichlorobenzene		ND	0.20	ppbv
Hexachlorobutadiene		ND	0.20	ppbv
Naphthalene		ND	0.20	ppbv

Laboratory Control Sample (LCS)

Lab Sample ID: 191120A8.LCSG20A

Run in Batch: 191120A8, Run Date: 11/20/2019 17:39, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
Freon 113		102.3	70.0	130.0
Propylene		91.2	70.0	130.0
Freon 114		99.0	70.0	130.0
1,3-Butadiene		97.0	70.0	130.0
Acetone		102.4	70.0	130.0
Isopropyl Alcohol		104.9	70.0	130.0
Carbon disulfide		99.5	70.0	130.0
Acrylonitrile		96.3	70.0	130.0
tert-Methyl butyl ether (MTBE)		98.7	70.0	130.0

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: GV191120G1 (continued)

Surrogates: Yes, QC Types: BLK/LCS

Laboratory Control Sample (LCS) (continued)

Lab Sample ID: 191120A8.LCSG20A

Run in Batch: 191120A8, Run Date: 11/20/2019 17:39, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
2-Butanone (MEK)		105.1	70.0	130.0
Dichlorodifluoromethane		99.3	70.0	130.0
Chloromethane		97.8	70.0	130.0
Vinyl chloride		96.3	70.0	130.0
Bromomethane		103.8	70.0	130.0
Chloroethane		106.5	70.0	130.0
Vinyl Bromide		102.2	70.0	130.0
Acrolein	*	131.1	70.0	130.0
Trichlorofluoromethane		102.3	70.0	130.0
Acetonitrile		103.2	70.0	130.0
1,1-Dichloroethene		99.2	70.0	130.0
Ethanol		98.7	70.0	130.0
3-Chloropropene		96.6	70.0	130.0
Methylene chloride		101.0	70.0	130.0
tert-Butyl alcohol		97.5	70.0	130.0
trans-1,2-Dichloroethene		99.2	70.0	130.0
Hexane		102.2	70.0	130.0
1,1-Dichloroethane		102.5	70.0	130.0
cis-1,2-Dichloroethene		104.7	70.0	130.0
Vinyl acetate		97.9	70.0	130.0
ethyl acetate		102.3	70.0	130.0
Tetrahydrofuran		98.4	70.0	130.0
Chloroform		101.3	70.0	130.0
1,2-Dichloroethane		98.2	70.0	130.0
1,1,1-Trichloroethane		101.7	70.0	130.0
Cyclohexane		101.1	70.0	130.0
4-Methyl-2-pentanone (MIBK)		98.1	70.0	130.0
2-Hexanone		100.7	70.0	130.0
Carbon tetrachloride		100.0	70.0	130.0
2,2,4-Trimethylpentane		98.0	70.0	130.0
Benzene		100.2	70.0	130.0
Heptane		96.1	70.0	130.0
Trichloroethene		99.2	70.0	130.0
Methyl methacrylate		102.4	70.0	130.0
1,2-Dichloropropane		99.8	70.0	130.0
1,4-Dioxane		100.9	70.0	130.0
Bromodichloromethane		96.5	70.0	130.0
cis-1,3-Dichloropropene		100.0	70.0	130.0
Toluene		100.9	70.0	130.0
trans-1,3-Dichloropropene		100.6	70.0	130.0
1,1,2-Trichloroethane		99.6	70.0	130.0
Dibromochloromethane		107.7	70.0	130.0
1,2-Dibromoethane		109.3	70.0	130.0
Tetrachloroethene		107.6	70.0	130.0
Chlorobenzene		106.2	70.0	130.0
1,1,1,2-Tetrachloroethane		117.5	70.0	130.0

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: GV191120G1 (continued)

Surrogates: Yes, QC Types: BLK/LCS

Laboratory Control Sample (LCS) (continued)

Lab Sample ID: 191120A8.LCSG20A

Run in Batch: 191120A8, Run Date: 11/20/2019 17:39, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
Ethylbenzene		108.0	70.0	130.0
p,m-Xylene		110.4	70.0	130.0
o-Xylene		108.8	70.0	130.0
Styrene		108.9	70.0	130.0
Bromoform		108.6	70.0	130.0
1,1,2,2-Tetrachloroethane		107.4	70.0	130.0
4-Ethyltoluene		108.7	70.0	130.0
Isopropylbenzene		127.1	70.0	130.0
n-Propylbenzene		124.1	70.0	130.0
1,3,5-Trimethylbenzene		108.5	70.0	130.0
2-Chlorotoluene		123.2	70.0	130.0
tert-Butylbenzene		121.4	70.0	130.0
1,2,4-Trimethylbenzene		109.0	70.0	130.0
sec-Butylbenzene		127.8	70.0	130.0
o-Isopropyltoluene		124.5	70.0	130.0
1,3-Dichlorobenzene		109.0	70.0	130.0
1,4-Dichlorobenzene		110.4	70.0	130.0
Benzyl chloride		97.8	70.0	130.0
1,2-Dichlorobenzene		107.0	70.0	130.0
n-Butylbenzene	*	137.8	70.0	130.0
1,2,4-Trichlorobenzene		98.2	70.0	130.0
Hexachlorobutadiene		100.9	70.0	130.0
Naphthalene		122.0	70.0	130.0

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: GV191120G2

Surrogates: Yes, QC Types: BLK/LCS

Blank (BLK)

Lab Sample ID: 191120A8.BLKG20B

Run in Batch: 191120A8, Run Date: 11/21/2019 06:19, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Analyte	Flags	Conc	RDL	Units
Freon 113		ND	0.20	ppbv
Propylene		ND	0.20	ppbv
Freon 114		ND	0.20	ppbv
1,3-Butadiene		ND	0.20	ppbv
Acetone		ND	2.00	ppbv
Isopropyl Alcohol		ND	2.00	ppbv
Carbon disulfide		ND	0.20	ppbv
Acrylonitrile		ND	0.20	ppbv
tert-Methyl butyl ether (MTBE)		ND	0.20	ppbv
2-Butanone (MEK)		ND	0.20	ppbv
Dichlorodifluoromethane		ND	0.20	ppbv
Chloromethane		ND	0.20	ppbv
Vinyl chloride		ND	0.20	ppbv
Bromomethane		ND	0.20	ppbv
Chloroethane		ND	0.20	ppbv
Vinyl Bromide		ND	0.20	ppbv
Acrolein		ND	2.00	ppbv
Trichlorofluoromethane		ND	0.20	ppbv
Acetonitrile		ND	2.00	ppbv
1,1-Dichloroethene		ND	0.20	ppbv
Ethanol		ND	2.00	ppbv
3-Chloropropene		ND	0.20	ppbv
Methylene chloride		ND	0.20	ppbv
tert-Butyl alcohol		ND	0.20	ppbv
trans-1,2-Dichloroethene		ND	0.20	ppbv
Hexane		ND	0.20	ppbv
1,1-Dichloroethane		ND	0.20	ppbv
cis-1,2-Dichloroethene		ND	0.20	ppbv
Vinyl acetate		ND	0.20	ppbv
ethyl acetate		ND	0.20	ppbv
Tetrahydrofuran		ND	0.20	ppbv
Chloroform		ND	0.20	ppbv
1,2-Dichloroethane		ND	0.20	ppbv
1,1,1-Trichloroethane		ND	0.20	ppbv
Cyclohexane		ND	0.20	ppbv
4-Methyl-2-pentanone (MIBK)		ND	0.20	ppbv
2-Hexanone		ND	0.20	ppbv
Carbon tetrachloride		ND	0.20	ppbv
2,2,4-Trimethylpentane		ND	0.20	ppbv
Benzene		ND	0.20	ppbv
Heptane		ND	0.20	ppbv
Trichloroethene		ND	0.20	ppbv
Methyl methacrylate		ND	0.20	ppbv
1,2-Dichloropropane		ND	0.20	ppbv
1,4-Dioxane		ND	0.20	ppbv
Bromodichloromethane		ND	0.20	ppbv

Organics - Volatiles, Prep Batch ID: GV191120G2 (continued)

Surrogates: Yes, QC Types: BLK/LCS

Blank (BLK) (continued)

Lab Sample ID: 191120A8.BLKG20B

Run in Batch: 191120A8, Run Date: 11/21/2019 06:19, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Analyte	Flags	Conc	RDL	Units
cis-1,3-Dichloropropene		ND	0.20	ppbv
Toluene		ND	0.20	ppbv
trans-1,3-Dichloropropene		ND	0.20	ppbv
1,1,2-Trichloroethane		ND	0.20	ppbv
Dibromochloromethane		ND	0.20	ppbv
1,2-Dibromoethane		ND	0.20	ppbv
Tetrachloroethene		ND	0.20	ppbv
Chlorobenzene		ND	0.20	ppbv
1,1,1,2-Tetrachloroethane		ND	0.20	ppbv
Ethylbenzene		ND	0.20	ppbv
p,m-Xylene		ND	0.20	ppbv
o-Xylene		ND	0.20	ppbv
Styrene		ND	0.20	ppbv
Bromoform		ND	0.20	ppbv
1,1,2,2-Tetrachloroethane		ND	0.20	ppbv
4-Ethyltoluene		ND	0.20	ppbv
Isopropylbenzene		ND	0.20	ppbv
n-Propylbenzene		ND	0.20	ppbv
1,3,5-Trimethylbenzene		ND	0.20	ppbv
2-Chlorotoluene		ND	0.20	ppbv
tert-Butylbenzene		ND	0.20	ppbv
1,2,4-Trimethylbenzene		ND	0.20	ppbv
sec-Butylbenzene		ND	0.20	ppbv
o-Isopropyltoluene		ND	0.20	ppbv
1,3-Dichlorobenzene		ND	0.20	ppbv
1,4-Dichlorobenzene		ND	0.20	ppbv
Benzyl chloride		ND	0.20	ppbv
1,2-Dichlorobenzene		ND	0.20	ppbv
n-Butylbenzene		ND	0.20	ppbv
1,2,4-Trichlorobenzene		ND	0.20	ppbv
Hexachlorobutadiene		ND	0.20	ppbv
Naphthalene		ND	0.20	ppbv

Laboratory Control Sample (LCS)

Lab Sample ID: 191120A8.LCSG20B

Run in Batch: 191120A8, Run Date: 11/21/2019 05:47, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
Freon 113		99.6	70.0	130.0
Propylene		87.3	70.0	130.0
Freon 114		95.0	70.0	130.0
1,3-Butadiene		89.5	70.0	130.0
Acetone		101.2	70.0	130.0
Isopropyl Alcohol		97.6	70.0	130.0
Carbon disulfide		95.1	70.0	130.0
Acrylonitrile		93.2	70.0	130.0
tert-Methyl butyl ether (MTBE)		93.7	70.0	130.0

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: GV191120G2 (continued)

Surrogates: Yes, QC Types: BLK/LCS

Laboratory Control Sample (LCS) (continued)

Lab Sample ID: 191120A8.LCSG20B

Run in Batch: 191120A8, Run Date: 11/21/2019 05:47, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
2-Butanone (MEK)		102.3	70.0	130.0
Dichlorodifluoromethane		97.4	70.0	130.0
Chloromethane		99.8	70.0	130.0
Vinyl chloride		90.9	70.0	130.0
Bromomethane		98.3	70.0	130.0
Chloroethane		101.0	70.0	130.0
Vinyl Bromide		97.9	70.0	130.0
Acrolein		125.8	70.0	130.0
Trichlorofluoromethane		96.9	70.0	130.0
Acetonitrile		100.4	70.0	130.0
1,1-Dichloroethene		94.3	70.0	130.0
Ethanol		94.3	70.0	130.0
3-Chloropropene		92.1	70.0	130.0
Methylene chloride		97.1	70.0	130.0
tert-Butyl alcohol		92.0	70.0	130.0
trans-1,2-Dichloroethene		95.1	70.0	130.0
Hexane		98.7	70.0	130.0
1,1-Dichloroethane		99.4	70.0	130.0
cis-1,2-Dichloroethene		103.0	70.0	130.0
Vinyl acetate		93.6	70.0	130.0
ethyl acetate		100.7	70.0	130.0
Tetrahydrofuran		94.6	70.0	130.0
Chloroform		98.3	70.0	130.0
1,2-Dichloroethane		93.9	70.0	130.0
1,1,1-Trichloroethane		97.5	70.0	130.0
Cyclohexane		100.1	70.0	130.0
4-Methyl-2-pentanone (MIBK)		95.5	70.0	130.0
2-Hexanone		97.8	70.0	130.0
Carbon tetrachloride		99.3	70.0	130.0
2,2,4-Trimethylpentane		96.8	70.0	130.0
Benzene		99.7	70.0	130.0
Heptane		94.5	70.0	130.0
Trichloroethene		99.8	70.0	130.0
Methyl methacrylate		99.1	70.0	130.0
1,2-Dichloropropane		99.4	70.0	130.0
1,4-Dioxane		99.8	70.0	130.0
Bromodichloromethane		95.8	70.0	130.0
cis-1,3-Dichloropropene		98.1	70.0	130.0
Toluene		100.2	70.0	130.0
trans-1,3-Dichloropropene		98.3	70.0	130.0
1,1,2-Trichloroethane		98.5	70.0	130.0
Dibromochloromethane		108.6	70.0	130.0
1,2-Dibromoethane		111.4	70.0	130.0
Tetrachloroethene		110.4	70.0	130.0
Chlorobenzene		108.4	70.0	130.0
1,1,1,2-Tetrachloroethane		119.0	70.0	130.0

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: GV191120G2 (continued)

Surrogates: Yes, QC Types: BLK/LCS

Laboratory Control Sample (LCS) (continued)

Lab Sample ID: 191120A8.LCSG20B

Run in Batch: 191120A8, Run Date: 11/21/2019 05:47, Prep Date: 11/20/2019, Matrix: G, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
Ethylbenzene		109.4	70.0	130.0
p,m-Xylene		111.6	70.0	130.0
o-Xylene		110.2	70.0	130.0
Styrene		109.4	70.0	130.0
Bromoform		108.8	70.0	130.0
1,1,2,2-Tetrachloroethane		108.9	70.0	130.0
4-Ethyltoluene		111.1	70.0	130.0
Isopropylbenzene		129.2	70.0	130.0
n-Propylbenzene		125.7	70.0	130.0
1,3,5-Trimethylbenzene		110.6	70.0	130.0
2-Chlorotoluene		126.2	70.0	130.0
tert-Butylbenzene		123.4	70.0	130.0
1,2,4-Trimethylbenzene		111.1	70.0	130.0
sec-Butylbenzene	*	131.1	70.0	130.0
o-Isopropyltoluene		128.4	70.0	130.0
1,3-Dichlorobenzene		110.6	70.0	130.0
1,4-Dichlorobenzene		111.0	70.0	130.0
Benzyl chloride		93.1	70.0	130.0
1,2-Dichlorobenzene		109.3	70.0	130.0
n-Butylbenzene	*	142.1	70.0	130.0
1,2,4-Trichlorobenzene		95.3	70.0	130.0
Hexachlorobutadiene		104.2	70.0	130.0
Naphthalene		114.3	70.0	130.0



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C.O.C. PAGE # 1 OF 1

A 4765

REPORT TO

AIR/GAS SAMPLES CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME <i>clifford Yantz</i>			
COMPANY <i>O'Brien & Gore Part of Ramboll</i>			
ADDRESS <i>2260 East Saginaw</i>			
CITY <i>East Lansing</i>	STATE <i>MI</i>	ZIP CODE <i>48823</i>	
PHONE NO. <i>313-333-0211</i>	FAX NO.	P.O. NO.	
EMAIL ADDRESS <i>clifford.Yantz@ramboll.com</i>		QUOTE NO.	

