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January 30, 2018

Illinois Department of Transportation
Kirk H. Brown, PE
Project Support Engineer
Division of Highways/Region 5/District 8
1102 Eastport Plaza Drive
Collinsville, Illinois 62234-6198

Subject: **Analytical Data for Soil Vapor Sampling According to Illinois Department of Transportation (IDOT) Permits No. 8-28548 and No. 8-28875**

Dear Mr. Brown,

AECOM, on behalf of Shell Oil Products US (SOPUS), is submitting the attached analytical results for soil vapor samples collected from the following vapor monitoring points in accordance with IDOT Permits No. 8-28548 and No. 8-28875:

- VMP-15
- VMP-55

If you have any questions or require further information, please contact Robert Mooshegian at robert.mooshegian@aecom.com (314/743-4106) or Samuel Fisher at samuel.fisher@aecom.com (314/296-1969).

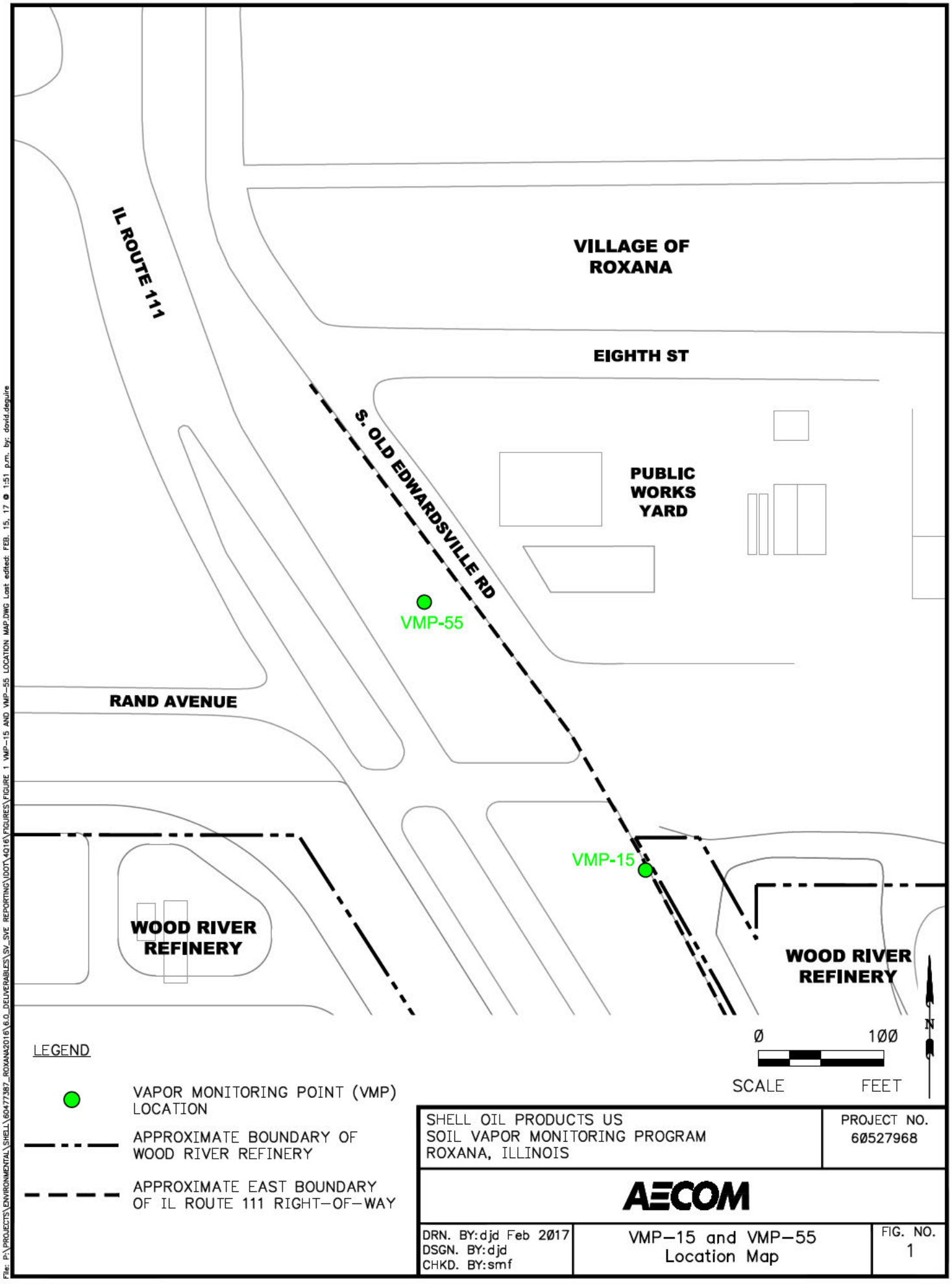
Sincerely,
AECOM, on behalf of Shell Oil Products US

Samuel Fisher
Environmental Scientist

Robert E. Mooshegian, STS
Senior Program Manager

Attachments

cc: Kevin Dyer, SOPUS
Repositories – Roxana Public Library, Website
Project File



SHELL OIL PRODUCTS US
SOIL VAPOR MONITORING PROGRAM
ROXANA, ILLINOIS

PROJECT NO.
60527968

AECOM

DRN. BY: djd Feb 2017
DSGN. BY: djd
CHKD. BY: smf

VMP-15 and VMP-55
Location Map

FIG. NO.
1

File: P:\PROJECTS\ENVIRONMENTAL\SHELL\60477387_ROXANA2016\6.0_DELIVERABLES\SV_SVE REPORTING\IDOT\4Q16\FIGURES\FIGURE 1 VMP-15 AND VMP-55 LOCATION MAP.DWG Last edited: FEB. 15, 17 @ 1:51 p.m. by: dovid.depuire

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11/16/2017
Ms. Elizabeth Kunkel
AECOM
1001 Highlands Plaza Dr. West
Suite 300
St. Louis MO 63110

Project Name: Roxana Quarterly Soil Vapor
Project #: 60527968-1.04.004
Workorder #: 1711070A

Dear Ms. Elizabeth Kunkel

The following report includes the data for the above referenced project for sample(s) received on 11/3/2017 at Air Toxics Ltd.

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

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

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1711070A

Work Order Summary

CLIENT:	Ms. Elizabeth Kunkel AECOM 1001 Highlands Plaza Dr. West Suite 300 St. Louis, MO 63110	**BILL TO:**	Accounts Payable Austin AECOM PO Box 203970 Austin, TX 78720
PHONE:	314-743-4179	**P.O. #**	60527968-104004
FAX:		**PROJECT #**	60527968-1.04.004 Roxana Quarterly Soil Vapor
DATE RECEIVED:	11/03/2017	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	11/16/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VMP-15-5-110217	TO-15	4.9 "Hg	15.1 psi
02A	VMP-15-21.5-110217	TO-15	5.1 "Hg	14.8 psi
03A	VMP-15-25.5-110217	TO-15	4.7 "Hg	15 psi
04A	Lab Blank	TO-15	NA	NA
05A	CCV	TO-15	NA	NA
06A	LCS	TO-15	NA	NA
06AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 11/16/17

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
EPA Method TO-15
AECOM
Workorder# 1711070A

Three 1 Liter Summa Canister samples were received on November 03, 2017. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

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

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

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

Definition of Data Qualifying Flags

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

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

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

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

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

N - The identification is based on presumptive evidence.

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

CN - See Case Narrative.

