

May 14, 2020

Illinois Department of Transportation
Keith Roberts, PE
Acting Regional 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. Roberts,

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 (314/802-1185) or Samuel Fisher at samuel.fisher@aecom.com (314/802-1152).

Sincerely,
AECOM, on behalf of Shell Oil Products US



Samuel Fisher, CHMM
Environmental Scientist



Robert E. Mooshegian, STS
Senior Program Manager

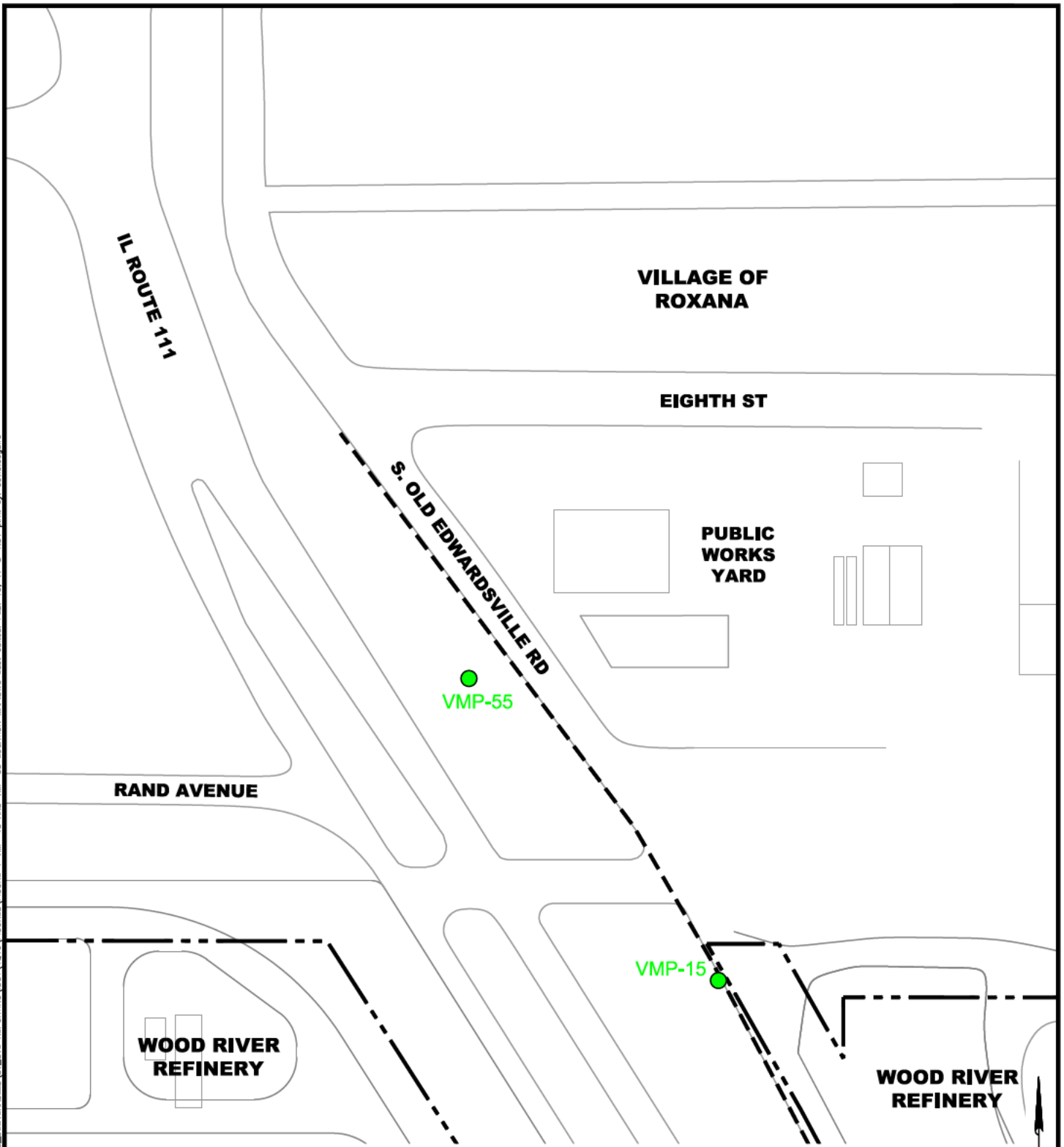
Attachments

cc:




Dan Kirk, SOPUS
Repositories – Roxana Public Library, Website
Project File

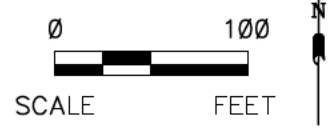
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File: P:\PROJECTS\ENVIRONMENTAL\SHLL\60477367_ROXANA2016\6.0_DELIVERABLES\SV_SVE_REPORTING\DOT\4016\FIGURES\FIGURE 1 VMP-15 AND VMP-55 LOCATION MAP.DWG Last edited: FEB. 15, 17 @ 1:51 p.m. by: david.dequire