CONTACT NAME <i>X SAME</i>	
COMPANY	
ADDRESS	
CITY	STATE ZIP CODE
PHONE NO.	EMAIL ADDRESS

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME <i>RACER Coldwater Rd</i>	SAMPLER(S) - PLEASE PRINT/SIGN NAME <i>Kevin Simmonds</i>
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER	
DELIVERABLES REQUIRED ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER	

Certifications
☐ OHIO VAP ☐ NELAP
☐ DoD ☐ NPDES

Sample Type

Analyses

MERIT LAB NO. FOR LAB USE ONLY	SAMPLE TAG IDENTIFICATION-DESCRIPTION	Start		Stop		Canister Vacuum in Field, "Hg (Start)	Canister Vacuum in Field, "Hg (Stop)	Flow Controller ID	Canister ID	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (specify in notes)	TO-15	Other (specify in notes)
		Date	Time	Date	Time											
09506.01	* VP-6D	11/18/19	1228	11/18/19	1245	-28.5	-27	182	23680						X	
.02	VP-5M		1522		1532	-27	-2	4	18360						X	
.03	VP-5D		1525		1535	-27	-4	178	13717						X	
.04	VP-5S		1519		1547	-27	-14	106	18357						X	
.05	VP-2S		1622		1635	-22	-5	198	12417						X	
.06	VP-2D		1623		1635	-22	-4	28	23671						X	
.07	VP-DUP-1	11/19/19	-	11/19/19	-	-26	-2	-	12447						X	
.08	VP-1S		946		958	-26	-2	145	18336						X	
.09	VP-3S		1057		1108	-30	-6	144	12449						X	

Temperature (Fahrenheit)

Pressure (inches of Hg)

	Interior	Ambient	Notes		Interior	Ambient	Notes
Start		41°F		Start		29.82	
Stop		38°F		Stop		29.83	

Notes

* Stalled possible interference with groundwater

RELINQUISHED BY: SIGNATURE/ORGANIZATION <i>[Signature]</i>	DATE <i>11/19/19</i> TIME <i>15:10</i>
RECEIVED BY: SIGNATURE/ORGANIZATION <i>[Signature]</i>	DATE <i>11/19/19</i> TIME <i>15:10</i>
RELINQUISHED BY: SIGNATURE/ORGANIZATION <i>[Signature]</i>	DATE <i>11/19/19</i> TIME <i>12:05</i>
RECEIVED BY: SIGNATURE/ORGANIZATION <i>[Signature]</i>	DATE <i>11/19/19</i> TIME <i>12:05</i>

RELINQUISHED BY: SIGNATURE/ORGANIZATION	DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION	DATE	TIME
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS

TEMP. ON ARRIVAL

RT

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 06/28/19



Analytical Laboratory Report

Report ID: S09507.01(01)
Generated on 11/21/2019

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 East Saginaw Street
East Lansing, MI 48823

Phone: 313-333-0211 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

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Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S09507.01-S09507.09
Project: RACER Coldwater Rd.
Collected Date(s): 11/18/2019 - 11/19/2019
Submitted Date/Time: 11/20/2019 08:15
Sampled by: Unknown
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
N/A	Not Applicable
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003



Analytical Laboratory Report

Sample Summary (9 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S09507.01	VP-6M-GW	Groundwater	11/18/19 11:30
S09507.02	VP-6S-GW	Groundwater	11/18/19 12:25
S09507.03	VP-1D-GW	Groundwater	11/19/19 09:30
S09507.04	VP-3D-GW	Groundwater	11/19/19 10:40
S09507.05	VP-3M-GW	Groundwater	11/19/19 10:45
S09507.06	VP-4D-GW	Groundwater	11/19/19 11:50
S09507.07	VP-4M-GW	Groundwater	11/19/19 11:55
S09507.08	VP-4S-GW	Groundwater	11/19/19 12:05
S09507.09	Trip Blank-111919	Water	11/19/19 00:01



Analytical Laboratory Report

Lab Sample ID: S09507.01

Sample Tag: VP-6M-GW

Collected Date/Time: 11/18/2019 11:30

Matrix: Groundwater

COC Reference: 114917

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	11/21/19 12:20	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 17:56, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	10		ug/L	1	60-29-7	
Acetone	Not detected	50		ug/L	1	67-64-1	
Methyl iodide	Not detected	1		ug/L	1	74-88-4	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Acrylonitrile	Not detected	2		ug/L	1	107-13-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90		ug/L	1	109-99-9	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Bromochloromethane	Not detected	1		ug/L	1	74-97-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Benzene	Not detected	1		ug/L	1	71-43-2	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Dibromomethane	Not detected	5		ug/L	1	74-95-3	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
Toluene	Not detected	1		ug/L	1	108-88-3	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	1		ug/L	1	110-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.01 (continued)

Sample Tag: VP-6M-GW

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 17:56, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	1		ug/L	1	630-20-6	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2		ug/L	1		
o-Xylene	Not detected	1		ug/L	1	95-47-6	
Styrene	Not detected	1		ug/L	1	100-42-5	
Isopropylbenzene	Not detected	5		ug/L	1	98-82-8	
Bromoform	Not detected	1		ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
1,2,3-Trichloropropane	Not detected	1		ug/L	1	96-18-4	
n-Propylbenzene	Not detected	1		ug/L	1	103-65-1	
Bromobenzene	Not detected	1		ug/L	1	108-86-1	
1,3,5-Trimethylbenzene	Not detected	1		ug/L	1	108-67-8	
tert-Butylbenzene	Not detected	1		ug/L	1	98-06-6	
1,2,4-Trimethylbenzene	Not detected	1		ug/L	1	95-63-6	
sec-Butylbenzene	Not detected	1		ug/L	1	135-98-8	
p-Isopropyltoluene	Not detected	5		ug/L	1	99-87-6	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2,3-Trimethylbenzene	Not detected	1		ug/L	1	526-73-8	
n-Butylbenzene	Not detected	1		ug/L	1	104-51-8	
Hexachloroethane	Not detected	5		ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
1,2,3-Trichlorobenzene	Not detected	5		ug/L	1	87-61-6	
Naphthalene	Not detected	5		ug/L	1	91-20-3	
2-Methylnaphthalene	Not detected	5		ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.02

Sample Tag: VP-6S-GW

Collected Date/Time: 11/18/2019 12:25

Matrix: Groundwater

COC Reference: 114917

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	11/21/19 12:20	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 18:15, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	10		ug/L	1	60-29-7	
Acetone	Not detected	50		ug/L	1	67-64-1	
Methyl iodide	Not detected	1		ug/L	1	74-88-4	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Acrylonitrile	Not detected	2		ug/L	1	107-13-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90		ug/L	1	109-99-9	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Bromochloromethane	Not detected	1		ug/L	1	74-97-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Benzene	Not detected	1		ug/L	1	71-43-2	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Dibromomethane	Not detected	5		ug/L	1	74-95-3	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
Toluene	Not detected	1		ug/L	1	108-88-3	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	1		ug/L	1	110-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.02 (continued)

Sample Tag: VP-6S-GW

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 18:15, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	1		ug/L	1	630-20-6	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2		ug/L	1		
o-Xylene	Not detected	1		ug/L	1	95-47-6	
Styrene	Not detected	1		ug/L	1	100-42-5	
Isopropylbenzene	Not detected	5		ug/L	1	98-82-8	
Bromoform	Not detected	1		ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
1,2,3-Trichloropropane	Not detected	1		ug/L	1	96-18-4	
n-Propylbenzene	Not detected	1		ug/L	1	103-65-1	
Bromobenzene	Not detected	1		ug/L	1	108-86-1	
1,3,5-Trimethylbenzene	Not detected	1		ug/L	1	108-67-8	
tert-Butylbenzene	Not detected	1		ug/L	1	98-06-6	
1,2,4-Trimethylbenzene	Not detected	1		ug/L	1	95-63-6	
sec-Butylbenzene	Not detected	1		ug/L	1	135-98-8	
p-Isopropyltoluene	Not detected	5		ug/L	1	99-87-6	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2,3-Trimethylbenzene	Not detected	1		ug/L	1	526-73-8	
n-Butylbenzene	Not detected	1		ug/L	1	104-51-8	
Hexachloroethane	Not detected	5		ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
1,2,3-Trichlorobenzene	Not detected	5		ug/L	1	87-61-6	
Naphthalene	Not detected	5		ug/L	1	91-20-3	
2-Methylnaphthalene	Not detected	5		ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.03

Sample Tag: VP-1D-GW

Collected Date/Time: 11/19/2019 09:30

Matrix: Groundwater

COC Reference: 114917

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	11/21/19 12:20	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 18:34, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	10		ug/L	1	60-29-7	
Acetone	Not detected	50		ug/L	1	67-64-1	
Methyl iodide	Not detected	1		ug/L	1	74-88-4	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Acrylonitrile	Not detected	2		ug/L	1	107-13-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90		ug/L	1	109-99-9	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Bromochloromethane	Not detected	1		ug/L	1	74-97-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Benzene	Not detected	1		ug/L	1	71-43-2	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Dibromomethane	Not detected	5		ug/L	1	74-95-3	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
Toluene	Not detected	1		ug/L	1	108-88-3	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	1		ug/L	1	110-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.03 (continued)

Sample Tag: VP-1D-GW

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 18:34, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	1		ug/L	1	630-20-6	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2		ug/L	1		
o-Xylene	Not detected	1		ug/L	1	95-47-6	
Styrene	Not detected	1		ug/L	1	100-42-5	
Isopropylbenzene	Not detected	5		ug/L	1	98-82-8	
Bromoform	Not detected	1		ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
1,2,3-Trichloropropane	Not detected	1		ug/L	1	96-18-4	
n-Propylbenzene	Not detected	1		ug/L	1	103-65-1	
Bromobenzene	Not detected	1		ug/L	1	108-86-1	
1,3,5-Trimethylbenzene	Not detected	1		ug/L	1	108-67-8	
tert-Butylbenzene	Not detected	1		ug/L	1	98-06-6	
1,2,4-Trimethylbenzene	Not detected	1		ug/L	1	95-63-6	
sec-Butylbenzene	Not detected	1		ug/L	1	135-98-8	
p-Isopropyltoluene	Not detected	5		ug/L	1	99-87-6	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2,3-Trimethylbenzene	Not detected	1		ug/L	1	526-73-8	
n-Butylbenzene	Not detected	1		ug/L	1	104-51-8	
Hexachloroethane	Not detected	5		ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
1,2,3-Trichlorobenzene	Not detected	5		ug/L	1	87-61-6	
Naphthalene	Not detected	5		ug/L	1	91-20-3	
2-Methylnaphthalene	Not detected	5		ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.04

Sample Tag: VP-3D-GW

Collected Date/Time: 11/19/2019 10:40

Matrix: Groundwater

COC Reference: 114917

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	11/21/19 12:20	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 18:54, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	10		ug/L	1	60-29-7	
Acetone	Not detected	50		ug/L	1	67-64-1	
Methyl iodide	Not detected	1		ug/L	1	74-88-4	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Acrylonitrile	Not detected	2		ug/L	1	107-13-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90		ug/L	1	109-99-9	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Bromochloromethane	Not detected	1		ug/L	1	74-97-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Benzene	Not detected	1		ug/L	1	71-43-2	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Dibromomethane	Not detected	5		ug/L	1	74-95-3	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
Toluene	Not detected	1		ug/L	1	108-88-3	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	1		ug/L	1	110-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.04 (continued)

Sample Tag: VP-3D-GW

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 18:54, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	1		ug/L	1	630-20-6	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2		ug/L	1		
o-Xylene	Not detected	1		ug/L	1	95-47-6	
Styrene	Not detected	1		ug/L	1	100-42-5	
Isopropylbenzene	Not detected	5		ug/L	1	98-82-8	
Bromoform	Not detected	1		ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
1,2,3-Trichloropropane	Not detected	1		ug/L	1	96-18-4	
n-Propylbenzene	Not detected	1		ug/L	1	103-65-1	
Bromobenzene	Not detected	1		ug/L	1	108-86-1	
1,3,5-Trimethylbenzene	Not detected	1		ug/L	1	108-67-8	
tert-Butylbenzene	Not detected	1		ug/L	1	98-06-6	
1,2,4-Trimethylbenzene	Not detected	1		ug/L	1	95-63-6	
sec-Butylbenzene	Not detected	1		ug/L	1	135-98-8	
p-Isopropyltoluene	Not detected	5		ug/L	1	99-87-6	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2,3-Trimethylbenzene	Not detected	1		ug/L	1	526-73-8	
n-Butylbenzene	Not detected	1		ug/L	1	104-51-8	
Hexachloroethane	Not detected	5		ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
1,2,3-Trichlorobenzene	Not detected	5		ug/L	1	87-61-6	
Naphthalene	Not detected	5		ug/L	1	91-20-3	
2-Methylnaphthalene	Not detected	5		ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.05