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

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VMP-15-5-110217

Lab ID#: 1711070A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.50 J	6.0	2.5 J
Freon 11	1.2	0.20 J	6.8	1.1 J
Acetone	12	6.8 J	29	16 J
Benzene	1.2	0.20 J	3.9	0.65 J

Client Sample ID: VMP-15-21.5-110217

Lab ID#: 1711070A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.45 J	6.0	2.2 J
Freon 11	1.2	0.21 J	6.8	1.2 J
Acetone	12	4.3 J	29	10 J
Carbon Disulfide	4.8	0.90 J	15	2.8 J
Chloroform	1.2	0.65 J	5.9	3.2 J
2,2,4-Trimethylpentane	1.2	0.17 J	5.6	0.80 J
Benzene	1.2	0.24 J	3.9	0.75 J
Toluene	1.2	0.32 J	4.6	1.2 J

Client Sample ID: VMP-15-25.5-110217

Lab ID#: 1711070A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.46 J	5.9	2.3 J
Acetone	12	6.0 J	28	14 J
2,2,4-Trimethylpentane	1.2	0.27 J	5.6	1.2 J
Benzene	1.2	0.26 J	3.8	0.84 J

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Client Sample ID: VMP-15-5-110217

Lab ID#: 1711070A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111509**	**Date of Collection:**	**11/2/17 12:38:00 PM**
Dil. Factor:	**2.42**	**Date of Analysis:**	**11/15/17 05:15 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.50 J	6.0	2.5 J
Freon 114	1.2	Not Detected	8.4	Not Detected
Chloromethane	12	Not Detected	25	Not Detected
Vinyl Chloride	1.2	Not Detected	3.1	Not Detected
1,3-Butadiene	1.2	Not Detected	2.7	Not Detected
Bromomethane	12	Not Detected	47	Not Detected
Chloroethane	4.8	Not Detected	13	Not Detected
Freon 11	1.2	0.20 J	6.8	1.1 J
Ethanol	4.8	Not Detected	9.1	Not Detected
Freon 113	1.2	Not Detected	9.3	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Acetone	12	6.8 J	29	16 J
2-Propanol	4.8	Not Detected	12	Not Detected
Carbon Disulfide	4.8	Not Detected	15	Not Detected
3-Chloropropene	4.8	Not Detected	15	Not Detected
Methylene Chloride	12	Not Detected	42	Not Detected
Methyl tert-butyl ether	4.8	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Hexane	1.2	Not Detected	4.3	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.8	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.6	Not Detected
Chloroform	1.2	Not Detected	5.9	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.6	Not Detected
Cyclohexane	1.2	Not Detected	4.2	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.6	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.6	Not Detected
Benzene	1.2	0.20 J	3.9	0.65 J
1,2-Dichloroethane	1.2	Not Detected	4.9	Not Detected
Heptane	1.2	Not Detected	5.0	Not Detected
Trichloroethene	1.2	Not Detected	6.5	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.6	Not Detected
1,4-Dioxane	4.8	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	8.1	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.5	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	5.0	Not Detected
Toluene	1.2	Not Detected	4.6	Not Detected
trans-1,3-Dichloropropene	1.2	Not Detected	5.5	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.6	Not Detected
Tetrachloroethene	1.2	Not Detected	8.2	Not Detected
2-Hexanone	4.8	Not Detected	20	Not Detected

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Client Sample ID: VMP-15-5-110217

Lab ID#: 1711070A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111509**	**Date of Collection:**	**11/2/17 12:38:00 PM**
Dil. Factor:	**2.42**	**Date of Analysis:**	**11/15/17 05:15 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.3	Not Detected
Chlorobenzene	1.2	Not Detected	5.6	Not Detected
Ethyl Benzene	1.2	Not Detected	5.2	Not Detected
m,p-Xylene	1.2	Not Detected	5.2	Not Detected
o-Xylene	1.2	Not Detected	5.2	Not Detected
Styrene	1.2	Not Detected	5.2	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.9	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.3	Not Detected
Propylbenzene	1.2	Not Detected	5.9	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.9	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.3	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.3	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.3	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.3	Not Detected
1,2,4-Trichlorobenzene	4.8	Not Detected	36	Not Detected
Hexachlorobutadiene	4.8	Not Detected	52	Not Detected
Butane	4.8	Not Detected	12	Not Detected
Isopentane	4.8	Not Detected	14	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: VMP-15-21.5-110217

Lab ID#: 1711070A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111510**	**Date of Collection:**	**11/2/17 12:59:00 PM**
Dil. Factor:	**2.42**	**Date of Analysis:**	**11/15/17 05:43 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.45 J	6.0	2.2 J
Freon 114	1.2	Not Detected	8.4	Not Detected
Chloromethane	12	Not Detected	25	Not Detected
Vinyl Chloride	1.2	Not Detected	3.1	Not Detected
1,3-Butadiene	1.2	Not Detected	2.7	Not Detected
Bromomethane	12	Not Detected	47	Not Detected
Chloroethane	4.8	Not Detected	13	Not Detected
Freon 11	1.2	0.21 J	6.8	1.2 J
Ethanol	4.8	Not Detected	9.1	Not Detected
Freon 113	1.2	Not Detected	9.3	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Acetone	12	4.3 J	29	10 J
2-Propanol	4.8	Not Detected	12	Not Detected
Carbon Disulfide	4.8	0.90 J	15	2.8 J
3-Chloropropene	4.8	Not Detected	15	Not Detected
Methylene Chloride	12	Not Detected	42	Not Detected
Methyl tert-butyl ether	4.8	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Hexane	1.2	Not Detected	4.3	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.8	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.6	Not Detected
Chloroform	1.2	0.65 J	5.9	3.2 J
1,1,1-Trichloroethane	1.2	Not Detected	6.6	Not Detected
Cyclohexane	1.2	Not Detected	4.2	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.6	Not Detected
2,2,4-Trimethylpentane	1.2	0.17 J	5.6	0.80 J
Benzene	1.2	0.24 J	3.9	0.75 J
1,2-Dichloroethane	1.2	Not Detected	4.9	Not Detected
Heptane	1.2	Not Detected	5.0	Not Detected
Trichloroethene	1.2	Not Detected	6.5	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.6	Not Detected
1,4-Dioxane	4.8	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	8.1	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.5	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	5.0	Not Detected
Toluene	1.2	0.32 J	4.6	1.2 J
trans-1,3-Dichloropropene	1.2	Not Detected	5.5	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.6	Not Detected
Tetrachloroethene	1.2	Not Detected	8.2	Not Detected
2-Hexanone	4.8	Not Detected	20	Not Detected

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Client Sample ID: VMP-15-21.5-110217

Lab ID#: 1711070A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111510**	**Date of Collection: 11/2/17 12:59:00 PM**	
Dil. Factor:	**2.42**	**Date of Analysis: 11/15/17 05:43 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.3	Not Detected
Chlorobenzene	1.2	Not Detected	5.6	Not Detected
Ethyl Benzene	1.2	Not Detected	5.2	Not Detected
m,p-Xylene	1.2	Not Detected	5.2	Not Detected
o-Xylene	1.2	Not Detected	5.2	Not Detected
Styrene	1.2	Not Detected	5.2	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.9	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.3	Not Detected
Propylbenzene	1.2	Not Detected	5.9	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.9	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.3	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.3	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.3	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.3	Not Detected
1,2,4-Trichlorobenzene	4.8	Not Detected	36	Not Detected
Hexachlorobutadiene	4.8	Not Detected	52	Not Detected
Butane	4.8	Not Detected	12	Not Detected
Isopentane	4.8	Not Detected	14	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: VMP-15-25.5-110217