LEGEND

-  VAPOR MONITORING POINT (VMP) LOCATION
-  APPROXIMATE BOUNDARY OF WOOD RIVER REFINERY
-  APPROXIMATE EAST BOUNDARY OF IL ROUTE 111 RIGHT-OF-WAY



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

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2/11/2020

Ms. Elizabeth Kunkel
AECOM
100 N. Broadway, 20th Floor

St. Louis MO 63102

Project Name: Roxana Quarterly Soil Vapor
Project #: 60619901-1.04.001
Workorder #: 2001664A

Dear Ms. Elizabeth Kunkel

The following report includes the data for the above referenced project for sample(s) received on 1/29/2020 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

WORK ORDER #: 2001664A

Work Order Summary

CLIENT: Ms. Elizabeth Kunkel
 AECOM
 100 N. Broadway, 20th Floor
 St. Louis, MO 63102

BILL TO: Accounts Payable Austin
 AECOM
 PO Box 203970
 Austin, TX 78720

PHONE: 314-802-1171

P.O. # 121921

FAX:

PROJECT # 60619901-1.04.001 Roxana Quarterly

DATE RECEIVED: 01/29/2020

CONTACT: Soil Vapor
 Kelly Buettner

DATE COMPLETED: 02/11/2020

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	VMP-15-5-012820	TO-15	8.4 "Hg	15.5 psi
02A	VMP-15-21.5-012820	TO-15	7.8 "Hg	16.2 psi
03A	VMP-15-25.5-012820	TO-15	6.9 "Hg	16.2 psi
03B	VMP-15-25.5-012820	TO-15	6.9 "Hg	16.2 psi
04A	VMP-55-20-012820	TO-15	9.4 "Hg	15.3 psi
04B	VMP-55-20-012820	TO-15	9.4 "Hg	15.3 psi
05A	Lab Blank	TO-15	NA	NA
05B	Lab Blank	TO-15	NA	NA
06A	CCV	TO-15	NA	NA
06B	CCV	TO-15	NA	NA
07A	LCS	TO-15	NA	NA
07AA	LCSD	TO-15	NA	NA
07B	LCS	TO-15	NA	NA
07BB	LCSD	TO-15	NA	NA

CERTIFIED BY:



Technical Director

DATE: 02/11/20

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP – CA009332019-11, VA NELAP - 460197, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005-011, Effective date: 10/18/2019, Expiration date: 10/17/2020.

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

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

(916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

LABORATORY NARRATIVE
EPA Method TO-15
AECOM
Workorder# 2001664A

Four 1 Liter Summa Canister samples were received on January 29, 2020. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

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 may be false positives.

Due to high-level target compounds, samples VMP-15-25.5-012820 and VMP-55-20-012820 were analyzed twice. In the "A" fraction, the sample was diluted to bring the highest-level compounds within the calibration range. The "B" fraction is also reported by client request and may be reported with "E" flags indicating the compound exceeds the calibration range. Both runs and associated QC are reported.

Dilution was performed on samples VMP-15-25.5-012820 and VMP-55-20-012820 due to the presence of high level target species.

The recovery of surrogate 1,2-Dichloroethane-d4 in sample VMP-55-20-012820 was outside laboratory control limits due to high level hydrocarbon matrix interference. The surrogate recovery is flagged.

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

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

Client Sample ID: VMP-15-5-012820

Lab ID#: 2001664A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.4	0.40 J	7.0	2.0 J

Client Sample ID: VMP-15-21.5-012820

Lab ID#: 2001664A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.4	0.27 J	7.0	1.3 J
2,2,4-Trimethylpentane	1.4	69	6.6	320
Benzene	1.4	0.30 J	4.5	0.95 J

Client Sample ID: VMP-15-25.5-012820

Lab ID#: 2001664A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2,2,4-Trimethylpentane	6.8	1700	32	7900
Benzene	6.8	2.5 J	22	7.9 J
Butane	27	57	65	140
Isopentane	27	15 J	80	44 J

Client Sample ID: VMP-15-25.5-012820

Lab ID#: 2001664A-03B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2,2,4-Trimethylpentane	3.4	1600 E	16	7300 E
Benzene	3.4	2.3 J	11	7.5 J
Butane	14	45	32	110
Isopentane	14	12 J	40	36 J

Client Sample ID: VMP-55-20-012820

Lab ID#: 2001664A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
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**Summary of Detected Compounds
EPA METHOD TO-15 GC/MS**

Client Sample ID: VMP-55-20-012820

Lab ID#: 2001664A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	15	5.1 J	54	18 J
2,2,4-Trimethylpentane	15	22000	69	100000
Butane	59	190	140	450
Isopentane	59	9900	180	29000

Client Sample ID: VMP-55-20-012820

Lab ID#: 2001664A-04B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	120	16 J	430	56 J
2,2,4-Trimethylpentane	30	20000 E	140	91000 E
Butane	120	220	280	530
Isopentane	120	7600	350	22000