Sample Tag: VP-3M-GW

Collected Date/Time: 11/19/2019 10:45

Matrix: Groundwater

COC Reference: 114917

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	11/21/19 12:20	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 19:13, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	10		ug/L	1	60-29-7	
Acetone	Not detected	50		ug/L	1	67-64-1	
Methyl iodide	Not detected	1		ug/L	1	74-88-4	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Acrylonitrile	Not detected	2		ug/L	1	107-13-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90		ug/L	1	109-99-9	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Bromochloromethane	Not detected	1		ug/L	1	74-97-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Benzene	Not detected	1		ug/L	1	71-43-2	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Dibromomethane	Not detected	5		ug/L	1	74-95-3	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
Toluene	Not detected	1		ug/L	1	108-88-3	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	1		ug/L	1	110-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.05 (continued)

Sample Tag: VP-3M-GW

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 19:13, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	1		ug/L	1	630-20-6	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2		ug/L	1		
o-Xylene	Not detected	1		ug/L	1	95-47-6	
Styrene	Not detected	1		ug/L	1	100-42-5	
Isopropylbenzene	Not detected	5		ug/L	1	98-82-8	
Bromoform	Not detected	1		ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
1,2,3-Trichloropropane	Not detected	1		ug/L	1	96-18-4	
n-Propylbenzene	Not detected	1		ug/L	1	103-65-1	
Bromobenzene	Not detected	1		ug/L	1	108-86-1	
1,3,5-Trimethylbenzene	Not detected	1		ug/L	1	108-67-8	
tert-Butylbenzene	Not detected	1		ug/L	1	98-06-6	
1,2,4-Trimethylbenzene	Not detected	1		ug/L	1	95-63-6	
sec-Butylbenzene	Not detected	1		ug/L	1	135-98-8	
p-Isopropyltoluene	Not detected	5		ug/L	1	99-87-6	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2,3-Trimethylbenzene	Not detected	1		ug/L	1	526-73-8	
n-Butylbenzene	Not detected	1		ug/L	1	104-51-8	
Hexachloroethane	Not detected	5		ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
1,2,3-Trichlorobenzene	Not detected	5		ug/L	1	87-61-6	
Naphthalene	Not detected	5		ug/L	1	91-20-3	
2-Methylnaphthalene	Not detected	5		ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.06

Sample Tag: VP-4D-GW

Collected Date/Time: 11/19/2019 11:50

Matrix: Groundwater

COC Reference: 114917

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	11/21/19 12:20	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 19:32, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	10		ug/L	1	60-29-7	
Acetone	Not detected	50		ug/L	1	67-64-1	
Methyl iodide	Not detected	1		ug/L	1	74-88-4	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Acrylonitrile	Not detected	2		ug/L	1	107-13-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90		ug/L	1	109-99-9	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Bromochloromethane	Not detected	1		ug/L	1	74-97-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Benzene	Not detected	1		ug/L	1	71-43-2	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Dibromomethane	Not detected	5		ug/L	1	74-95-3	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
Toluene	Not detected	1		ug/L	1	108-88-3	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	1		ug/L	1	110-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.06 (continued)

Sample Tag: VP-4D-GW

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 19:32, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	1		ug/L	1	630-20-6	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2		ug/L	1		
o-Xylene	Not detected	1		ug/L	1	95-47-6	
Styrene	Not detected	1		ug/L	1	100-42-5	
Isopropylbenzene	Not detected	5		ug/L	1	98-82-8	
Bromoform	Not detected	1		ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
1,2,3-Trichloropropane	Not detected	1		ug/L	1	96-18-4	
n-Propylbenzene	Not detected	1		ug/L	1	103-65-1	
Bromobenzene	Not detected	1		ug/L	1	108-86-1	
1,3,5-Trimethylbenzene	Not detected	1		ug/L	1	108-67-8	
tert-Butylbenzene	Not detected	1		ug/L	1	98-06-6	
1,2,4-Trimethylbenzene	Not detected	1		ug/L	1	95-63-6	
sec-Butylbenzene	Not detected	1		ug/L	1	135-98-8	
p-Isopropyltoluene	Not detected	5		ug/L	1	99-87-6	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2,3-Trimethylbenzene	Not detected	1		ug/L	1	526-73-8	
n-Butylbenzene	Not detected	1		ug/L	1	104-51-8	
Hexachloroethane	Not detected	5		ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
1,2,3-Trichlorobenzene	Not detected	5		ug/L	1	87-61-6	
Naphthalene	Not detected	5		ug/L	1	91-20-3	
2-Methylnaphthalene	Not detected	5		ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.07

Sample Tag: VP-4M-GW

Collected Date/Time: 11/19/2019 11:55

Matrix: Groundwater

COC Reference: 114917

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
2	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	11/21/19 12:20	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 19:52, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	10		ug/L	1	60-29-7	
Acetone	Not detected	50		ug/L	1	67-64-1	
Methyl iodide	Not detected	1		ug/L	1	74-88-4	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Acrylonitrile	Not detected	2		ug/L	1	107-13-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90		ug/L	1	109-99-9	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Bromochloromethane	Not detected	1		ug/L	1	74-97-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Benzene	Not detected	1		ug/L	1	71-43-2	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Dibromomethane	Not detected	5		ug/L	1	74-95-3	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
Toluene	Not detected	1		ug/L	1	108-88-3	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	1		ug/L	1	110-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.07 (continued)

Sample Tag: VP-4M-GW

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 19:52, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	1		ug/L	1	630-20-6	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2		ug/L	1		
o-Xylene	Not detected	1		ug/L	1	95-47-6	
Styrene	Not detected	1		ug/L	1	100-42-5	
Isopropylbenzene	Not detected	5		ug/L	1	98-82-8	
Bromoform	Not detected	1		ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
1,2,3-Trichloropropane	Not detected	1		ug/L	1	96-18-4	
n-Propylbenzene	Not detected	1		ug/L	1	103-65-1	
Bromobenzene	Not detected	1		ug/L	1	108-86-1	
1,3,5-Trimethylbenzene	Not detected	1		ug/L	1	108-67-8	
tert-Butylbenzene	Not detected	1		ug/L	1	98-06-6	
1,2,4-Trimethylbenzene	Not detected	1		ug/L	1	95-63-6	
sec-Butylbenzene	Not detected	1		ug/L	1	135-98-8	
p-Isopropyltoluene	Not detected	5		ug/L	1	99-87-6	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2,3-Trimethylbenzene	Not detected	1		ug/L	1	526-73-8	
n-Butylbenzene	Not detected	1		ug/L	1	104-51-8	
Hexachloroethane	Not detected	5		ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
1,2,3-Trichlorobenzene	Not detected	5		ug/L	1	87-61-6	
Naphthalene	Not detected	5		ug/L	1	91-20-3	
2-Methylnaphthalene	Not detected	5		ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.08

Sample Tag: VP-4S-GW

Collected Date/Time: 11/19/2019 12:05

Matrix: Groundwater

COC Reference: 114917

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	11/21/19 12:20	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 20:11, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	10		ug/L	1	60-29-7	
Acetone	Not detected	50		ug/L	1	67-64-1	
Methyl iodide	Not detected	1		ug/L	1	74-88-4	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Acrylonitrile	Not detected	2		ug/L	1	107-13-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90		ug/L	1	109-99-9	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Bromochloromethane	Not detected	1		ug/L	1	74-97-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Benzene	Not detected	1		ug/L	1	71-43-2	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Dibromomethane	Not detected	5		ug/L	1	74-95-3	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
Toluene	Not detected	1		ug/L	1	108-88-3	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	1		ug/L	1	110-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.08 (continued)

Sample Tag: VP-4S-GW

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 20:11, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	1		ug/L	1	630-20-6	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2		ug/L	1		
o-Xylene	Not detected	1		ug/L	1	95-47-6	
Styrene	Not detected	1		ug/L	1	100-42-5	
Isopropylbenzene	Not detected	5		ug/L	1	98-82-8	
Bromoform	Not detected	1		ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
1,2,3-Trichloropropane	Not detected	1		ug/L	1	96-18-4	
n-Propylbenzene	Not detected	1		ug/L	1	103-65-1	
Bromobenzene	Not detected	1		ug/L	1	108-86-1	
1,3,5-Trimethylbenzene	Not detected	1		ug/L	1	108-67-8	
tert-Butylbenzene	Not detected	1		ug/L	1	98-06-6	
1,2,4-Trimethylbenzene	Not detected	1		ug/L	1	95-63-6	
sec-Butylbenzene	Not detected	1		ug/L	1	135-98-8	
p-Isopropyltoluene	Not detected	5		ug/L	1	99-87-6	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2,3-Trimethylbenzene	Not detected	1		ug/L	1	526-73-8	
n-Butylbenzene	Not detected	1		ug/L	1	104-51-8	
Hexachloroethane	Not detected	5		ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
1,2,3-Trichlorobenzene	Not detected	5		ug/L	1	87-61-6	
Naphthalene	Not detected	5		ug/L	1	91-20-3	
2-Methylnaphthalene	Not detected	5		ug/L	1	91-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.09

Sample Tag: Trip Blank-111919

Collected Date/Time: 11/19/2019 00:01

Matrix: Water

COC Reference: 114917

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	11/21/19 12:20	JML	

Organics - Volatiles

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 15:01, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Diethyl ether	Not detected	10		ug/L	1	60-29-7	
Acetone	Not detected	50		ug/L	1	67-64-1	
Methyl iodide	Not detected	1		ug/L	1	74-88-4	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Acrylonitrile	Not detected	2		ug/L	1	107-13-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Tetrahydrofuran*	Not detected	90		ug/L	1	109-99-9	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Bromochloromethane	Not detected	1		ug/L	1	74-97-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Benzene	Not detected	1		ug/L	1	71-43-2	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Dibromomethane	Not detected	5		ug/L	1	74-95-3	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
Toluene	Not detected	1		ug/L	1	108-88-3	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
trans-1,4-Dichloro-2-butene	Not detected	1		ug/L	1	110-57-6	



Analytical Laboratory Report

Lab Sample ID: S09507.09 (continued)

Sample Tag: Trip Blank-111919

Volatile Organics - DEQ List, Method: SW5030C/8260C, Run Date: 11/20/19 15:01, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
1,1,1,2-Tetrachloroethane	Not detected	1		ug/L	1	630-20-6	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
p,m-Xylene*	Not detected	2		ug/L	1		
o-Xylene	Not detected	1		ug/L	1	95-47-6	
Styrene	Not detected	1		ug/L	1	100-42-5	
Isopropylbenzene	Not detected	5		ug/L	1	98-82-8	
Bromoform	Not detected	1		ug/L	1	75-25-2	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
1,2,3-Trichloropropane	Not detected	1		ug/L	1	96-18-4	
n-Propylbenzene	Not detected	1		ug/L	1	103-65-1	
Bromobenzene	Not detected	1		ug/L	1	108-86-1	
1,3,5-Trimethylbenzene	Not detected	1		ug/L	1	108-67-8	
tert-Butylbenzene	Not detected	1		ug/L	1	98-06-6	
1,2,4-Trimethylbenzene	Not detected	1		ug/L	1	95-63-6	
sec-Butylbenzene	Not detected	1		ug/L	1	135-98-8	
p-Isopropyltoluene	Not detected	5		ug/L	1	99-87-6	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2,3-Trimethylbenzene	Not detected	1		ug/L	1	526-73-8	
n-Butylbenzene	Not detected	1		ug/L	1	104-51-8	
Hexachloroethane	Not detected	5		ug/L	1	67-72-1	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
1,2,3-Trichlorobenzene	Not detected	5		ug/L	1	87-61-6	
Naphthalene	Not detected	5		ug/L	1	91-20-3	
2-Methylnaphthalene	Not detected	5		ug/L	1	91-57-6	

Merit Laboratories Login Checklist

Lab Set ID:S09507

Client:OBG02 (O'Brien & Gere Engineers, Inc. - East Lansing, MI)

Project: RACER Coldwater Rd.

Submitted: 11/20/2019 08:15 Login User: SRS

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 East Saginaw Street
East Lansing, MI 48823

Phone: 313-333-0211 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
Sample Receiving		
01.	☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer # IR 4.7
02.	☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun
03.	☐ Yes ☒ No ☐ N/A	Samples shipped
04.	☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box
05.	☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	☒ Yes ☐ No ☐ N/A	COC adequately filled out
07.	☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab
08.	☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC
09.	☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:
Preservation		
10.	☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation
11.	☐ Yes ☐ No ☒ N/A	Completed pH checks on preserved samples? (no VOAs)
12.	☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	☒ Yes ☐ No ☐ N/A	All bottles intact
14.	☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used
15.	☒ Yes ☐ No ☐ N/A	Merit bottles used
16.	☒ Yes ☐ No ☐ N/A	Sufficient sample volume received
17.	☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration
18.	☒ Yes ☐ No ☐ N/A	Samples submitted within holding time
19.	☐ Yes ☒ No ☐ N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Clifford Yantz			
COMPANY O'Brien & Gore Part of Ramboll			
ADDRESS 2260 East Saginaw			
CITY East Lansing		STATE MI	ZIP CODE 48823
PHONE NO. 313-333-0211		FAX NO.	P.O. NO.
E-MAIL ADDRESS Clifford.Yantz@Ramboll.com		QUOTE NO.	