Lab ID#: 1711070A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111511**	**Date of Collection:**	**11/2/17 1:17:00 PM**
Dil. Factor:	**2.40**	**Date of Analysis:**	**11/15/17 06:12 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.46 J	5.9	2.3 J
Freon 114	1.2	Not Detected	8.4	Not Detected
Chloromethane	12	Not Detected	25	Not Detected
Vinyl Chloride	1.2	Not Detected	3.1	Not Detected
1,3-Butadiene	1.2	Not Detected	2.6	Not Detected
Bromomethane	12	Not Detected	47	Not Detected
Chloroethane	4.8	Not Detected	13	Not Detected
Freon 11	1.2	Not Detected	6.7	Not Detected
Ethanol	4.8	Not Detected	9.0	Not Detected
Freon 113	1.2	Not Detected	9.2	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Acetone	12	6.0 J	28	14 J
2-Propanol	4.8	Not Detected	12	Not Detected
Carbon Disulfide	4.8	Not Detected	15	Not Detected
3-Chloropropene	4.8	Not Detected	15	Not Detected
Methylene Chloride	12	Not Detected	42	Not Detected
Methyl tert-butyl ether	4.8	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Hexane	1.2	Not Detected	4.2	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.8	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.5	Not Detected
Chloroform	1.2	Not Detected	5.8	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.5	Not Detected
Cyclohexane	1.2	Not Detected	4.1	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.6	Not Detected
2,2,4-Trimethylpentane	1.2	0.27 J	5.6	1.2 J
Benzene	1.2	0.26 J	3.8	0.84 J
1,2-Dichloroethane	1.2	Not Detected	4.8	Not Detected
Heptane	1.2	Not Detected	4.9	Not Detected
Trichloroethene	1.2	Not Detected	6.4	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.5	Not Detected
1,4-Dioxane	4.8	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	8.0	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.4	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	4.9	Not Detected
Toluene	1.2	Not Detected	4.5	Not Detected
trans-1,3-Dichloropropene	1.2	Not Detected	5.4	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.5	Not Detected
Tetrachloroethene	1.2	Not Detected	8.1	Not Detected
2-Hexanone	4.8	Not Detected	20	Not Detected

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Client Sample ID: VMP-15-25.5-110217

Lab ID#: 1711070A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111511**	**Date of Collection:**	**11/2/17 1:17:00 PM**
Dil. Factor:	**2.40**	**Date of Analysis:**	**11/15/17 06:12 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.2	Not Detected
Chlorobenzene	1.2	Not Detected	5.5	Not Detected
Ethyl Benzene	1.2	Not Detected	5.2	Not Detected
m,p-Xylene	1.2	Not Detected	5.2	Not Detected
o-Xylene	1.2	Not Detected	5.2	Not Detected
Styrene	1.2	Not Detected	5.1	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.9	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.2	Not Detected
Propylbenzene	1.2	Not Detected	5.9	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.9	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.2	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.2	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.2	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.2	Not Detected
1,2,4-Trichlorobenzene	4.8	Not Detected	36	Not Detected
Hexachlorobutadiene	4.8	Not Detected	51	Not Detected
Butane	4.8	Not Detected	11	Not Detected
Isopentane	4.8	Not Detected	14	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1711070A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111508a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/15/17 03:49 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	0.93 J	12	2.2 J
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	2.0	Not Detected	7.2	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	0.083 J	1.6	0.26 J
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1711070A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111508a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/15/17 03:49 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected
Butane	2.0	Not Detected	4.8	Not Detected
Isopentane	2.0	Not Detected	5.9	Not Detected

J = Estimated value.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: CCV

Lab ID#: 1711070A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111502**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/15/17 10:42 AM**	

Compound	%Recovery
Freon 12	101
Freon 114	99
Chloromethane	93
Vinyl Chloride	99
1,3-Butadiene	98
Bromomethane	98
Chloroethane	95
Freon 11	99
Ethanol	89
Freon 113	98
1,1-Dichloroethene	101
Acetone	95
2-Propanol	96
Carbon Disulfide	96
3-Chloropropene	95
Methylene Chloride	97
Methyl tert-butyl ether	100
trans-1,2-Dichloroethene	103
Hexane	102
1,1-Dichloroethane	100
2-Butanone (Methyl Ethyl Ketone)	100
cis-1,2-Dichloroethene	102
Tetrahydrofuran	101
Chloroform	99
1,1,1-Trichloroethane	97
Cyclohexane	103
Carbon Tetrachloride	99
2,2,4-Trimethylpentane	110
Benzene	95
1,2-Dichloroethane	96
Heptane	107
Trichloroethene	94
1,2-Dichloropropane	91
1,4-Dioxane	99
Bromodichloromethane	95
cis-1,3-Dichloropropene	99
4-Methyl-2-pentanone	99
Toluene	95
trans-1,3-Dichloropropene	102
1,1,2-Trichloroethane	94
Tetrachloroethene	98
2-Hexanone	103

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Client Sample ID: CCV

Lab ID#: 1711070A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111502**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/15/17 10:42 AM**	

Compound	%Recovery
Dibromochloromethane	97
1,2-Dibromoethane (EDB)	99
Chlorobenzene	99
Ethyl Benzene	101
m,p-Xylene	106
o-Xylene	106
Styrene	108
Bromoform	99
Cumene	107
1,1,2,2-Tetrachloroethane	95
Propylbenzene	102
4-Ethyltoluene	106
1,3,5-Trimethylbenzene	107
1,2,4-Trimethylbenzene	108
1,3-Dichlorobenzene	98
1,4-Dichlorobenzene	101
alpha-Chlorotoluene	100
1,2-Dichlorobenzene	98
1,2,4-Trichlorobenzene	100
Hexachlorobutadiene	95
Butane	95
Isopentane	94

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCS

Lab ID#: 1711070A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111503**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/15/17 11:09 AM**	

Compound	%Recovery	Method Limits
Freon 12	103	70-130
Freon 114	104	70-130
Chloromethane	90	70-130
Vinyl Chloride	100	70-130
1,3-Butadiene	96	70-130
Bromomethane	100	70-130
Chloroethane	99	70-130
Freon 11	101	70-130
Ethanol	99	70-130
Freon 113	96	70-130
1,1-Dichloroethene	100	70-130
Acetone	93	70-130
2-Propanol	102	70-130
Carbon Disulfide	84	70-130
3-Chloropropene	89	70-130
Methylene Chloride	93	70-130
Methyl tert-butyl ether	96	70-130
trans-1,2-Dichloroethene	89	70-130
Hexane	102	70-130
1,1-Dichloroethane	99	70-130
2-Butanone (Methyl Ethyl Ketone)	97	70-130
cis-1,2-Dichloroethene	112	70-130
Tetrahydrofuran	99	70-130
Chloroform	99	70-130
1,1,1-Trichloroethane	95	70-130
Cyclohexane	102	70-130
Carbon Tetrachloride	96	70-130
2,2,4-Trimethylpentane	109	70-130
Benzene	96	70-130
1,2-Dichloroethane	97	70-130
Heptane	106	70-130
Trichloroethene	96	70-130
1,2-Dichloropropane	93	70-130
1,4-Dioxane	96	70-130
Bromodichloromethane	98	70-130
cis-1,3-Dichloropropene	94	70-130
4-Methyl-2-pentanone	100	70-130
Toluene	97	70-130
trans-1,3-Dichloropropene	104	70-130
1,1,2-Trichloroethane	96	70-130
Tetrachloroethene	99	70-130
2-Hexanone	105	70-130

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Client Sample ID: LCS

Lab ID#: 1711070A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111503**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/15/17 11:09 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	98	70-130
1,2-Dibromoethane (EDB)	101	70-130
Chlorobenzene	98	70-130
Ethyl Benzene	102	70-130
m,p-Xylene	107	70-130
o-Xylene	108	70-130
Styrene	109	70-130
Bromoform	101	70-130
Cumene	107	70-130
1,1,2,2-Tetrachloroethane	96	70-130
Propylbenzene	105	70-130
4-Ethyltoluene	107	70-130
1,3,5-Trimethylbenzene	108	70-130
1,2,4-Trimethylbenzene	110	70-130
1,3-Dichlorobenzene	100	70-130
1,4-Dichlorobenzene	102	70-130
alpha-Chlorotoluene	104	70-130
1,2-Dichlorobenzene	100	70-130
1,2,4-Trichlorobenzene	109	70-130
Hexachlorobutadiene	101	70-130
Butane	98	60-140
Isopentane	94	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCSD

Lab ID#: 1711070A-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111504**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/15/17 11:36 AM**	