CONTACT NAME		BY SAME	
COMPANY			
ADDRESS			
CITY		STATE	ZIP CODE
PHONE NO.		E-MAIL ADDRESS	

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME	RACER Coldwater Rd	SAMPLER(S) - PLEASE PRINT/SIGN NAME
TURNAROUND TIME REQUIRED		
☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER		
DELIVERABLES REQUIRED		
☒ LEVEL I ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER		

Certifications

☐ OHIO VAP ☐ Drinking Water

☐ DoD ☐ NPDES

Project Locations

☐ Detroit ☐ New York

☐ Other _____

Special Instructions

MATRIX CODE:	GW=GROUNDWATER	WW=WASTEWATER	S=SOIL	L=LIQUID	SD=SOLID
	SL=SLUDGE	DW=DRINKING WATER	O=OIL	WP=WIPE	A=AIR
					W=WASTE

Containers & Preservatives

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES
	DATE	TIME			
09507.01	11/18/19	1130	VP-6M-6W	GW	3
.02	11/18/19	1225	VP-6S-6W		3
.03	11/19/19	930	VP-1D-6W		3
.04	11/19/19	1040	VP-3D-6W		1
.05	11/19/19	1045	VP-3M-6W		1
.06	11/19/19	1150	VP-4D-6W		3
.07	11/19/19	1155	VP-4M-6W		2
.08	11/19/19	1205	VP-4S-6W	↓	1
.09	11/19/19	—	Trip Blank - 11/19/19	QC	1

# Containers & Preservatives							Project Locations	
NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	☐ Detroit	☐ New York
3							☐ Other _____	Special Instructions
3								
3								
1								low volume
1								low volume
3								
2								
1								low volume
1								

RELINQUISHED BY:	JK SK	oBG	X	☐ Sampler	DATE	TIME
SIGNATURE/ORGANIZATION					11/19/19	15:10
RECEIVED BY:	JK				DATE	TIME
SIGNATURE/ORGANIZATION					11/19/19	15:10
RELINQUISHED BY:					DATE	TIME
SIGNATURE/ORGANIZATION					11/19/19	17:15
RECEIVED BY:					DATE	TIME
SIGNATURE/ORGANIZATION					11/19/19	17:15

RELINQUISHED BY: SIGNATURE/ORGANIZATION			DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION			DATE	TIME
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES: TEMP. ON ARRIVAL _____ 4.7	
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS		

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Quality Control Report

Report ID: QC-S09507-01
Generated on 11/22/2019

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 East Saginaw Street
East Lansing, MI 48823

Phone: 313-333-0211 FAX:

Report Produced by

Merit Laboratories
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Report Summary

Lab Sample ID(s): S09507.01-S09507.09
Project: RACER Coldwater Rd.
Submitted Date/Time: 11/20/2019 08:15
Sampled by: Unknown
P.O. #: PO

QC Report Sections

Cover Page (Page 1)
Analysis Summary (Pages 2-10)
Prep Batch Summary (Page 11)
Surrogates per Lab Sample (Pages 12-20)
Surrogates per QC Sample (Page 21)
Batch QC Results (Pages 22-29)

Report Flag Descriptions

*: QC result is outside of indicated control limits
W: Surrogate result not applicable due to sample dilution

I certify that this data package is in compliance with the terms and conditions of the program, and project, and contractual requirements both technically and for completeness. Release of the data contained in this hardcopy data package and its computer-readable data submitted has been authorized by the Quality Assurance Manager and his/her designee, as verified by the following signature.

Barbara Ball
Quality Assurance Manager

QC Report - Analysis Summary

Lab Sample ID: S09507.01

Sample Tag: VP-6M-GW

Collected Date/Time: 11/18/2019 11:30

Matrix: Groundwater

COC Reference: 114917

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 17:56	191120A7	VF191120W1	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Analysis Summary

Lab Sample ID: S09507.02

Sample Tag: VP-6S-GW

Collected Date/Time: 11/18/2019 12:25

Matrix: Groundwater

COC Reference: 114917

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 18:15	191120A7	VF191120W1	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Analysis Summary

Lab Sample ID: S09507.03

Sample Tag: VP-1D-GW

Collected Date/Time: 11/19/2019 09:30

Matrix: Groundwater

COC Reference: 114917

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 18:34	191120A7	VF191120W1	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Analysis Summary

Lab Sample ID: S09507.04

Sample Tag: VP-3D-GW

Collected Date/Time: 11/19/2019 10:40

Matrix: Groundwater

COC Reference: 114917

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 18:54	191120A7	VF191120W1	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Analysis Summary

Lab Sample ID: S09507.05

Sample Tag: VP-3M-GW

Collected Date/Time: 11/19/2019 10:45

Matrix: Groundwater

COC Reference: 114917

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 19:13	191120A7	VF191120W1	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Analysis Summary

Lab Sample ID: S09507.06

Sample Tag: VP-4D-GW

Collected Date/Time: 11/19/2019 11:50

Matrix: Groundwater

COC Reference: 114917

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 19:32	191120A7	VF191120W1	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Analysis Summary

Lab Sample ID: S09507.07

Sample Tag: VP-4M-GW

Collected Date/Time: 11/19/2019 11:55

Matrix: Groundwater

COC Reference: 114917

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 19:52	191120A7	VF191120W1	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Analysis Summary

Lab Sample ID: S09507.08

Sample Tag: VP-4S-GW

Collected Date/Time: 11/19/2019 12:05

Matrix: Groundwater

COC Reference: 114917

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 20:11	191120A7	VF191120W1	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Analysis Summary

Lab Sample ID: S09507.09

Sample Tag: Trip Blank-111919

Collected Date/Time: 11/19/2019 00:01

Matrix: Water

COC Reference: 114917

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Organics - Volatiles						
Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 15:01	191120A7	VF191120W1	Yes	BLK/LCS/LCSD/MS/MS

QC Report - Prep Batch Summary

Organics - Volatiles, Prep Batch ID: VF191120W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S09507.01	Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 17:56	191120A7
S09507.02	Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 18:15	191120A7
S09507.03	Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 18:34	191120A7
S09507.04	Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 18:54	191120A7
S09507.05	Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 19:13	191120A7
S09507.06	Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 19:32	191120A7
S09507.07	Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 19:52	191120A7
S09507.08	Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 20:11	191120A7
S09507.09	Volatile Organics - DEQ List	SW5030C/8260C	11/20/19 15:01	191120A7

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09507.01

Sample Tag: VP-6M-GW

Collected Date/Time: 11/18/2019 11:30

Matrix: Groundwater

COC Reference: 114917

Organics - Volatiles, Analysis: Volatile Organics - DEQ List

Run in Batch: 191120A7, Run Date: 11/20/2019 17:56, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		100.0	80.0	124.0
1,2-Dichloroethane-D4		106.4	72.0	125.0
Toluene-D8		97.0	89.0	112.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09507.02

Sample Tag: VP-6S-GW

Collected Date/Time: 11/18/2019 12:25

Matrix: Groundwater

COC Reference: 114917

Organics - Volatiles, Analysis: Volatile Organics - DEQ List

Run in Batch: 191120A7, Run Date: 11/20/2019 18:15, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		100.8	80.0	124.0
1,2-Dichloroethane-D4		109.8	72.0	125.0
Toluene-D8		92.6	89.0	112.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09507.03

Sample Tag: VP-1D-GW

Collected Date/Time: 11/19/2019 09:30

Matrix: Groundwater

COC Reference: 114917

Organics - Volatiles, Analysis: Volatile Organics - DEQ List

Run in Batch: 191120A7, Run Date: 11/20/2019 18:34, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		97.6	80.0	124.0
1,2-Dichloroethane-D4		107.6	72.0	125.0
Toluene-D8		95.8	89.0	112.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09507.04

Sample Tag: VP-3D-GW

Collected Date/Time: 11/19/2019 10:40

Matrix: Groundwater

COC Reference: 114917

Organics - Volatiles, Analysis: Volatile Organics - DEQ List

Run in Batch: 191120A7, Run Date: 11/20/2019 18:54, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		99.0	80.0	124.0
1,2-Dichloroethane-D4		106.2	72.0	125.0
Toluene-D8		95.6	89.0	112.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09507.05

Sample Tag: VP-3M-GW

Collected Date/Time: 11/19/2019 10:45

Matrix: Groundwater

COC Reference: 114917

Organics - Volatiles, Analysis: Volatile Organics - DEQ List

Run in Batch: 191120A7, Run Date: 11/20/2019 19:13, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		96.6	80.0	124.0
1,2-Dichloroethane-D4		108.8	72.0	125.0
Toluene-D8		97.4	89.0	112.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09507.06

Sample Tag: VP-4D-GW

Collected Date/Time: 11/19/2019 11:50

Matrix: Groundwater

COC Reference: 114917

Organics - Volatiles, Analysis: Volatile Organics - DEQ List

Run in Batch: 191120A7, Run Date: 11/20/2019 19:32, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		99.2	80.0	124.0
1,2-Dichloroethane-D4		107.2	72.0	125.0
Toluene-D8		96.8	89.0	112.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09507.07

Sample Tag: VP-4M-GW

Collected Date/Time: 11/19/2019 11:55

Matrix: Groundwater

COC Reference: 114917

Organics - Volatiles, Analysis: Volatile Organics - DEQ List

Run in Batch: 191120A7, Run Date: 11/20/2019 19:52, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		98.4	80.0	124.0
1,2-Dichloroethane-D4		108.0	72.0	125.0
Toluene-D8		95.0	89.0	112.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09507.08

Sample Tag: VP-4S-GW

Collected Date/Time: 11/19/2019 12:05

Matrix: Groundwater

COC Reference: 114917

Organics - Volatiles, Analysis: Volatile Organics - DEQ List

Run in Batch: 191120A7, Run Date: 11/20/2019 20:11, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		98.6	80.0	124.0
1,2-Dichloroethane-D4		107.8	72.0	125.0
Toluene-D8		97.0	89.0	112.0

QC Report - Surrogates per Lab Sample

Lab Sample ID: S09507.09

Sample Tag: Trip Blank-111919

Collected Date/Time: 11/19/2019 00:01

Matrix: Water

COC Reference: 114917

Organics - Volatiles, Analysis: Volatile Organics - DEQ List

Run in Batch: 191120A7, Run Date: 11/20/2019 15:01, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		96.8	80.0	124.0
1,2-Dichloroethane-D4		108.0	72.0	125.0
Toluene-D8		99.6	89.0	112.0

QC Report - Surrogates per QC Sample

Organics - Volatiles, Prep Batch ID: VF191120W1

QC Types: BLK/LCS/LCSD/MS/MSD

Blank (BLK)

Lab Sample ID: 191120A7.BLKW20A

Run in Batch: 191120A7, Run Date: 11/20/2019 14:22, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		97.0	80.0	124.0
1,2-Dichloroethane-D4		111.0	72.0	125.0
Toluene-D8		97.2	89.0	112.0

Laboratory Control Sample (LCS)

Lab Sample ID: 191120A7.LCSW20A

Run in Batch: 191120A7, Run Date: 11/20/2019 13:05, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		101.0	80.0	124.0
1,2-Dichloroethane-D4		109.8	72.0	125.0
Toluene-D8		100.6	89.0	112.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 191120A7.LCSDW20A, Parent Sample ID: 191120A7.LCSW20A

Run in Batch: 191120A7, Run Date: 11/20/2019 13:24, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		103.6	80.0	124.0
1,2-Dichloroethane-D4		111.6	72.0	125.0
Toluene-D8		99.2	89.0	112.0

Matrix Spike (MS)

Lab Sample ID: 191120A7.0940207M, Parent Sample ID: S09402.06

Run in Batch: 191120A7, Run Date: 11/20/2019 21:28, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		103.0	80.0	124.0
1,2-Dichloroethane-D4		110.6	72.0	125.0
Toluene-D8		100.6	89.0	112.0

Matrix Spike Duplicate (MSD)

Lab Sample ID: 191120A7.0940208N, Parent Sample ID: 191120A7.0940207M

Run in Batch: 191120A7, Run Date: 11/20/2019 21:48, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Surrogate	Flags	%Rec	LCL	UCL
4-Bromofluorobenzene		100.8	80.0	124.0
1,2-Dichloroethane-D4		111.8	72.0	125.0
Toluene-D8		99.6	89.0	112.0

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: VF191120W1

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Blank (BLK)

Lab Sample ID: 191120A7.BLKW20A

Run in Batch: 191120A7, Run Date: 11/20/2019 14:22, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Analyte	Flags	Conc	RDL	Units
Diethyl ether		ND	1.00	ug/l
Acetone		ND	10.00	ug/l
Methyl iodide		ND	1.00	ug/l
Carbon disulfide		ND	1.00	ug/l
tert-Methyl butyl ether (MTBE)		ND	1.00	ug/l
Acrylonitrile		ND	1.00	ug/l
2-Butanone (MEK)		ND	10.00	ug/l
Dichlorodifluoromethane		ND	1.00	ug/l
Chloromethane		ND	1.00	ug/l
Vinyl chloride		ND	1.00	ug/l
Bromomethane		ND	1.00	ug/l
Chloroethane		ND	1.00	ug/l
Trichlorofluoromethane		ND	1.00	ug/l
1,1-Dichloroethene		ND	1.00	ug/l
Methylene chloride		ND	1.00	ug/l
trans-1,2-Dichloroethene		ND	1.00	ug/l
1,1-Dichloroethane		ND	1.00	ug/l
cis-1,2-Dichloroethene		ND	1.00	ug/l
Tetrahydrofuran		ND	10.00	ug/l
Chloroform		ND	1.00	ug/l
Bromochloromethane		ND	1.00	ug/l
1,1,1-Trichloroethane		ND	1.00	ug/l
4-Methyl-2-pentanone (MIBK)		ND	10.00	ug/l
2-Hexanone		ND	10.00	ug/l
Carbon tetrachloride		ND	1.00	ug/l
Benzene		ND	1.00	ug/l
1,2-Dichloroethane		ND	1.00	ug/l
Trichloroethene		ND	1.00	ug/l
1,2-Dichloropropane		ND	1.00	ug/l
Bromodichloromethane		ND	1.00	ug/l
Dibromomethane		ND	1.00	ug/l
cis-1,3-Dichloropropene		ND	1.00	ug/l
Toluene		ND	1.00	ug/l
trans-1,3-Dichloropropene		ND	1.00	ug/l
1,1,2-Trichloroethane		ND	1.00	ug/l
Tetrachloroethene		ND	1.00	ug/l
trans-1,4-Dichloro-2-butene		ND	1.00	ug/l
Dibromochloromethane		ND	1.00	ug/l
1,2-Dibromoethane		ND	1.00	ug/l
Chlorobenzene		ND	1.00	ug/l
1,1,1,2-Tetrachloroethane		ND	1.00	ug/l
Ethylbenzene		ND	1.00	ug/l
p,m-Xylene		ND	1.00	ug/l
o-Xylene		ND	1.00	ug/l
Styrene		ND	1.00	ug/l
Isopropylbenzene		ND	1.00	ug/l

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: VF191120W1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Blank (BLK) (continued)

Lab Sample ID: 191120A7.BLKW20A

Run in Batch: 191120A7, Run Date: 11/20/2019 14:22, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Analyte	Flags	Conc	RDL	Units
Bromoform		ND	1.00	ug/l
1,1,2,2-Tetrachloroethane		ND	1.00	ug/l
1,2,3-Trichloropropane		ND	1.00	ug/l
n-Propylbenzene		ND	1.00	ug/l
Bromobenzene		ND	1.00	ug/l
1,3,5-Trimethylbenzene		ND	1.00	ug/l
tert-Butylbenzene		ND	1.00	ug/l
1,2,4-Trimethylbenzene		ND	1.00	ug/l
sec-Butylbenzene		ND	1.00	ug/l
p-Isopropyltoluene		ND	1.00	ug/l
1,3-Dichlorobenzene		ND	1.00	ug/l
1,4-Dichlorobenzene		ND	1.00	ug/l
1,2-Dichlorobenzene		ND	1.00	ug/l
1,2,3-Trimethylbenzene		ND	1.00	ug/l
n-Butylbenzene		ND	1.00	ug/l
Hexachloroethane		ND	1.00	ug/l
1,2-Dibromo-3-chloropropane		ND	1.00	ug/l
1,2,4-Trichlorobenzene		ND	1.00	ug/l
1,2,3-Trichlorobenzene		ND	1.00	ug/l
Naphthalene		ND	1.00	ug/l
2-Methylnaphthalene		ND	1.00	ug/l

Laboratory Control Sample (LCS)

Lab Sample ID: 191120A7.LCSW20A

Run in Batch: 191120A7, Run Date: 11/20/2019 13:05, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
Diethyl ether		86.4	67.4	121.2
Acetone		103.8	29.9	161.5
Methyl iodide		88.1	68.8	116.4
Carbon disulfide		79.2	63.8	137.4
tert-Methyl butyl ether (MTBE)		93.2	73.2	122.4
Acrylonitrile		105.6	69.9	128.9
2-Butanone (MEK)		112.4	44.0	134.4
Dichlorodifluoromethane		77.9	10.0	222.8
Chloromethane		73.0	23.8	166.5
Vinyl chloride		73.3	43.5	149.1
Bromomethane		80.9	56.8	151.3
Chloroethane		83.4	53.4	149.4
Trichlorofluoromethane		98.7	59.7	151.8
1,1-Dichloroethene		91.2	69.6	139.4
Methylene chloride		87.3	73.3	121.1
trans-1,2-Dichloroethene		89.7	73.6	129.3
1,1-Dichloroethane		93.3	71.5	126.2
cis-1,2-Dichloroethene		85.4	76.6	122.1
Tetrahydrofuran		115.4	59.0	117.9
Chloroform		94.5	78.4	124.0

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: VF191120W1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Laboratory Control Sample (LCS) (continued)

Lab Sample ID: 191120A7.LCSW20A

Run in Batch: 191120A7, Run Date: 11/20/2019 13:05, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
Bromochloromethane		91.5	78.2	120.8
1,1,1-Trichloroethane		101.6	79.4	130.9
4-Methyl-2-pentanone (MIBK)		113.7	71.6	125.2
2-Hexanone		119.1	55.4	136.9
Carbon tetrachloride		107.0	72.6	133.0
Benzene		92.2	79.9	124.9
1,2-Dichloroethane		109.4	76.0	126.3
Trichloroethene		94.5	79.7	124.2
1,2-Dichloropropane		97.4	78.6	126.4
Bromodichloromethane		102.6	80.4	128.2
Dibromomethane		99.5	76.9	122.1
cis-1,3-Dichloropropene		103.9	79.8	129.9
Toluene		96.5	79.8	124.5
trans-1,3-Dichloropropene		111.3	74.0	131.3
1,1,2-Trichloroethane		101.2	78.7	123.1
Tetrachloroethene		99.1	74.5	124.5
trans-1,4-Dichloro-2-butene		128.0	68.6	135.4
Dibromochloromethane		103.7	74.6	127.2
1,2-Dibromoethane		101.7	70.3	133.7
Chlorobenzene		95.2	79.2	122.7
1,1,1,2-Tetrachloroethane		102.3	80.3	128.2
Ethylbenzene		94.6	79.5	129.1
p,m-Xylene		96.6	79.4	132.2
o-Xylene		98.1	80.2	131.0
Styrene		97.6	69.5	126.7
Isopropylbenzene		98.9	74.4	121.5
Bromoform		108.9	69.4	128.0
1,1,2,2-Tetrachloroethane		107.4	79.8	126.3
1,2,3-Trichloropropane		110.9	78.3	138.8
n-Propylbenzene		97.8	82.0	130.7
Bromobenzene		96.4	78.7	124.6
1,3,5-Trimethylbenzene		99.4	81.3	128.9
tert-Butylbenzene		105.5	80.7	128.9
1,2,4-Trimethylbenzene		99.4	81.4	130.8
sec-Butylbenzene		94.7	77.4	129.8
p-Isopropyltoluene		95.6	79.8	137.5
1,3-Dichlorobenzene		93.2	77.0	131.3
1,4-Dichlorobenzene		92.5	20.7	137.7
1,2-Dichlorobenzene		94.7	10.0	166.2
1,2,3-Trimethylbenzene		94.9	76.3	124.2
n-Butylbenzene		94.6	80.0	133.3
Hexachloroethane		99.6	23.8	138.1
1,2-Dibromo-3-chloropropane		111.9	21.2	189.4
1,2,4-Trichlorobenzene		88.1	27.4	143.4
1,2,3-Trichlorobenzene		89.3	75.4	131.4
Naphthalene		94.7	32.9	135.8

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: VF191120W1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Laboratory Control Sample (LCS) (continued)

Lab Sample ID: 191120A7.LCSW20A

Run in Batch: 191120A7, Run Date: 11/20/2019 13:05, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
2-Methylnaphthalene		97.3	25.5	165.5

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: 191120A7.LCSDW20A, Parent Sample ID: 191120A7.LCSW20A

Run in Batch: 191120A7, Run Date: 11/20/2019 13:24, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
Diethyl ether		92.6	67.4	121.2	6.9	30.0
Acetone		113.8	29.9	161.5	9.2	30.0
Methyl iodide		93.4	68.8	116.4	5.8	30.0
Carbon disulfide		84.1	63.8	137.4	6.0	30.0
tert-Methyl butyl ether (MTBE)		100.3	73.2	122.4	7.3	30.0
Acrylonitrile		112.5	69.9	128.9	6.4	30.0
2-Butanone (MEK)		119.7	44.0	134.4	6.3	30.0
Dichlorodifluoromethane		81.6	10.0	222.8	4.6	30.0
Chloromethane		78.2	23.8	166.5	7.0	30.0
Vinyl chloride		77.9	43.5	149.1	6.1	30.0
Bromomethane		83.6	56.8	151.3	3.3	30.0
Chloroethane		84.9	53.4	149.4	1.8	30.0
Trichlorofluoromethane		101.8	59.7	151.8	3.2	30.0
1,1-Dichloroethene		95.8	69.6	139.4	4.9	30.0
Methylene chloride		91.7	73.3	121.1	4.8	30.0
trans-1,2-Dichloroethene		94.7	73.6	129.3	5.4	30.0
1,1-Dichloroethane		98.4	71.5	126.2	5.3	30.0
cis-1,2-Dichloroethene		90.1	76.6	122.1	5.3	30.0
Tetrahydrofuran	*	123.6	59.0	117.9	6.9	30.0
Chloroform		100.2	78.4	124.0	5.8	30.0
Bromochloromethane		97.1	78.2	120.8	5.9	30.0
1,1,1-Trichloroethane		105.2	79.4	130.9	3.4	30.0
4-Methyl-2-pentanone (MIBK)		122.3	71.6	125.2	7.3	30.0
2-Hexanone		125.6	55.4	136.9	5.3	30.0
Carbon tetrachloride		111.0	72.6	133.0	3.7	30.0
Benzene		95.5	79.9	124.9	3.6	30.0
1,2-Dichloroethane		115.2	76.0	126.3	5.1	30.0
Trichloroethene		97.7	79.7	124.2	3.4	30.0
1,2-Dichloropropane		100.5	78.6	126.4	3.1	30.0
Bromodichloromethane		106.7	80.4	128.2	4.0	30.0
Dibromomethane		104.5	76.9	122.1	4.9	30.0
cis-1,3-Dichloropropene		107.6	79.8	129.9	3.5	30.0
Toluene		98.8	79.8	124.5	2.3	30.0
trans-1,3-Dichloropropene		116.0	74.0	131.3	4.1	30.0
1,1,2-Trichloroethane		105.4	78.7	123.1	4.1	30.0
Tetrachloroethene		101.8	74.5	124.5	2.7	30.0
trans-1,4-Dichloro-2-butene		134.7	68.6	135.4	5.1	30.0
Dibromochloromethane		110.6	74.6	127.2	6.5	30.0
1,2-Dibromoethane		108.1	70.3	133.7	6.1	30.0
Chlorobenzene		100.6	79.2	122.7	5.5	30.0

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: VF191120W1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Laboratory Control Sample Duplicate (LCSD) (continued)

Lab Sample ID: 191120A7.LCSDW20A, Parent Sample ID: 191120A7.LCSW20A

Run in Batch: 191120A7, Run Date: 11/20/2019 13:24, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,1,1,2-Tetrachloroethane		110.4	80.3	128.2	7.7	30.0
Ethylbenzene		100.5	79.5	129.1	6.0	30.0
p,m-Xylene		102.2	79.4	132.2	5.6	30.0
o-Xylene		105.2	80.2	131.0	6.9	30.0
Styrene		104.1	69.5	126.7	6.4	30.0
Isopropylbenzene		105.3	74.4	121.5	6.3	30.0
Bromoform		118.7	69.4	128.0	8.6	30.0
1,1,2,2-Tetrachloroethane		116.0	79.8	126.3	7.7	30.0
1,2,3-Trichloropropane		120.5	78.3	138.8	8.3	30.0
n-Propylbenzene		104.3	82.0	130.7	6.5	30.0
Bromobenzene		103.4	78.7	124.6	7.0	30.0
1,3,5-Trimethylbenzene		107.0	81.3	128.9	7.3	30.0
tert-Butylbenzene		109.5	80.7	128.9	3.7	30.0
1,2,4-Trimethylbenzene		105.7	81.4	130.8	6.2	30.0
sec-Butylbenzene		100.6	77.4	129.8	6.1	30.0
p-Isopropyltoluene		102.7	79.8	137.5	7.2	30.0
1,3-Dichlorobenzene		100.8	77.0	131.3	7.8	30.0
1,4-Dichlorobenzene		99.9	20.7	137.7	7.8	30.0
1,2-Dichlorobenzene		101.8	10.0	166.2	7.2	30.0
1,2,3-Trimethylbenzene		103.7	76.3	124.2	8.8	30.0
n-Butylbenzene		100.2	80.0	133.3	5.7	30.0
Hexachloroethane		105.3	23.8	138.1	5.5	30.0
1,2-Dibromo-3-chloropropane		123.6	21.2	189.4	10.0	30.0
1,2,4-Trichlorobenzene		93.3	27.4	143.4	5.8	30.0
1,2,3-Trichlorobenzene		91.0	75.4	131.4	1.9	30.0
Naphthalene		102.8	32.9	135.8	8.3	30.0
2-Methylnaphthalene		100.7	25.5	165.5	3.4	30.0

Matrix Spike (MS)

Lab Sample ID: 191120A7.0940207M, Parent Sample ID: S09402.06

Run in Batch: 191120A7, Run Date: 11/20/2019 21:28, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
Diethyl ether		84.8	67.4	121.2
Acetone		107.5	29.9	161.5
Methyl iodide		85.4	68.8	116.4
Carbon disulfide		73.3	63.8	137.4
tert-Methyl butyl ether (MTBE)		90.6	73.2	122.4
Acrylonitrile		107.1	69.9	128.9
2-Butanone (MEK)		118.4	44.0	134.4
Dichlorodifluoromethane		69.3	10.0	222.8
Chloromethane		71.4	23.8	166.5
Vinyl chloride		71.8	43.5	149.1
Bromomethane		78.0	56.8	151.3
Chloroethane		81.3	53.4	149.4
Trichlorofluoromethane		96.1	59.7	151.8
1,1-Dichloroethene		88.0	69.6	139.4

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: VF191120W1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Matrix Spike (MS) (continued)

Lab Sample ID: 191120A7.0940207M, Parent Sample ID: S09402.06

Run in Batch: 191120A7, Run Date: 11/20/2019 21:28, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
Methylene chloride		83.4	73.3	121.1
trans-1,2-Dichloroethene		86.5	73.6	129.3
1,1-Dichloroethane		91.1	71.5	126.2
cis-1,2-Dichloroethene		83.3	76.6	122.1
Tetrahydrofuran		114.1	59.0	117.9
Chloroform		93.4	78.4	124.0
Bromochloromethane		89.9	78.2	120.8
1,1,1-Trichloroethane		98.3	79.4	130.9
4-Methyl-2-pentanone (MIBK)		121.4	71.6	125.2
2-Hexanone		126.1	55.4	136.9
Carbon tetrachloride		100.0	72.6	133.0
Benzene		89.4	79.9	124.9
1,2-Dichloroethane		105.5	76.0	126.3
Trichloroethene		91.9	79.7	124.2
1,2-Dichloropropane		95.2	78.6	126.4
Bromodichloromethane		100.3	80.4	128.2
Dibromomethane		98.3	76.9	122.1
cis-1,3-Dichloropropene		101.5	79.8	129.9
Toluene		95.3	79.8	124.5
trans-1,3-Dichloropropene		108.5	74.0	131.3
1,1,2-Trichloroethane		103.3	78.7	123.1
Tetrachloroethene		96.9	74.5	124.5
trans-1,4-Dichloro-2-butene		123.4	68.6	135.4
Dibromochloromethane		102.4	74.6	127.2
1,2-Dibromoethane		101.9	70.3	133.7
Chlorobenzene		94.5	79.2	122.7
1,1,1,2-Tetrachloroethane		101.5	80.3	128.2
Ethylbenzene		93.3	79.5	129.1
p,m-Xylene		96.0	79.4	132.2
o-Xylene		97.7	80.2	131.0
Styrene		96.2	69.5	126.7
Isopropylbenzene		100.0	74.4	121.5
Bromoform		109.8	69.4	128.0
1,1,2,2-Tetrachloroethane		111.5	79.8	126.3
1,2,3-Trichloropropane		116.9	78.3	138.8
n-Propylbenzene		99.6	82.0	130.7
Bromobenzene		97.8	78.7	124.6
1,3,5-Trimethylbenzene		100.5	81.3	128.9
tert-Butylbenzene		107.5	80.7	128.9
1,2,4-Trimethylbenzene		101.3	81.4	130.8
sec-Butylbenzene		92.8	77.4	129.8
p-Isopropyltoluene		93.9	79.8	137.5
1,3-Dichlorobenzene		93.0	77.0	131.3
1,4-Dichlorobenzene		92.1	20.7	137.7
1,2-Dichlorobenzene		94.3	10.0	166.2
1,2,3-Trimethylbenzene		95.1	76.3	124.2