Compound	%Recovery	Method Limits
Freon 12	104	70-130
Freon 114	104	70-130
Chloromethane	88	70-130
Vinyl Chloride	101	70-130
1,3-Butadiene	96	70-130
Bromomethane	99	70-130
Chloroethane	99	70-130
Freon 11	101	70-130
Ethanol	100	70-130
Freon 113	96	70-130
1,1-Dichloroethene	104	70-130
Acetone	96	70-130
2-Propanol	103	70-130
Carbon Disulfide	85	70-130
3-Chloropropene	94	70-130
Methylene Chloride	96	70-130
Methyl tert-butyl ether	97	70-130
trans-1,2-Dichloroethene	90	70-130
Hexane	105	70-130
1,1-Dichloroethane	101	70-130
2-Butanone (Methyl Ethyl Ketone)	101	70-130
cis-1,2-Dichloroethene	113	70-130
Tetrahydrofuran	102	70-130
Chloroform	100	70-130
1,1,1-Trichloroethane	97	70-130
Cyclohexane	103	70-130
Carbon Tetrachloride	98	70-130
2,2,4-Trimethylpentane	111	70-130
Benzene	100	70-130
1,2-Dichloroethane	100	70-130
Heptane	105	70-130
Trichloroethene	100	70-130
1,2-Dichloropropane	95	70-130
1,4-Dioxane	100	70-130
Bromodichloromethane	102	70-130
cis-1,3-Dichloropropene	97	70-130
4-Methyl-2-pentanone	103	70-130
Toluene	98	70-130
trans-1,3-Dichloropropene	103	70-130
1,1,2-Trichloroethane	94	70-130
Tetrachloroethene	99	70-130
2-Hexanone	104	70-130

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Client Sample ID: LCSD

Lab ID#: 1711070A-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111504**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/15/17 11:36 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	98	70-130
1,2-Dibromoethane (EDB)	99	70-130
Chlorobenzene	97	70-130
Ethyl Benzene	101	70-130
m,p-Xylene	106	70-130
o-Xylene	107	70-130
Styrene	109	70-130
Bromoform	99	70-130
Cumene	107	70-130
1,1,2,2-Tetrachloroethane	95	70-130
Propylbenzene	104	70-130
4-Ethyltoluene	107	70-130
1,3,5-Trimethylbenzene	107	70-130
1,2,4-Trimethylbenzene	110	70-130
1,3-Dichlorobenzene	99	70-130
1,4-Dichlorobenzene	101	70-130
alpha-Chlorotoluene	103	70-130
1,2-Dichlorobenzene	99	70-130
1,2,4-Trichlorobenzene	110	70-130
Hexachlorobutadiene	103	70-130
Butane	97	60-140
Isopentane	95	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	103	70-130

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11/16/2017
Ms. Elizabeth Kunkel
AECOM
1001 Highlands Plaza Dr. West
Suite 300
St. Louis MO 63110

Project Name: Roxana Quarterly Soil Vapor
Project #: 60527968-1.04.004
Workorder #: 1711070B

Dear Ms. Elizabeth Kunkel

The following report includes the data for the above referenced project for sample(s) received on 11/3/2017 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

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

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1711070B

Work Order Summary

CLIENT:	Ms. Elizabeth Kunkel AECOM 1001 Highlands Plaza Dr. West Suite 300 St. Louis, MO 63110	**BILL TO:**	Accounts Payable Austin AECOM PO Box 203970 Austin, TX 78720
PHONE:	314-743-4179	**P.O. #**	60527968-104004
FAX:		**PROJECT #**	60527968-1.04.004 Roxana Quarterly Soil Vapor
DATE RECEIVED:	11/03/2017	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	11/16/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VMP-15-5-110217	Modified ASTM D-1946	4.9 "Hg	15.1 psi
02A	VMP-15-21.5-110217	Modified ASTM D-1946	5.1 "Hg	14.8 psi
03A	VMP-15-25.5-110217	Modified ASTM D-1946	4.7 "Hg	15 psi
04A	Lab Blank	Modified ASTM D-1946	NA	NA
04B	Lab Blank	Modified ASTM D-1946	NA	NA
05A	LCS	Modified ASTM D-1946	NA	NA
05AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 11/16/17

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
Modified ASTM D-1946
AECOM
Workorder# 1711070B

Three 1 Liter Summa Canister samples were received on November 03, 2017. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and fixed gases in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

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

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VMP-15-5-110217

Lab ID#: 1711070B-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	16
Nitrogen	0.24	80
Carbon Dioxide	0.024	3.5

Client Sample ID: VMP-15-21.5-110217

Lab ID#: 1711070B-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	13
Nitrogen	0.24	83
Carbon Dioxide	0.024	4.0

Client Sample ID: VMP-15-25.5-110217

Lab ID#: 1711070B-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	2.8
Nitrogen	0.24	82
Carbon Dioxide	0.024	15

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Client Sample ID: VMP-15-5-110217

Lab ID#: 1711070B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10111135**	**Date of Collection: 11/2/17 12:38:00 PM**	
Dil. Factor:	**2.42**	**Date of Analysis: 11/11/17 01:45 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	16
Nitrogen	0.24	80
Carbon Monoxide	0.024	Not Detected
Methane	0.00024	Not Detected
Carbon Dioxide	0.024	3.5
Ethane	0.0024	Not Detected
Ethene	0.0024	Not Detected
Helium	0.12	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VMP-15-21.5-110217

Lab ID#: 1711070B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10111136**	**Date of Collection: 11/2/17 12:59:00 PM**	
Dil. Factor:	**2.42**	**Date of Analysis: 11/11/17 02:09 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	13
Nitrogen	0.24	83
Carbon Monoxide	0.024	Not Detected
Methane	0.00024	Not Detected
Carbon Dioxide	0.024	4.0
Ethane	0.0024	Not Detected
Ethene	0.0024	Not Detected
Helium	0.12	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VMP-15-25.5-110217

Lab ID#: 1711070B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10111137**	**Date of Collection: 11/2/17 1:17:00 PM**	
Dil. Factor:	**2.40**	**Date of Analysis: 11/11/17 02:33 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	2.8
Nitrogen	0.24	82
Carbon Monoxide	0.024	Not Detected
Methane	0.00024	Not Detected
Carbon Dioxide	0.024	15
Ethane	0.0024	Not Detected
Ethene	0.0024	Not Detected
Helium	0.12	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1711070B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10111127a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/11/17 10:36 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.10	0.0032 J
Nitrogen	0.10	0.024 J
Carbon Monoxide	0.010	Not Detected
Methane	0.00010	Not Detected
Carbon Dioxide	0.010	Not Detected
Ethane	0.0010	Not Detected
Ethene	0.0010	Not Detected

J = Estimated value.

Container Type: NA - Not Applicable

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Client Sample ID: Lab Blank

Lab ID#: 1711070B-04B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10111126c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/11/17 10:13 AM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.050	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1711070B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10111125**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/11/17 09:47 AM**	

Compound	%Recovery	Method Limits
Oxygen	103	85-115
Nitrogen	89	85-115
Carbon Monoxide	93	85-115
Methane	105	85-115
Carbon Dioxide	101	85-115
Ethane	104	85-115
Ethene	104	85-115
Helium	97	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1711070B-05AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10111138**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/11/17 02:55 PM**	

Compound	%Recovery	Method Limits
Oxygen	101	85-115
Nitrogen	89	85-115
Carbon Monoxide	92	85-115
Methane	106	85-115
Carbon Dioxide	100	85-115
Ethane	105	85-115
Ethene	106	85-115
Helium	99	85-115

Container Type: NA - Not Applicable

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11/16/2017
Ms. Elizabeth Kunkel
AECOM
1001 Highlands Plaza Dr. West
Suite 300
St. Louis MO 63110

Project Name: Roxana Quarterly Soil Vapor
Project #: 60527968-1.04.004
Workorder #: 1711065A

Dear Ms. Elizabeth Kunkel

The following report includes the data for the above referenced project for sample(s) received on 11/3/2017 at Air Toxics Ltd.