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: VF191120W1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Matrix Spike (MS) (continued)

Lab Sample ID: 191120A7.0940207M, Parent Sample ID: S09402.06

Run in Batch: 191120A7, Run Date: 11/20/2019 21:28, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
n-Butylbenzene		90.2	80.0	133.3
Hexachloroethane		97.3	23.8	138.1
1,2-Dibromo-3-chloropropane		117.6	21.2	189.4
1,2,4-Trichlorobenzene		85.9	27.4	143.4
1,2,3-Trichlorobenzene		87.3	75.4	131.4
Naphthalene		97.2	32.9	135.8
2-Methylnaphthalene		93.9	25.5	165.5

Matrix Spike Duplicate (MSD)

Lab Sample ID: 191120A7.0940208N, Parent Sample ID: 191120A7.0940207M

Run in Batch: 191120A7, Run Date: 11/20/2019 21:48, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
Diethyl ether		95.0	67.4	121.2	11.4	30.0
Acetone		117.4	29.9	161.5	8.1	30.0
Methyl iodide		94.6	68.8	116.4	10.2	30.0
Carbon disulfide		82.2	63.8	137.4	11.4	30.0
tert-Methyl butyl ether (MTBE)		102.3	73.2	122.4	12.1	30.0
Acrylonitrile		117.0	69.9	128.9	8.9	30.0
2-Butanone (MEK)		130.7	44.0	134.4	9.8	30.0
Dichlorodifluoromethane		79.3	10.0	222.8	13.5	30.0
Chloromethane		76.9	23.8	166.5	7.4	30.0
Vinyl chloride		76.6	43.5	149.1	6.4	30.0
Bromomethane		83.9	56.8	151.3	7.3	30.0
Chloroethane		87.6	53.4	149.4	7.5	30.0
Trichlorofluoromethane		104.1	59.7	151.8	8.1	30.0
1,1-Dichloroethene		98.9	69.6	139.4	11.7	30.0
Methylene chloride		94.3	73.3	121.1	12.3	30.0
trans-1,2-Dichloroethene		95.9	73.6	129.3	10.3	30.0
1,1-Dichloroethane		100.7	71.5	126.2	9.9	30.0
cis-1,2-Dichloroethene		91.6	76.6	122.1	9.4	30.0
Tetrahydrofuran	*	122.8	59.0	117.9	7.4	30.0
Chloroform		102.2	78.4	124.0	9.1	30.0
Bromochloromethane		99.4	78.2	120.8	10.1	30.0
1,1,1-Trichloroethane		108.7	79.4	130.9	10.1	30.0
4-Methyl-2-pentanone (MIBK)	*	130.6	71.6	125.2	7.3	30.0
2-Hexanone		133.3	55.4	136.9	5.5	30.0
Carbon tetrachloride		111.5	72.6	133.0	10.9	30.0
Benzene		96.8	79.9	124.9	7.9	30.0
1,2-Dichloroethane		117.4	76.0	126.3	10.7	30.0
Trichloroethene		99.7	79.7	124.2	8.1	30.0
1,2-Dichloropropane		103.9	78.6	126.4	8.8	30.0
Bromodichloromethane		110.5	80.4	128.2	9.6	30.0
Dibromomethane		107.3	76.9	122.1	8.7	30.0
cis-1,3-Dichloropropene		110.4	79.8	129.9	8.4	30.0
Toluene		102.0	79.8	124.5	6.7	30.0
trans-1,3-Dichloropropene		118.2	74.0	131.3	8.6	30.0

QC Report - Batch QC Results

Organics - Volatiles, Prep Batch ID: VF191120W1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/MSD

Matrix Spike Duplicate (MSD) (continued)

Lab Sample ID: 191120A7.0940208N, Parent Sample ID: 191120A7.0940207M

Run in Batch: 191120A7, Run Date: 11/20/2019 21:48, Prep Date: 11/20/2019, Matrix: WW, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
1,1,2-Trichloroethane		110.4	78.7	123.1	6.7	30.0
Tetrachloroethene		102.4	74.5	124.5	5.6	30.0
trans-1,4-Dichloro-2-butene		131.0	68.6	135.4	6.0	30.0
Dibromochloromethane		114.3	74.6	127.2	11.0	30.0
1,2-Dibromoethane		113.0	70.3	133.7	10.3	30.0
Chlorobenzene		102.5	79.2	122.7	8.2	30.0
1,1,1,2-Tetrachloroethane		111.4	80.3	128.2	9.4	30.0
Ethylbenzene		101.2	79.5	129.1	8.2	30.0
p,m-Xylene		104.0	79.4	132.2	7.9	30.0
o-Xylene		104.8	80.2	131.0	7.0	30.0
Styrene		103.9	69.5	126.7	7.7	30.0
Isopropylbenzene		105.6	74.4	121.5	5.4	30.0
Bromoform		120.8	69.4	128.0	9.5	30.0
1,1,2,2-Tetrachloroethane		119.5	79.8	126.3	6.9	30.0
1,2,3-Trichloropropane		123.9	78.3	138.8	5.8	30.0
n-Propylbenzene		102.9	82.0	130.7	3.3	30.0
Bromobenzene		104.5	78.7	124.6	6.7	30.0
1,3,5-Trimethylbenzene		105.6	81.3	128.9	5.0	30.0
tert-Butylbenzene		112.3	80.7	128.9	4.4	30.0
1,2,4-Trimethylbenzene		105.7	81.4	130.8	4.3	30.0
sec-Butylbenzene		101.7	77.4	129.8	9.2	30.0
p-Isopropyltoluene		102.8	79.8	137.5	9.1	30.0
1,3-Dichlorobenzene		101.1	77.0	131.3	8.3	30.0
1,4-Dichlorobenzene		101.7	20.7	137.7	9.9	30.0
1,2-Dichlorobenzene		104.0	10.0	166.2	9.8	30.0
1,2,3-Trimethylbenzene		103.8	76.3	124.2	8.8	30.0
n-Butylbenzene		98.3	80.0	133.3	8.6	30.0
Hexachloroethane		108.2	23.8	138.1	10.6	30.0
1,2-Dibromo-3-chloropropane		128.8	21.2	189.4	9.1	30.0
1,2,4-Trichlorobenzene		95.9	27.4	143.4	11.0	30.0
1,2,3-Trichlorobenzene		99.1	75.4	131.4	12.7	30.0
Naphthalene		108.2	32.9	135.8	10.8	30.0
2-Methylnaphthalene		110.4	25.5	165.5	16.1	30.0

REPORT TO

CONTACT NAME Clifford Yantz			
COMPANY O'Brien & Gore Part of Ramboll			
ADDRESS 2260 East Lansing			
CITY East Lansing		STATE MI	ZIP CODE 48823
PHONE NO. 313-333-0211		FAX NO.	P.O. NO.
E-MAIL ADDRESS clifford.yantz@Ramboll.com		QUOTE NO.	

CHAIN OF CUSTODY RECORD

CONTACT NAME		☐ SAME ☐ DIFFERENT	
COMPANY			
ADDRESS			
CITY		STATE	ZIP CODE
PHONE NO.		E-MAIL ADDRESS	

INVOICE TO

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME	RACER Coldwater Rd	SAMPLER(S) - PLEASE PRINT/SIGN NAME	
TURNAROUND TIME REQUIRED		☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER _____	
DELIVERABLES REQUIRED		☒ LEVEL I ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER _____	

MATRIX CODE:	GW=GROUNDWATER SL=SLUDGE	WW=WASTEWATER DW=DRINKING WATER	S=SOIL O=OIL	L=LIQUID WP=WIPE	SD=SOLID A=AIR W=WASTE
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Containers & Preservatives

Certifications

☐ OHIO VAP ☐ Drinking Water
☐ DoD ☐ NPDES

Project Locations

☐ Detroit ☐ New York☐ Other

Special Instructions

[illegible]

RELINQUISHED BY: 7C SH 086 ☒ Sampler
SIGNATURE/ORGANIZATION

RECEIVED BY: NAME
SIGNATURE/ORGANIZATION

RELINQUISHED BY:
SIGNATURE/ORGANIZATION *[Signature]*

RECEIVED BY: 
SIGNATURE/ORGANIZATION

RELINQUISHED BY:
SIGNATURE/ORGANIZATION

RECEIVED BY:
SIGNATURE/ORGANIZATION

SEAL NO.	SEAL INTACT	INITIALS
	YES ☐ NO ☐	

SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
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DATE	TIME
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DATE	TIME
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NOTES: TEMP. ON ARRIVAL _____

4.5

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

APPENDIX C
Site-specific VIAC criteria & Transmittal Letter



GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
LANSING



LIESL EICHLER CLARK
DIRECTOR

October 22, 2020

VIA E-MAIL AND U.S. MAIL

Mr. David Favero
Deputy Cleanup Manager - Michigan
RACER Trust
500 Woodward Avenue, Suite 2650
Detroit, Michigan 48226

Dear Mr. Favero,

SUBJECT: Transmittal of Site-Specific Volatilization to Indoor Air Criteria:
Revitalizing Auto Communities Environmental Response (RACER) Trust,
Coldwater Road Landfill; Flint, Michigan; MID 005 356 860; Waste Data
System Number 393431

The purpose of this letter is to transmit Michigan Department of Environment, Great Lakes, and Energy (EGLE), Materials Management Division (MMD), site-specific criteria for soil, groundwater, soil gas, and indoor air for the compounds on the Target Analyte List. The site-specific criteria for various scenarios are attached, as described below:

- The site-specific soil, groundwater, and soil gas criteria for residential houses constructed with a crawlspace with a dirt floor and groundwater three feet below grade are attached as Table 1.
- The site-specific soil, groundwater, and soil gas criteria for residential houses constructed as slab-on-grade and groundwater three feet below grade are attached as Table 2.
- The site-specific soil, groundwater, and soil gas criteria for residential houses constructed with a basement and groundwater three feet below grade are attached as Table 3.

EGLE developed the site-specific soil, groundwater, and soil gas criteria using values that better reflect best available information regarding facility geology and hydrogeology, building-specific information, and the toxicity and exposure risks posed by the hazardous substances present at the facility.

Provided that the conditions used to develop the site-specific criteria are met, the values may be used without further EGLE, MMD approval. As always, please maintain records to document that the site-specific criteria were used as intended and approved.

If desired, RACER may initiate the development of other site-specific criteria, using additional site-specific information consistent with the statutory provisions for development of site-specific criteria of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Such a process will require EGLE, MMD involvement, and any other site-specific criteria developed will require EGLE, MMD review and approval.

The site-specific criteria should be used to evaluate groundwater, soil, soil gas, and sub-slab soil gas collected as part of any volatilization to indoor air pathway investigation. In addition, the indoor air data should be evaluated against the Recommended Interim Action Screening Levels and the Time-Sensitive Recommended Interim Action Screening Levels (TS RIASL). Concentrations in sub-slab soil gas greater than the site-specific criteria should be interpreted as indicative of a potential long-term source of inhalation exposure risk. The exceedance of an indoor air TS RIASL will require more rapid exposure mitigation, such as immediately increased ventilation, and/or may require collaboration with the Michigan Department of Health and Human Services, and/or the Genesee County Health Department.

Should you have any questions, please contact me at 517-284-6580; RungeJ@Michigan.gov; or EGLE, MMD, P.O. Box 30241, Lansing, MI 48909-7741.

Sincerely,



Jacob Runge, Environmental Engineer
Management and Tracking Unit
Hazardous Waste Section
Materials Management Division

Enclosures

cc: Mr. Clifford Yantz, Senior Hydrogeologist, Ramboll
Mr. Kevin Schneider, Environmental Scientist, Ramboll
Mr. Rich Conforti, EGLE
Mr. John McCabe, EGLE
Ms. Nicole Sanabria, EGLE
cc/encl: Corrective Action File

DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

INTEROFFICE COMMUNICATION

TO: Nicole Sanabria, Geologist, MMD

FROM: Shane Morrison, Senior Toxicologist, RRD

DATE: January 6, 2020

SUBJECT: Coldwater Road Landfill Site-Specific Criteria Evaluation



The following site-specific volatilization to indoor air criteria (VIAC) are the Michigan Department of Environment, Great Lakes, and Energy's (EGLE's) determination of values that reflect best available information regarding the toxicity and exposure risks posed by the hazardous substances present at the facility. These values are based upon the information provided with the request to develop site-specific VIAC for this facility. These values may be used provided it is documented that the conditions used to develop the site-specific criteria are met at the facility. Other values may be developed by a person consistent with the statutory provisions for development of site-specific criteria and provided for EGLE review and approval.

Correspondence transmitting these values to the submitter/consultant as part of a report, review, or other request must incorporate the appropriate sections of the VIAP model document language. As indicated in this document, when GVIC and SVIC are not applicable, the correspondence must include language indicating the requirement to satisfy the site-specific VIAC for all three media i.e., groundwater, soil, and soil gas. In addition, all of the following site-specific VIAC tables must be copied into the correspondence or letter as part of your response to the submitter/consultant.