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

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

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1711065A

Work Order Summary

CLIENT:	Ms. Elizabeth Kunkel AECOM 1001 Highlands Plaza Dr. West Suite 300 St. Louis, MO 63110	**BILL TO:**	Accounts Payable Austin AECOM PO Box 203970 Austin, TX 78720
PHONE:	314-743-4179	**P.O. #**	60527968-104004
FAX:		**PROJECT #**	60527968-1.04.004 Roxana Quarterly Soil Vapor
DATE RECEIVED:	11/03/2017	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	11/16/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VMP-55-5-110217	TO-15	3.5 "Hg	15.2 psi
02A	VMP-55-20-110217	TO-15	4.5 "Hg	15.1 psi
03A	Lab Blank	TO-15	NA	NA
03B	Lab Blank	TO-15	NA	NA
04A	CCV	TO-15	NA	NA
04B	CCV	TO-15	NA	NA
05A	LCS	TO-15	NA	NA
05AA	LCSD	TO-15	NA	NA
05B	LCS	TO-15	NA	NA
05BB	LCSD	TO-15	NA	NA

CERTIFIED BY:  DATE: 11/16/17

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
EPA Method TO-15
AECOM
Workorder# 1711065A

Two 1 Liter Summa Canister samples were received on November 03, 2017. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

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

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

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

Dilution was performed on sample VMP-55-20-110217 due to matrix interference.

Definition of Data Qualifying Flags

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

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

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

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VMP-55-5-110217

Lab ID#: 1711065A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.40 J	5.7	2.0 J
Ethanol	4.6	6.0	8.7	11
Acetone	12	6.0 J	27	14 J
Chloroform	1.2	0.30 J	5.6	1.4 J
Cyclohexane	1.2	0.22 J	4.0	0.76 J
2,2,4-Trimethylpentane	1.2	5.5	5.4	26
Benzene	1.2	0.30 J	3.7	0.95 J
Heptane	1.2	0.30 J	4.7	1.2 J
Toluene	1.2	0.22 J	4.3	0.82 J
m,p-Xylene	1.2	0.26 J	5.0	1.1 J
Cumene	1.2	0.26 J	5.6	1.3 J
Propylbenzene	1.2	0.40 J	5.6	1.9 J

Client Sample ID: VMP-55-20-110217

Lab ID#: 1711065A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	300	38000	1000	140000
Cyclohexane	300	57000	1000	200000
2,2,4-Trimethylpentane	300	59000	1400	270000
Heptane	300	20000	1200	82000
1,2-Dichloropropane	300	250 J	1400	1200 J
Butane	1200	58000	2800	140000
Isopentane	1200	230000	3500	690000

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Client Sample ID: VMP-55-5-110217

Lab ID#: 1711065A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111418**	**Date of Collection:**	**11/2/17 11:16:00 AM**
Dil. Factor:	**2.30**	**Date of Analysis:**	**11/14/17 10:47 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.40 J	5.7	2.0 J
Freon 114	1.2	Not Detected	8.0	Not Detected
Chloromethane	12	Not Detected	24	Not Detected
Vinyl Chloride	1.2	Not Detected	2.9	Not Detected
1,3-Butadiene	1.2	Not Detected	2.5	Not Detected
Bromomethane	12	Not Detected	45	Not Detected
Chloroethane	4.6	Not Detected	12	Not Detected
Freon 11	1.2	Not Detected	6.5	Not Detected
Ethanol	4.6	6.0	8.7	11
Freon 113	1.2	Not Detected	8.8	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Acetone	12	6.0 J	27	14 J
2-Propanol	4.6	Not Detected	11	Not Detected
Carbon Disulfide	4.6	Not Detected	14	Not Detected
3-Chloropropene	4.6	Not Detected	14	Not Detected
Methylene Chloride	12	Not Detected	40	Not Detected
Methyl tert-butyl ether	4.6	Not Detected	16	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Hexane	1.2	Not Detected	4.0	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.6	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.4	Not Detected
Chloroform	1.2	0.30 J	5.6	1.4 J
1,1,1-Trichloroethane	1.2	Not Detected	6.3	Not Detected
Cyclohexane	1.2	0.22 J	4.0	0.76 J
Carbon Tetrachloride	1.2	Not Detected	7.2	Not Detected
2,2,4-Trimethylpentane	1.2	5.5	5.4	26
Benzene	1.2	0.30 J	3.7	0.95 J
1,2-Dichloroethane	1.2	Not Detected	4.6	Not Detected
Heptane	1.2	0.30 J	4.7	1.2 J
Trichloroethene	1.2	Not Detected	6.2	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.3	Not Detected
1,4-Dioxane	4.6	Not Detected	16	Not Detected
Bromodichloromethane	1.2	Not Detected	7.7	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.2	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	4.7	Not Detected
Toluene	1.2	0.22 J	4.3	0.82 J
trans-1,3-Dichloropropene	1.2	Not Detected	5.2	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.3	Not Detected
Tetrachloroethene	1.2	Not Detected	7.8	Not Detected
2-Hexanone	4.6	Not Detected	19	Not Detected

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Client Sample ID: VMP-55-5-110217

Lab ID#: 1711065A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111418**	**Date of Collection:**	**11/2/17 11:16:00 AM**
Dil. Factor:	**2.30**	**Date of Analysis:**	**11/14/17 10:47 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	9.8	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	8.8	Not Detected
Chlorobenzene	1.2	Not Detected	5.3	Not Detected
Ethyl Benzene	1.2	Not Detected	5.0	Not Detected
m,p-Xylene	1.2	0.26 J	5.0	1.1 J
o-Xylene	1.2	Not Detected	5.0	Not Detected
Styrene	1.2	Not Detected	4.9	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	0.26 J	5.6	1.3 J
1,1,2,2-Tetrachloroethane	1.2	Not Detected	7.9	Not Detected
Propylbenzene	1.2	0.40 J	5.6	1.9 J
4-Ethyltoluene	1.2	Not Detected	5.6	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.6	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.6	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	6.9	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	6.9	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.0	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	6.9	Not Detected
1,2,4-Trichlorobenzene	4.6	Not Detected	34	Not Detected
Hexachlorobutadiene	4.6	Not Detected	49	Not Detected
Butane	4.6	Not Detected	11	Not Detected
Isopentane	4.6	Not Detected	14	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: VMP-55-20-110217

Lab ID#: 1711065A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14111422**	**Date of Collection:**	**11/2/17 11:44:00 AM**
Dil. Factor:	**59.5**	**Date of Analysis:**	**11/14/17 09:29 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	300	Not Detected	1500	Not Detected
Freon 114	300	Not Detected	2100	Not Detected
Chloromethane	1200	Not Detected	2400	Not Detected
Vinyl Chloride	300	Not Detected	760	Not Detected
1,3-Butadiene	300	Not Detected	660	Not Detected
Bromomethane	1200	Not Detected	4600	Not Detected
Chloroethane	1200	Not Detected	3100	Not Detected
Freon 11	300	Not Detected	1700	Not Detected
Ethanol	1200	Not Detected	2200	Not Detected
Freon 113	300	Not Detected	2300	Not Detected
1,1-Dichloroethene	300	Not Detected	1200	Not Detected
Acetone	1200	Not Detected	2800	Not Detected
2-Propanol	1200	Not Detected	2900	Not Detected
Carbon Disulfide	1200	Not Detected	3700	Not Detected
3-Chloropropene	1200	Not Detected	3700	Not Detected
Methylene Chloride	1200	Not Detected	4100	Not Detected
Methyl tert-butyl ether	300	Not Detected	1100	Not Detected
trans-1,2-Dichloroethene	300	Not Detected	1200	Not Detected
Hexane	300	38000	1000	140000
1,1-Dichloroethane	300	Not Detected	1200	Not Detected
2-Butanone (Methyl Ethyl Ketone)	1200	Not Detected	3500	Not Detected
cis-1,2-Dichloroethene	300	Not Detected	1200	Not Detected
Tetrahydrofuran	300	Not Detected	880	Not Detected
Chloroform	300	Not Detected	1400	Not Detected
1,1,1-Trichloroethane	300	Not Detected	1600	Not Detected
Cyclohexane	300	57000	1000	200000
Carbon Tetrachloride	300	Not Detected	1900	Not Detected
2,2,4-Trimethylpentane	300	59000	1400	270000
Benzene	300	Not Detected	950	Not Detected
1,2-Dichloroethane	300	Not Detected	1200	Not Detected
Heptane	300	20000	1200	82000
Trichloroethene	300	Not Detected	1600	Not Detected
1,2-Dichloropropane	300	250 J	1400	1200 J
1,4-Dioxane	1200	Not Detected	4300	Not Detected
Bromodichloromethane	300	Not Detected	2000	Not Detected
cis-1,3-Dichloropropene	300	Not Detected	1400	Not Detected
4-Methyl-2-pentanone	300	Not Detected	1200	Not Detected
Toluene	300	Not Detected	1100	Not Detected
trans-1,3-Dichloropropene	300	Not Detected	1400	Not Detected
1,1,2-Trichloroethane	300	Not Detected	1600	Not Detected
Tetrachloroethene	300	Not Detected	2000	Not Detected
2-Hexanone	1200	Not Detected	4900	Not Detected

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Client Sample ID: VMP-55-20-110217

Lab ID#: 1711065A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14111422**	**Date of Collection:**	**11/2/17 11:44:00 AM**
Dil. Factor:	**59.5**	**Date of Analysis:**	**11/14/17 09:29 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	300	Not Detected	2500	Not Detected
1,2-Dibromoethane (EDB)	300	Not Detected	2300	Not Detected
Chlorobenzene	300	Not Detected	1400	Not Detected
Ethyl Benzene	300	Not Detected	1300	Not Detected
m,p-Xylene	300	Not Detected	1300	Not Detected
o-Xylene	300	Not Detected	1300	Not Detected
Styrene	300	Not Detected	1300	Not Detected
Bromoform	300	Not Detected	3100	Not Detected
Cumene	300	Not Detected	1500	Not Detected
1,1,2,2-Tetrachloroethane	300	Not Detected	2000	Not Detected
Propylbenzene	300	Not Detected	1500	Not Detected
4-Ethyltoluene	300	Not Detected	1500	Not Detected
1,3,5-Trimethylbenzene	300	Not Detected	1500	Not Detected
1,2,4-Trimethylbenzene	300	Not Detected	1500	Not Detected
1,3-Dichlorobenzene	300	Not Detected	1800	Not Detected
1,4-Dichlorobenzene	300	Not Detected	1800	Not Detected
alpha-Chlorotoluene	300	Not Detected	1500	Not Detected
1,2-Dichlorobenzene	300	Not Detected	1800	Not Detected
1,2,4-Trichlorobenzene	1200	Not Detected	8800	Not Detected
Hexachlorobutadiene	1200	Not Detected	13000	Not Detected
Butane	1200	58000	2800	140000
Isopentane	1200	230000	3500	690000

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	115	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1711065A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111410a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 05:58 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	0.65 J	12	1.6 J
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	2.0	Not Detected	7.2	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1711065A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111410a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 05:58 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected
Butane	2.0	Not Detected	4.8	Not Detected
Isopentane	2.0	Not Detected	5.9	Not Detected

J = Estimated value.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1711065A-03B

EPA METHOD TO-15 GC/MS

File Name:	**14111407d**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 10:33 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	20	Not Detected	78	Not Detected
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	20	Not Detected	62	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	20	Not Detected	69	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1711065A-03B

EPA METHOD TO-15 GC/MS

File Name:	**14111407d**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 10:33 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Butane	20	Not Detected	48	Not Detected
Isopentane	20	Not Detected	59	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: CCV

Lab ID#: 1711065A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111402**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 11:01 AM**	

Compound	%Recovery
Freon 12	99
Freon 114	97
Chloromethane	95
Vinyl Chloride	96
1,3-Butadiene	93
Bromomethane	98
Chloroethane	96
Freon 11	96
Ethanol	91
Freon 113	94
1,1-Dichloroethene	97
Acetone	95
2-Propanol	93
Carbon Disulfide	96
3-Chloropropene	93
Methylene Chloride	94
Methyl tert-butyl ether	95
trans-1,2-Dichloroethene	99
Hexane	98
1,1-Dichloroethane	97
2-Butanone (Methyl Ethyl Ketone)	96
cis-1,2-Dichloroethene	98
Tetrahydrofuran	98
Chloroform	98
1,1,1-Trichloroethane	95
Cyclohexane	99
Carbon Tetrachloride	97
2,2,4-Trimethylpentane	105
Benzene	99
1,2-Dichloroethane	101
Heptane	107
Trichloroethene	97
1,2-Dichloropropane	96
1,4-Dioxane	98
Bromodichloromethane	98
cis-1,3-Dichloropropene	101
4-Methyl-2-pentanone	101
Toluene	99
trans-1,3-Dichloropropene	103
1,1,2-Trichloroethane	98
Tetrachloroethene	100
2-Hexanone	104

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Client Sample ID: CCV

Lab ID#: 1711065A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111402**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 11:01 AM**	

Compound	%Recovery
Dibromochloromethane	99
1,2-Dibromoethane (EDB)	100
Chlorobenzene	99
Ethyl Benzene	102
m,p-Xylene	108
o-Xylene	105
Styrene	111
Bromoform	100
Cumene	107
1,1,2,2-Tetrachloroethane	97
Propylbenzene	103
4-Ethyltoluene	107
1,3,5-Trimethylbenzene	109
1,2,4-Trimethylbenzene	109
1,3-Dichlorobenzene	100
1,4-Dichlorobenzene	101
alpha-Chlorotoluene	101
1,2-Dichlorobenzene	100
1,2,4-Trichlorobenzene	98
Hexachlorobutadiene	95
Butane	92
Isopentane	93

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: CCV

Lab ID#: 1711065A-04B

EPA METHOD TO-15 GC/MS

File Name:	**14111402**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 07:46 AM**	

Compound	%Recovery
Freon 12	97
Freon 114	97
Chloromethane	95
Vinyl Chloride	100
1,3-Butadiene	94
Bromomethane	111
Chloroethane	93
Freon 11	104
Ethanol	98
Freon 113	103
1,1-Dichloroethene	102
Acetone	107
2-Propanol	109
Carbon Disulfide	97
3-Chloropropene	102
Methylene Chloride	103
Methyl tert-butyl ether	104
trans-1,2-Dichloroethene	93
Hexane	102
1,1-Dichloroethane	103
2-Butanone (Methyl Ethyl Ketone)	101
cis-1,2-Dichloroethene	102
Tetrahydrofuran	99
Chloroform	102
1,1,1-Trichloroethane	101
Cyclohexane	102
Carbon Tetrachloride	103
2,2,4-Trimethylpentane	100
Benzene	98
1,2-Dichloroethane	96
Heptane	88
Trichloroethene	96
1,2-Dichloropropane	98
1,4-Dioxane	105
Bromodichloromethane	97
cis-1,3-Dichloropropene	97
4-Methyl-2-pentanone	88
Toluene	95
trans-1,3-Dichloropropene	99
1,1,2-Trichloroethane	96
Tetrachloroethene	100
2-Hexanone	101

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Client Sample ID: CCV
Lab ID#: 1711065A-04B
EPA METHOD TO-15 GC/MS

File Name:	**14111402**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 07:46 AM**	