Unrestricted residential site-specific criteria were included in the evaluation based on information provided and EGLE's residential conceptual site model. Exceedance of the site-specific unrestricted residential criteria will require restrictions or institutional controls for closure or aid in the determination of off-site migration.

If multiple foundation types are present for a structure (i.e. slab-on-grade, crawlspace, and/or basement), a sensitivity analysis should be performed to identify the most restrictive set of criteria to evaluate risk associated with the VIAP for that structure.

The site-specific criteria were generated using the United States Department of Agriculture (USDA) soil type of sand. Other site-specific criteria can be generated using a different soil type by providing soil characterization results from department approved methods on soils collected at the site.

Additional hazardous substances were included in the site-specific evaluation that were not explicitly requested. These hazardous substances may be components of recent petroleum releases and the primary breakdown products of tetrachloroethylene. The preemptive site-specific evaluation of these substances was provided to limit the potential need for future resubmittal for this facility.

Please contact me at MorrisonS5@michigan.gov or 517-284-5063 if you require any clarification of these comments and criterion or have additional questions.

cc: Eric Wildfang, Toxicology Unit Supervisor, RRD
Virginia Himich, Environmental Manager, MMD
Joe Rogers, Environmental Quality Specialist, MMD
Jacob Runge, Environmental Engineer, MMD

John McCabe, Senior Environmental Quality Analyst, MMD

Table 1. Residential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a residential house with a **crawlspace with a dirt floor**, the depth to groundwater submitted for this site (i.e. 3 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m ³)
83329	Acenaphthene	130 nc	48,000 nc	220 nc
208968	Acenaphthylene	65 nc	DATA	220 nc
994058	t-Amyl methyl ether (TAME)	3.9 (M) nc	DATA	65 nc
120127	Anthracene	43 (S) sol	4.1E+06 nc	1,000 nc
71432	Benzene	0.14 (M) ca	0.21 (M) ca	3.3 ca
56553	Benzo(a)anthracene	2.7 (MM) mut	89,000 (MM) mut	0.17 (MM) mut
78933	2-Butanone (MEK)	2,600 (DD) dev	3,800 (DD) dev	5,000 (DD) dev
75650	t-Butyl alcohol	230 nc	DATA	75 nc
104518	n-Butylbenzene	9.9 nc	120 nc	210 nc
135988	sec-Butylbenzene	8.1 nc	840 nc	0.42 nc
98066	t-Butylbenzene	1.9E-02 (M) nc	0.14 (M) nc	0.42 nc
110827	Cyclohexane	230 nc	44 (M) nc	6,300 nc
124481	Dibromochloromethane	4.0E-02 (MM) (M) mut	0.14 (MM) (M) mut	0.43 (MM) mut
95501	1,2-Dichlorobenzene	23 nc	310 nc	310 nc
541731	1,3-Dichlorobenzene	0.19 (M) nc	2.1 (M) nc	3.1 nc
106467	1,4-Dichlorobenzene	0.42 (M) ca	5.0 (M) ca	6.5 ca
75718	Dichlorodifluoromethane	12 nc	1.9 (M) nc	340 nc
75343	1,1-Dichloroethane	0.66 (M) ca	0.35 (M) ca	16 ca
107062	1,2-Dichloroethane	7.5E-02 (M) ca	0.11 (M) ca	0.98 ca
75354	1,1-Dichloroethylene	7.0 nc	1.6 (M) nc	210 nc
156592	cis-1,2-Dichloroethylene	0.36 (M) nc	0.26 (M) nc	8.3 nc
156605	trans-1,2-Dichloroethylene	3.0 nc	1.5 (M) nc	83 nc
78875	1,2-Dichloropropane	0.22 (M) nc	0.32 (M) nc	4.2 nc
542756	1,3-Dichloropropene	0.31 (M) (J) ca	0.45 (M) (J) ca	6.4 (J) ca
60297	Diethyl ether	75 nc	46 (M) nc	1,000 nc
108203	Diisopropyl ether	36 (DD) dev	34 (M) (DD) dev	700 (DD) dev

Table 1. Residential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a residential house with a **crawlspace with a dirt floor**, the depth to groundwater submitted for this site (i.e. 3 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m ³)
123911	1,4-Dioxane	59 ca	46 (M) ca	5.1 ca
64175	Ethanol	1.0E+05 (FF) st	1.2E+05 (EE) st	19,000 (EE) st
141786	Ethyl acetate	31 nc	28 nc	73 nc
637923	Ethyl-tert-butyl ether (ETBE)	22 nc	DATA	390 nc
100414	Ethylbenzene	0.47 (M) ca	2.0 (M) ca	10 ca
106934	Ethylene dibromide	5.5E-03 (M) ca	2.1E-02 (M) ca	4.2E-02 ca
86737	Fluorene	160 nc	87,000 nc	150 nc
142825	n-Heptane	150 nc	23 nc	3,700 nc
87683	Hexachlorobutadiene (C-46)	5.9E-02 ca	1.3 (M) ca	1.2 ca
110543	n-Hexane	28 nc	3.9 nc	730 nc
591786	2-Hexanone	22 (M) nc	35 (M) nc	31 nc
67630	Isopropyl alcohol	1,700 nc	1,100 (M) nc	210 nc
98828	Isopropyl benzene	0.11 (M) ca	0.73 (M) ca	2.4 ca
108101	4-Methyl-2-pentanone (MIBK)	720 (DD) dev	2,000 (M) (DD) dev	3,000 (DD) dev
1634044	Methyl-tert-butyl ether (MTBE)	12 ca	11 (M) ca	98 ca
96377	Methylcyclopentane	27 (M) nc	4.1 (M) nc	730 nc
91576	2-Methylnaphthalene	2.5 (M) nc	390 nc	10 nc
91203	Naphthalene	0.16 (M) ca	13 (M) ca	0.75 ca
109660	Pentane	39 (M) nc	4.9 (M) nc	1,000 nc
85018	Phenanthrene	7.7E-02 (M) nc	DATA	0.10 nc
1336363	Polychlorinated biphenyls (PCBs)	3.1E-02 (M) (J) ca	DATA	0.25 (J) ca
103651	n-Propylbenzene	43 (DD) dev	340 (DD) dev	1,000 (DD) dev
129000	Pyrene	140 (S) sol	1.3E+07 nc	100 nc
100425	Styrene	2.7 ca	24 (M) ca	45 ca
630206	1,1,1,2-Tetrachloroethane	0.22 (M) ca	0.81 (M) ca	3.4 ca
79345	1,1,2,2-Tetrachloroethane	9.2E-02 (M) ca	0.67 (M) ca	0.44 ca

Table 1. Residential Volatilization to Indoor Air Criteria (VIAC). The following are **restricted** site-specific criteria that apply to a residential house with a **crawlspace with a dirt floor**, the depth to groundwater submitted for this site (i.e. 3 ft), and USDA soil type of **sand**.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m ³)
127184	Tetrachloroethylene	1.5 (FF) st	1.5 (M) (EE) st	41 (EE) st
109999	Tetrahydrofuran	1,500 nc	1,500 nc	2,100 nc
108883	Toluene	300 (FF) st	540 nc	5,200 nc
87616	1,2,3-Trichlorobenzene	2.9 (M) nc	270 nc	28 nc
120821	1,2,4-Trichlorobenzene	0.20 (M) nc	17 (M) nc	2.1 nc
71556	1,1,1-Trichloroethane	180 (FF) st	79 (EE) st	5,000 (EE) st
79005	1,1,2-Trichloroethane	2.2E-02 (M) nc	6.4E-02 (M) nc	0.21 nc
79016	Trichloroethylene	7.3E-02 (M) (DD) dev	5.5E-02 (M) (DD) dev	2.0 (DD) dev
75694	Trichlorofluoromethane	16 nc	3.4 (M) nc	460 nc
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	750 nc	290 nc	20,000 nc
540841	2,2,4-Trimethyl pentane	160 nc	26 (M) nc	3,700 nc
526738	1,2,3-Trimethylbenzene	3.7 (M) (JT) nc	52 (M) (JT) nc	63 (JT) nc
95636	1,2,4-Trimethylbenzene	3.2 (JT) nc	28 (M) (JT) nc	63 (JT) nc
108678	1,3,5-Trimethylbenzene	3.0 (JT) nc	20 (M) (JT) nc	63 (JT) nc
75014	Vinyl chloride	5.1E-02 (MM) (M) mut	8.4E-03 (MM) (M) mut	1.6 (MM) mut
1330207	Xylenes	11 (J) nc	47 (M) (J) nc	230 (J) nc
76142	1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	NR	NR	NR
622968	4-Ethyltoluene	NR	NR	NR
115071	Propylene	NR	NR	NR

Table 2. Residential Volatilization to Indoor Air Criteria (VIAC). The following are unrestricted site-specific criteria that apply to a residential house with a slab-on-grade, the depth to groundwater submitted for this site (i.e. 3 ft), and USDA soil type of sand.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m ³)
83329	Acenaphthene	3,900 (S) sol	2.1E+05 nc	7,300 nc
208968	Acenaphthylene	65 nc	DATA	7,300 nc
994058	t-Amyl methyl ether (TAME)	3.9 (M) nc	DATA	2,200 nc
120127	Anthracene	43 (S) sol	1.3E+07 nc	35,000 nc
71432	Benzene	1.0 ca	1.7 (M) ca	110 ca
56553	Benzo(a)anthracene	9.4 (S) (MM) sol	1.6E+05 (MM) mut	5.8 (MM) mut
78933	2-Butanone (MEK)	2,600 (DD) dev	31,000 (DD) dev	1.7E+05 (DD) dev
75650	t-Butyl alcohol	230 nc	DATA	2,500 nc
104518	n-Butylbenzene	44 nc	560 nc	7,000 nc
135988	sec-Butylbenzene	270 nc	3,800 nc	14 nc
98066	t-Butylbenzene	7.7E-02 (M) nc	0.64 (M) nc	14 nc
110827	Cyclohexane	290 nc	320 (M) nc	2.1E+05 nc
124481	Dibromochloromethane	0.78 (MM) (M) mut	0.40 (MM) (M) mut	14 (MM) mut
95501	1,2-Dichlorobenzene	370 nc	1,500 nc	10,000 nc
541731	1,3-Dichlorobenzene	2.6 nc	10 (M) nc	100 nc
106467	1,4-Dichlorobenzene	5.9 ca	23 (M) ca	220 ca
75718	Dichlorodifluoromethane	13 nc	12 (M) nc	11,000 nc
75343	1,1-Dichloroethane	4.7 ca	2.6 (M) ca	530 ca
107062	1,2-Dichloroethane	1.4 ca	0.82 (M) ca	33 ca
75354	1,1-Dichloroethylene	18 nc	12 (M) nc	7,000 nc
156592	cis-1,2-Dichloroethylene	3.4 nc	2.1 (M) nc	280 nc
156605	trans-1,2-Dichloroethylene	16 nc	12 (M) nc	2,800 nc
78875	1,2-Dichloropropane	2.6 nc	2.1 (M) nc	140 nc
542756	1,3-Dichloropropene	3.3 (J) ca	3.1 (M) (J) ca	210 (J) ca
60297	Diethyl ether	1,200 nc	350 nc	35,000 nc
108203	Diisopropyl ether	36 (DD) dev	200 (M) (DD) dev	23,000 (DD) dev

Table 2. Residential Volatilization to Indoor Air Criteria (VIAC). The following are unrestricted site-specific criteria that apply to a residential house with a slab-on-grade, the depth to groundwater submitted for this site (i.e. 3 ft), and USDA soil type of sand.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m ³)
123911	1,4-Dioxane	1,900 ca	370 (M) ca	170 ca
64175	Ethanol	1.0E+05 (FF) st	1.3E+06 (EE) st	6.3E+05 (EE) st
141786	Ethyl acetate	910 nc	210 nc	2,400 nc
637923	Ethyl-tert-butyl ether (ETBE)	22 nc	DATA	13,000 nc
100414	Ethylbenzene	2.8 ca	12 (M) ca	340 ca
106934	Ethylene dibromide	0.13 ca	7.4E-02 (M) ca	1.4 ca
86737	Fluorene	1,700 (S) sol	4.7E+05 nc	4,900 nc
142825	n-Heptane	150 nc	130 nc	1.2E+05 nc
87683	Hexachlorobutadiene (C-46)	0.32 ca	2.5 (M) ca	39 ca
110543	n-Hexane	29 nc	25 nc	24,000 nc
591786	2-Hexanone	660 nc	220 (M) nc	1,000 nc
67630	Isopropyl alcohol	53,000 nc	9,900 nc	7,000 nc
98828	Isopropyl benzene	0.60 (M) ca	3.8 (M) ca	81 ca
108101	4-Methyl-2-pentanone (MIBK)	720 (DD) dev	12,000 (DD) dev	1.0E+05 (DD) dev
1634044	Methyl-tert-butyl ether (MTBE)	250 ca	74 (M) ca	3,300 ca
96377	Methylcyclopentane	30 (M) nc	29 (M) nc	24,000 nc
91576	2-Methylnaphthalene	66 nc	1,700 nc	350 nc
91203	Naphthalene	4.2 (M) ca	67 (M) ca	25 ca
109660	Pentane	40 (M) nc	36 (M) nc	35,000 nc
85018	Phenanthrene	7.7E-02 (M) nc	DATA	3.5 nc
1336363	Polychlorinated biphenyls (PCBs)	3.1E-02 (M) (J) ca	DATA	8.5 (J) ca
103651	n-Propylbenzene	43 (DD) dev	1,800 (DD) dev	33,000 (DD) dev
129000	Pyrene	140 (S) sol	2.5E+07 nc	3,500 nc
100425	Styrene	33 ca	150 ca	1,500 ca
630206	1,1,1,2-Tetrachloroethane	3.1 ca	3.2 (M) ca	110 ca
79345	1,1,2,2-Tetrachloroethane	2.4 ca	2.7 (M) ca	15 ca