Compound	%Recovery
Dibromochloromethane	102
1,2-Dibromoethane (EDB)	102
Chlorobenzene	97
Ethyl Benzene	97
m,p-Xylene	101
o-Xylene	99
Styrene	101
Bromoform	103
Cumene	99
1,1,2,2-Tetrachloroethane	99
Propylbenzene	101
4-Ethyltoluene	102
1,3,5-Trimethylbenzene	106
1,2,4-Trimethylbenzene	102
1,3-Dichlorobenzene	103
1,4-Dichlorobenzene	104
alpha-Chlorotoluene	110
1,2-Dichlorobenzene	104
1,2,4-Trichlorobenzene	118
Hexachlorobutadiene	109
Butane	88
Isopentane	108

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCS

Lab ID#: 1711065A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111403**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 12:36 PM**	

Compound	%Recovery	Method Limits
Freon 12	102	70-130
Freon 114	103	70-130
Chloromethane	90	70-130
Vinyl Chloride	102	70-130
1,3-Butadiene	96	70-130
Bromomethane	100	70-130
Chloroethane	101	70-130
Freon 11	100	70-130
Ethanol	100	70-130
Freon 113	94	70-130
1,1-Dichloroethene	98	70-130
Acetone	93	70-130
2-Propanol	101	70-130
Carbon Disulfide	84	70-130
3-Chloropropene	91	70-130
Methylene Chloride	97	70-130
Methyl tert-butyl ether	94	70-130
trans-1,2-Dichloroethene	88	70-130
Hexane	101	70-130
1,1-Dichloroethane	99	70-130
2-Butanone (Methyl Ethyl Ketone)	94	70-130
cis-1,2-Dichloroethene	110	70-130
Tetrahydrofuran	101	70-130
Chloroform	100	70-130
1,1,1-Trichloroethane	96	70-130
Cyclohexane	102	70-130
Carbon Tetrachloride	98	70-130
2,2,4-Trimethylpentane	108	70-130
Benzene	98	70-130
1,2-Dichloroethane	100	70-130
Heptane	104	70-130
Trichloroethene	98	70-130
1,2-Dichloropropane	95	70-130
1,4-Dioxane	98	70-130
Bromodichloromethane	100	70-130
cis-1,3-Dichloropropene	94	70-130
4-Methyl-2-pentanone	101	70-130
Toluene	97	70-130
trans-1,3-Dichloropropene	103	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	99	70-130
2-Hexanone	106	70-130

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Client Sample ID: LCS

Lab ID#: 1711065A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111403**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 12:36 PM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	99	70-130
1,2-Dibromoethane (EDB)	101	70-130
Chlorobenzene	99	70-130
Ethyl Benzene	102	70-130
m,p-Xylene	107	70-130
o-Xylene	107	70-130
Styrene	111	70-130
Bromoform	100	70-130
Cumene	107	70-130
1,1,2,2-Tetrachloroethane	98	70-130
Propylbenzene	105	70-130
4-Ethyltoluene	106	70-130
1,3,5-Trimethylbenzene	108	70-130
1,2,4-Trimethylbenzene	108	70-130
1,3-Dichlorobenzene	99	70-130
1,4-Dichlorobenzene	100	70-130
alpha-Chlorotoluene	102	70-130
1,2-Dichlorobenzene	99	70-130
1,2,4-Trichlorobenzene	89	70-130
Hexachlorobutadiene	86	70-130
Butane	101	60-140
Isopentane	97	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCSD

Lab ID#: 1711065A-05AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111404**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 01:03 PM**	

Compound	%Recovery	Method Limits
Freon 12	102	70-130
Freon 114	101	70-130
Chloromethane	92	70-130
Vinyl Chloride	102	70-130
1,3-Butadiene	94	70-130
Bromomethane	97	70-130
Chloroethane	98	70-130
Freon 11	97	70-130
Ethanol	98	70-130
Freon 113	93	70-130
1,1-Dichloroethene	97	70-130
Acetone	96	70-130
2-Propanol	100	70-130
Carbon Disulfide	83	70-130
3-Chloropropene	90	70-130
Methylene Chloride	95	70-130
Methyl tert-butyl ether	94	70-130
trans-1,2-Dichloroethene	87	70-130
Hexane	102	70-130
1,1-Dichloroethane	98	70-130
2-Butanone (Methyl Ethyl Ketone)	95	70-130
cis-1,2-Dichloroethene	109	70-130
Tetrahydrofuran	99	70-130
Chloroform	98	70-130
1,1,1-Trichloroethane	95	70-130
Cyclohexane	101	70-130
Carbon Tetrachloride	94	70-130
2,2,4-Trimethylpentane	108	70-130
Benzene	97	70-130
1,2-Dichloroethane	97	70-130
Heptane	107	70-130
Trichloroethene	96	70-130
1,2-Dichloropropane	93	70-130
1,4-Dioxane	95	70-130
Bromodichloromethane	98	70-130
cis-1,3-Dichloropropene	93	70-130
4-Methyl-2-pentanone	100	70-130
Toluene	96	70-130
trans-1,3-Dichloropropene	104	70-130
1,1,2-Trichloroethane	96	70-130
Tetrachloroethene	99	70-130
2-Hexanone	106	70-130

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Client Sample ID: LCSD

Lab ID#: 1711065A-05AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17111404**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 01:03 PM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	99	70-130
1,2-Dibromoethane (EDB)	99	70-130
Chlorobenzene	98	70-130
Ethyl Benzene	102	70-130
m,p-Xylene	106	70-130
o-Xylene	107	70-130
Styrene	111	70-130
Bromoform	101	70-130
Cumene	108	70-130
1,1,2,2-Tetrachloroethane	98	70-130
Propylbenzene	105	70-130
4-Ethyltoluene	108	70-130
1,3,5-Trimethylbenzene	108	70-130
1,2,4-Trimethylbenzene	110	70-130
1,3-Dichlorobenzene	101	70-130
1,4-Dichlorobenzene	102	70-130
alpha-Chlorotoluene	104	70-130
1,2-Dichlorobenzene	101	70-130
1,2,4-Trichlorobenzene	103	70-130
Hexachlorobutadiene	98	70-130
Butane	93	60-140
Isopentane	95	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCS

Lab ID#: 1711065A-05B

EPA METHOD TO-15 GC/MS

File Name:	**14111403**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 08:19 AM**	

Compound	%Recovery	Method Limits
Freon 12	100	70-130
Freon 114	105	70-130
Chloromethane	97	70-130
Vinyl Chloride	105	70-130
1,3-Butadiene	92	70-130
Bromomethane	113	70-130
Chloroethane	98	70-130
Freon 11	110	70-130
Ethanol	111	70-130
Freon 113	105	70-130
1,1-Dichloroethene	103	70-130
Acetone	105	70-130
2-Propanol	115	70-130
Carbon Disulfide	88	70-130
3-Chloropropene	96	70-130
Methylene Chloride	103	70-130
Methyl tert-butyl ether	104	70-130
trans-1,2-Dichloroethene	82	70-130
Hexane	103	70-130
1,1-Dichloroethane	103	70-130
2-Butanone (Methyl Ethyl Ketone)	105	70-130
cis-1,2-Dichloroethene	115	70-130
Tetrahydrofuran	99	70-130
Chloroform	104	70-130
1,1,1-Trichloroethane	102	70-130
Cyclohexane	104	70-130
Carbon Tetrachloride	105	70-130
2,2,4-Trimethylpentane	102	70-130
Benzene	102	70-130
1,2-Dichloroethane	97	70-130
Heptane	92	70-130
Trichloroethene	102	70-130
1,2-Dichloropropane	99	70-130
1,4-Dioxane	103	70-130
Bromodichloromethane	102	70-130
cis-1,3-Dichloropropene	96	70-130
4-Methyl-2-pentanone	96	70-130
Toluene	99	70-130
trans-1,3-Dichloropropene	98	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	102	70-130
2-Hexanone	104	70-130