Table 2. Residential Volatilization to Indoor Air Criteria (VIAC). The following are unrestricted site-specific criteria that apply to a residential house with a slab-on-grade, the depth to groundwater submitted for this site (i.e. 3 ft), and USDA soil type of sand.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m ³)
127184	Tetrachloroethylene	1.5 (FF) st	6.2 (M) (EE) st	1,400 (EE) st
109999	Tetrahydrofuran	45,000 nc	13,000 nc	70,000 nc
108883	Toluene	300 (FF) st	3,700 nc	1.7E+05 nc
87616	1,2,3-Trichlorobenzene	58 nc	840 nc	940 nc
120821	1,2,4-Trichlorobenzene	3.8 (M) nc	53 (M) nc	70 nc
71556	1,1,1-Trichloroethane	180 (FF) st	450 (EE) st	1.7E+05 (EE) st
79005	1,1,2-Trichloroethane	0.47 (M) nc	0.37 (M) nc	7.0 nc
79016	Trichloroethylene	7.3E-02 (M) (DD) dev	0.33 (M) (DD) dev	67 (DD) dev
75694	Trichlorofluoromethane	22 nc	19 (M) nc	15,000 nc
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	840 nc	860 nc	6.6E+05 nc
540841	2,2,4-Trimethyl pentane	160 nc	130 (M) nc	1.2E+05 nc
526738	1,2,3-Trimethylbenzene	43 (JT) nc	270 (JT) nc	2,100 (JT) nc
95636	1,2,4-Trimethylbenzene	25 (JT) nc	150 (JT) nc	2,100 (JT) nc
108678	1,3,5-Trimethylbenzene	18 (JT) nc	100 (JT) nc	2,100 (JT) nc
75014	Vinyl chloride	0.12 (MM) (M) mut	8.2E-02 (MM) (M) mut	54 (MM) mut
1330207	Xylenes	75 (J) nc	280 (J) nc	7,600 (J) nc
76142	1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	NR	NR	NR
622968	4-Ethyltoluene	NR	NR	NR
115071	Propylene	NR	NR	NR

Table 3. Residential Volatilization to Indoor Air Criteria (VIAC). The following are unrestricted site-specific criteria that apply to a residential house with a basement, the depth to groundwater submitted for this site (i.e. 3 ft), and USDA soil type of sand.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m ³)
83329	Acenaphthene	3,900 (S) sol	2.0E+05 nc	7,300 nc
208968	Acenaphthylene	65 nc	DATA	7,300 nc
994058	t-Amyl methyl ether (TAME)	3.9 (M) nc	DATA	2,200 nc
120127	Anthracene	43 (S) sol	1.3E+07 nc	35,000 nc
71432	Benzene	1.0 ca	1.7 (M) ca	110 ca
56553	Benzo(a)anthracene	9.4 (S) (MM) sol	1.6E+05 (MM) mut	5.8 (MM) mut
78933	2-Butanone (MEK)	2,600 (DD) dev	31,000 (DD) dev	1.7E+05 (DD) dev
75650	t-Butyl alcohol	230 nc	DATA	2,500 nc
104518	n-Butylbenzene	44 nc	550 nc	7,000 nc
135988	sec-Butylbenzene	270 nc	3,800 nc	14 nc
98066	t-Butylbenzene	7.7E-02 (M) nc	0.64 (M) nc	14 nc
110827	Cyclohexane	290 nc	320 (M) nc	2.1E+05 nc
124481	Dibromochloromethane	0.78 (MM) (M) mut	0.40 (MM) (M) mut	14 (MM) mut
95501	1,2-Dichlorobenzene	370 nc	1,500 nc	10,000 nc
541731	1,3-Dichlorobenzene	2.6 nc	10 (M) nc	100 nc
106467	1,4-Dichlorobenzene	5.9 ca	23 (M) ca	220 ca
75718	Dichlorodifluoromethane	13 nc	12 (M) nc	11,000 nc
75343	1,1-Dichloroethane	4.7 ca	2.6 (M) ca	530 ca
107062	1,2-Dichloroethane	1.4 ca	0.82 (M) ca	33 ca
75354	1,1-Dichloroethylene	18 nc	12 (M) nc	7,000 nc
156592	cis-1,2-Dichloroethylene	3.4 nc	2.1 (M) nc	280 nc
156605	trans-1,2-Dichloroethylene	16 nc	12 (M) nc	2,800 nc
78875	1,2-Dichloropropane	2.6 nc	2.1 (M) nc	140 nc
542756	1,3-Dichloropropene	3.3 (J) ca	3.1 (M) (J) ca	210 (J) ca
60297	Diethyl ether	1,200 nc	350 nc	35,000 nc
108203	Diisopropyl ether	36 (DD) dev	190 (M) (DD) dev	23,000 (DD) dev

Table 3. Residential Volatilization to Indoor Air Criteria (VIAC). The following are unrestricted site-specific criteria that apply to a residential house with a basement, the depth to groundwater submitted for this site (i.e. 3 ft), and USDA soil type of sand.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m ³)
123911	1,4-Dioxane	1,900 ca	360 (M) ca	170 ca
64175	Ethanol	1.0E+05 (FF) st	1.3E+06 (EE) st	6.3E+05 (EE) st
141786	Ethyl acetate	910 nc	210 nc	2,400 nc
637923	Ethyl-tert-butyl ether (ETBE)	22 nc	DATA	13,000 nc
100414	Ethylbenzene	2.8 ca	12 (M) ca	340 ca
106934	Ethylene dibromide	0.13 ca	7.4E-02 (M) ca	1.4 ca
86737	Fluorene	1,700 (S) sol	4.7E+05 nc	4,900 nc
142825	n-Heptane	150 nc	130 nc	1.2E+05 nc
87683	Hexachlorobutadiene (C-46)	0.32 ca	2.5 (M) ca	39 ca
110543	n-Hexane	29 nc	25 nc	24,000 nc
591786	2-Hexanone	660 nc	210 (M) nc	1,000 nc
67630	Isopropyl alcohol	53,000 nc	9,800 nc	7,000 nc
98828	Isopropyl benzene	0.60 (M) ca	3.8 (M) ca	81 ca
108101	4-Methyl-2-pentanone (MIBK)	720 (DD) dev	12,000 (DD) dev	1.0E+05 (DD) dev
1634044	Methyl-tert-butyl ether (MTBE)	250 ca	74 (M) ca	3,300 ca
96377	Methylcyclopentane	30 (M) nc	29 (M) nc	24,000 nc
91576	2-Methylnaphthalene	66 nc	1,700 nc	350 nc
91203	Naphthalene	4.2 (M) ca	67 (M) ca	25 ca
109660	Pentane	40 (M) nc	36 (M) nc	35,000 nc
85018	Phenanthrene	7.7E-02 (M) nc	DATA	3.5 nc
1336363	Polychlorinated biphenyls (PCBs)	3.1E-02 (M) (J) ca	DATA	8.5 (J) ca
103651	n-Propylbenzene	43 (DD) dev	1,800 (DD) dev	33,000 (DD) dev
129000	Pyrene	140 (S) sol	2.5E+07 nc	3,500 nc
100425	Styrene	33 ca	150 ca	1,500 ca
630206	1,1,1,2-Tetrachloroethane	3.1 ca	3.2 (M) ca	110 ca
79345	1,1,2,2-Tetrachloroethane	2.4 ca	2.7 (M) ca	15 ca

Table 3. Residential Volatilization to Indoor Air Criteria (VIAC). The following are unrestricted site-specific criteria that apply to a residential house with a basement, the depth to groundwater submitted for this site (i.e. 3 ft), and USDA soil type of sand.

CAS#	Hazardous Substance	Groundwater In Contact (GWIC) (µg/L)	Soil (µg/kg)	Soil Gas** (µg/m ³)
127184	Tetrachloroethylene	1.5 (FF) st	6.2 (M) (EE) st	1,400 (EE) st
109999	Tetrahydrofuran	45,000 nc	13,000 nc	70,000 nc
108883	Toluene	300 (FF) st	3,700 nc	1.7E+05 nc
87616	1,2,3-Trichlorobenzene	58 nc	830 nc	940 nc
120821	1,2,4-Trichlorobenzene	3.8 (M) nc	53 (M) nc	70 nc
71556	1,1,1-Trichloroethane	180 (FF) st	450 (EE) st	1.7E+05 (EE) st
79005	1,1,2-Trichloroethane	0.47 (M) nc	0.37 (M) nc	7.0 nc
79016	Trichloroethylene	7.3E-02 (M) (DD) dev	0.33 (M) (DD) dev	67 (DD) dev
75694	Trichlorofluoromethane	22 nc	19 (M) nc	15,000 nc
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	840 nc	860 nc	6.6E+05 nc
540841	2,2,4-Trimethyl pentane	160 nc	130 (M) nc	1.2E+05 nc
526738	1,2,3-Trimethylbenzene	43 (JT) nc	270 (JT) nc	2,100 (JT) nc
95636	1,2,4-Trimethylbenzene	25 (JT) nc	150 (JT) nc	2,100 (JT) nc
108678	1,3,5-Trimethylbenzene	18 (JT) nc	100 (JT) nc	2,100 (JT) nc
75014	Vinyl chloride	0.12 (MM) (M) mut	8.2E-02 (MM) (M) mut	54 (MM) mut
1330207	Xylenes	75 (J) nc	280 (J) nc	7,600 (J) nc
76142	1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	NR	NR	NR
622968	4-Ethyltoluene	NR	NR	NR
115071	Propylene	NR	NR	NR

FOOTNOTES

**Soil gas site-specific volatilization to indoor air (SSVIAC) are applicable for all depths.

- Acceptable Air Values (AAV) endpoint basis used for SSVIAC: (**ca**) = Carcinogenic; (**nc**) = Non-Carcinogenic; (**dev**) = Developmental; (**mut**) = Mutagenic cancer; (**st**) = Short-term (i.e., less than chronic exposure).
- Footnote **AA**: Health-based groundwater SSVIAC are not available due to insufficient toxicological data. Dissolved-phase methane in groundwater is not explosive; however, if liberated and allowed to accumulate in an enclosed structure the principle health and safety concerns are explosive, flammable, and asphyxiant properties of gas phase methane. The acceptable groundwater concentration is the flammability and explosivity screening level (**FESL**) is 10,000 µg/L.
- Footnote **C**: The health-based SSVIAC exceeds the chemical-specific soil saturation screening level (**Csat**). The person proposing or implementing response activity must document whether additional response activity is required to control non aqueous phase liquid (**NAPL**) to protect against risks associated with NAPL by using methods appropriate for the NAPL present.
- Footnote **CC**: Insufficient chemical-physical input parameters have been identified to allow the development of a health-based SSVIAC using standard equations. The health-based SSVIAC for groundwater is developed based solely on the approach that the department uses for shallow groundwater. If groundwater detections are present, soil vapor may be the most appropriate media to evaluate risk posed from the VIAP.
- Footnote **DATA**: Insufficient physical chemical parameters to calculate a health-based SSVIAC for specified media. If detections are present in specified media, health-based soil vapor SSVIAC should be used to evaluate risk.
- Footnote **DD**: Hazardous substance causes developmental effects. Residential SSVIAC are protective of both prenatal exposure using a pregnant female receptor and postnatal exposure using a child receptor. Nonresidential SSVIAC are protective of prenatal exposure using a pregnant female receptor. Prenatal developmental effects may occur after an acute (i.e. short-term) or full-term exposure.
- Footnote **EE**: The acceptable air concentration (**AAC**) for the volatile hazardous substances is not derived using standard equations. The hazardous substance may cause adverse human health effects for less than chronic exposures (i.e. short-term or acute). The AAC for these hazardous substances is the acute or intermediate minimum risk level (MRL) developed by the Agency for Toxic Substances and Disease Registry (ATSDR), a United States Environmental Protection Agency Integrated Risk Information System (IRIS) acute reference concentration, or an acute initial threshold screening level (ITSL) by the EGLE's Air Quality Division.
- Footnote **FF**: The AAC for the volatile hazardous substances are based on toxicity values that have been identified to have the potential to cause adverse human health effects for less than chronic exposures (i.e. short-term or acute). The short-term exposure for shallow groundwater health-based SSVIAC are based on modification of the standard equations by the department to develop applicable shallow groundwater values.
- Footnote **GG**: Health-based SSVIAC for soil vapor are not available due to insufficient toxicological data. The soil vapor value addresses the health and safety concerns of explosive, flammable, and asphyxiant properties of gas phase methane. The acceptable soil vapor concentration is derived based on 25% of the lower explosive level (**LEL**) for methane.
- Footnote **GW**: The calculated health-based SSVIAC for a hazardous substance based upon shallow groundwater is considered protective when it is greater than the calculated value for groundwater.
- Footnote **ID**: Requires further evaluation to determine the appropriate media to sample.
- Footnote **J**: Hazardous substance may be present in several isomer forms. Isomer-specific concentrations must be added together for comparison to criteria.
- Footnote **JT**: Hazardous substance may be present in several isomer forms. The health-based SSVIAC may be used for the individual isomer provided that it is the sole isomer detected; however, when multiple isomers are detected in a medium, the isomer-specific concentrations must be added together and compared to the most restrictive health-based SSVIAC of the detected isomers.
- Footnote **M**: The health-based SSVIAC may be below target detection limits (**TDL**). In accordance with Sec. 20120a(10) when the TDL for a hazardous substance is greater than the developed health-based SSVIAC, the TDL is used to evaluate the risk posed from the pathway.
- Footnote **MM**: Hazardous substance is a carcinogen with a mutagenic mode of action. The cancer potency values used in calculating health-based SSVIAC are modified using age-dependent adjustment factors for those carcinogenic chemicals identified as mutagenic.
- Footnote **NA**: The hazardous substance does not meet the department's definition of a volatile; therefore, no health-based SSVIAC were developed.
- Footnote **NR**: The hazardous substance has not been previously evaluated by the Remediation and Redevelopment Division Toxicology Unit. The identification, collection, and evaluation of toxicological literature and chemical-physical data cannot be completed within the timeframe requested.
- Footnote **S**: Calculated health-based SSVIAC exceeds the hazardous substance-specific water solubility limit; therefore, the water solubility limit is used to evaluate the risk posed from the pathway.
- Footnote **TX**: The Remediation and Redevelopment Division Toxicology Unit has not identified an inhalation toxicity value for the hazardous substance.