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Client Sample ID: LCS

Lab ID#: 1711065A-05B

EPA METHOD TO-15 GC/MS

File Name:	**14111403**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 08:19 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	105	70-130
1,2-Dibromoethane (EDB)	104	70-130
Chlorobenzene	98	70-130
Ethyl Benzene	101	70-130
m,p-Xylene	101	70-130
o-Xylene	104	70-130
Styrene	107	70-130
Bromoform	81	70-130
Cumene	100	70-130
1,1,2,2-Tetrachloroethane	102	70-130
Propylbenzene	105	70-130
4-Ethyltoluene	104	70-130
1,3,5-Trimethylbenzene	106	70-130
1,2,4-Trimethylbenzene	104	70-130
1,3-Dichlorobenzene	106	70-130
1,4-Dichlorobenzene	106	70-130
alpha-Chlorotoluene	114	70-130
1,2-Dichlorobenzene	106	70-130
1,2,4-Trichlorobenzene	124	70-130
Hexachlorobutadiene	110	70-130
Butane	90	60-140
Isopentane	110	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	96	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCSD

Lab ID#: 1711065A-05BB

EPA METHOD TO-15 GC/MS

File Name:	**14111404**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 08:50 AM**	

Compound	%Recovery	Method Limits
Freon 12	99	70-130
Freon 114	104	70-130
Chloromethane	94	70-130
Vinyl Chloride	103	70-130
1,3-Butadiene	95	70-130
Bromomethane	118	70-130
Chloroethane	101	70-130
Freon 11	109	70-130
Ethanol	108	70-130
Freon 113	105	70-130
1,1-Dichloroethene	104	70-130
Acetone	103	70-130
2-Propanol	113	70-130
Carbon Disulfide	86	70-130
3-Chloropropene	97	70-130
Methylene Chloride	106	70-130
Methyl tert-butyl ether	102	70-130
trans-1,2-Dichloroethene	84	70-130
Hexane	102	70-130
1,1-Dichloroethane	104	70-130
2-Butanone (Methyl Ethyl Ketone)	101	70-130
cis-1,2-Dichloroethene	115	70-130
Tetrahydrofuran	99	70-130
Chloroform	102	70-130
1,1,1-Trichloroethane	100	70-130
Cyclohexane	101	70-130
Carbon Tetrachloride	102	70-130
2,2,4-Trimethylpentane	103	70-130
Benzene	100	70-130
1,2-Dichloroethane	97	70-130
Heptane	90	70-130
Trichloroethene	99	70-130
1,2-Dichloropropane	99	70-130
1,4-Dioxane	107	70-130
Bromodichloromethane	99	70-130
cis-1,3-Dichloropropene	94	70-130
4-Methyl-2-pentanone	94	70-130
Toluene	98	70-130
trans-1,3-Dichloropropene	100	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	102	70-130
2-Hexanone	105	70-130

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Client Sample ID: LCSD
Lab ID#: 1711065A-05BB
EPA METHOD TO-15 GC/MS

File Name:	**14111404**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/14/17 08:50 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	104	70-130
1,2-Dibromoethane (EDB)	103	70-130
Chlorobenzene	97	70-130
Ethyl Benzene	100	70-130
m,p-Xylene	100	70-130
o-Xylene	103	70-130
Styrene	106	70-130
Bromoform	80	70-130
Cumene	101	70-130
1,1,2,2-Tetrachloroethane	101	70-130
Propylbenzene	105	70-130
4-Ethyltoluene	102	70-130
1,3,5-Trimethylbenzene	108	70-130
1,2,4-Trimethylbenzene	104	70-130
1,3-Dichlorobenzene	106	70-130
1,4-Dichlorobenzene	107	70-130
alpha-Chlorotoluene	116	70-130
1,2-Dichlorobenzene	108	70-130
1,2,4-Trichlorobenzene	128	70-130
Hexachlorobutadiene	115	70-130
Butane	91	60-140
Isopentane	107	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	102	70-130

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11/16/2017
Ms. Elizabeth Kunkel
AECOM
1001 Highlands Plaza Dr. West
Suite 300
St. Louis MO 63110

Project Name: Roxana Quarterly Soil Vapor
Project #: 60527968-1.04.004
Workorder #: 1711065B

Dear Ms. Elizabeth Kunkel

The following report includes the data for the above referenced project for sample(s) received on 11/3/2017 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

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

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1711065B

Work Order Summary

CLIENT:	Ms. Elizabeth Kunkel AECOM 1001 Highlands Plaza Dr. West Suite 300 St. Louis, MO 63110	**BILL TO:**	Accounts Payable Austin AECOM PO Box 203970 Austin, TX 78720
PHONE:	314-743-4179	**P.O. #**	60527968-104004
FAX:		**PROJECT #**	60527968-1.04.004 Roxana Quarterly Soil Vapor
DATE RECEIVED:	11/03/2017	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	11/16/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VMP-55-5-110217	Modified ASTM D-1946	3.5 "Hg	15.2 psi
02A	VMP-55-20-110217	Modified ASTM D-1946	4.5 "Hg	15.1 psi
03A	Lab Blank	Modified ASTM D-1946	NA	NA
03B	Lab Blank	Modified ASTM D-1946	NA	NA
04A	LCS	Modified ASTM D-1946	NA	NA
04AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 11/16/17

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
Modified ASTM D-1946
AECOM
Workorder# 1711065B

Two 1 Liter Summa Canister samples were received on November 03, 2017. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and fixed gases in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

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

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VMP-55-5-110217

Lab ID#: 1711065B-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	4.8
Nitrogen	0.23	80
Methane	0.00023	0.00047
Carbon Dioxide	0.023	15

Client Sample ID: VMP-55-20-110217

Lab ID#: 1711065B-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	1.8
Nitrogen	0.24	74
Methane	0.00024	5.4
Carbon Dioxide	0.024	19
Ethane	0.0024	0.0015 J

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Client Sample ID: VMP-55-5-110217

Lab ID#: 1711065B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10111426**	**Date of Collection: 11/2/17 11:16:00 AM**	
Dil. Factor:	**2.30**	**Date of Analysis: 11/14/17 11:31 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	4.8
Nitrogen	0.23	80
Carbon Monoxide	0.023	Not Detected
Methane	0.00023	0.00047
Carbon Dioxide	0.023	15
Ethane	0.0023	Not Detected
Ethene	0.0023	Not Detected
Helium	0.12	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VMP-55-20-110217

Lab ID#: 1711065B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10111427**	**Date of Collection: 11/2/17 11:44:00 AM**	
Dil. Factor:	**2.38**	**Date of Analysis: 11/14/17 11:56 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	1.8
Nitrogen	0.24	74
Carbon Monoxide	0.024	Not Detected
Methane	0.00024	5.4
Carbon Dioxide	0.024	19
Ethane	0.0024	0.0015 J
Ethene	0.0024	Not Detected
Helium	0.12	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1711065B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10111405**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/13/17 08:10 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.10	0.0081 J
Nitrogen	0.10	0.094 J
Carbon Monoxide	0.010	Not Detected
Methane	0.00010	Not Detected
Carbon Dioxide	0.010	Not Detected
Ethane	0.0010	Not Detected
Ethene	0.0010	Not Detected

J = Estimated value.

Container Type: NA - Not Applicable

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Client Sample ID: Lab Blank

Lab ID#: 1711065B-03B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10111407c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/13/17 09:00 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.050	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1711065B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10111402**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/13/17 06:39 PM**	

Compound	%Recovery	Method Limits
Oxygen	104	85-115
Nitrogen	89	85-115
Carbon Monoxide	93	85-115
Methane	106	85-115
Carbon Dioxide	100	85-115
Ethane	104	85-115
Ethene	104	85-115
Helium	102	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1711065B-04AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10111403**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 11/13/17 07:02 PM**	

Compound	%Recovery	Method Limits
Oxygen	102	85-115
Nitrogen	89	85-115
Carbon Monoxide	93	85-115
Methane	108	85-115
Carbon Dioxide	100	85-115
Ethane	107	85-115
Ethene	107	85-115
Helium	102	85-115

Container Type: NA - Not Applicable