Air Toxics

Client Sample ID: VMP-15-5-012820

Lab ID#: 2001664A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020422	Date of Collection:	1/28/20 8:44:00 AM
Dil. Factor:	2.85	Date of Analysis:	2/4/20 11:27 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.4	0.40 J	7.0	2.0 J
Freon 114	1.4	Not Detected	10	Not Detected
Chloromethane	14	Not Detected	29	Not Detected
Vinyl Chloride	1.4	Not Detected	3.6	Not Detected
1,3-Butadiene	1.4	Not Detected	3.2	Not Detected
Bromomethane	14	Not Detected	55	Not Detected
Chloroethane	5.7	Not Detected	15	Not Detected
Freon 11	1.4	Not Detected	8.0	Not Detected
Ethanol	5.7	Not Detected	11	Not Detected
Freon 113	1.4	Not Detected	11	Not Detected
1,1-Dichloroethene	1.4	Not Detected	5.6	Not Detected
Acetone	14	Not Detected	34	Not Detected
2-Propanol	5.7	Not Detected	14	Not Detected
Carbon Disulfide	5.7	Not Detected	18	Not Detected
3-Chloropropene	5.7	Not Detected	18	Not Detected
Methylene Chloride	14	Not Detected	50	Not Detected
Methyl tert-butyl ether	5.7	Not Detected	20	Not Detected
trans-1,2-Dichloroethene	1.4	Not Detected	5.6	Not Detected
Hexane	1.4	Not Detected	5.0	Not Detected
1,1-Dichloroethane	1.4	Not Detected	5.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.7	Not Detected	17	Not Detected
cis-1,2-Dichloroethene	1.4	Not Detected	5.6	Not Detected
Tetrahydrofuran	1.4	Not Detected	4.2	Not Detected
Chloroform	1.4	Not Detected	7.0	Not Detected
1,1,1-Trichloroethane	1.4	Not Detected	7.8	Not Detected
Cyclohexane	1.4	Not Detected	4.9	Not Detected
Carbon Tetrachloride	1.4	Not Detected	9.0	Not Detected
2,2,4-Trimethylpentane	1.4	Not Detected	6.6	Not Detected
Benzene	1.4	Not Detected	4.6	Not Detected
1,2-Dichloroethane	1.4	Not Detected	5.8	Not Detected
Heptane	1.4	Not Detected	5.8	Not Detected
Trichloroethene	1.4	Not Detected	7.6	Not Detected
1,2-Dichloropropane	1.4	Not Detected	6.6	Not Detected
1,4-Dioxane	5.7	Not Detected	20	Not Detected
Bromodichloromethane	1.4	Not Detected	9.5	Not Detected
cis-1,3-Dichloropropene	1.4	Not Detected	6.5	Not Detected
4-Methyl-2-pentanone	1.4	Not Detected	5.8	Not Detected
Toluene	1.4	Not Detected	5.4	Not Detected
trans-1,3-Dichloropropene	1.4	Not Detected	6.5	Not Detected
1,1,2-Trichloroethane	1.4	Not Detected	7.8	Not Detected
Tetrachloroethene	1.4	Not Detected	9.7	Not Detected
2-Hexanone	5.7	Not Detected	23	Not Detected



Air Toxics

Client Sample ID: VMP-15-5-012820

Lab ID#: 2001664A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020422	Date of Collection:	1/28/20 8:44:00 AM
Dil. Factor:	2.85	Date of Analysis:	2/4/20 11:27 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.4	Not Detected	12	Not Detected
1,2-Dibromoethane (EDB)	1.4	Not Detected	11	Not Detected
Chlorobenzene	1.4	Not Detected	6.6	Not Detected
Ethyl Benzene	1.4	Not Detected	6.2	Not Detected
m,p-Xylene	1.4	Not Detected	6.2	Not Detected
o-Xylene	1.4	Not Detected	6.2	Not Detected
Styrene	1.4	Not Detected	6.1	Not Detected
Bromoform	1.4	Not Detected	15	Not Detected
Cumene	1.4	Not Detected	7.0	Not Detected
1,1,2,2-Tetrachloroethane	1.4	Not Detected	9.8	Not Detected
Propylbenzene	1.4	Not Detected	7.0	Not Detected
4-Ethyltoluene	1.4	Not Detected	7.0	Not Detected
1,3,5-Trimethylbenzene	1.4	Not Detected	7.0	Not Detected
1,2,4-Trimethylbenzene	1.4	Not Detected	7.0	Not Detected
1,3-Dichlorobenzene	1.4	Not Detected	8.6	Not Detected
1,4-Dichlorobenzene	1.4	Not Detected	8.6	Not Detected
alpha-Chlorotoluene	1.4	Not Detected	7.4	Not Detected
1,2-Dichlorobenzene	1.4	Not Detected	8.6	Not Detected
1,2,4-Trichlorobenzene	5.7	Not Detected	42	Not Detected
Hexachlorobutadiene	5.7	Not Detected	61	Not Detected
Butane	5.7	Not Detected	14	Not Detected
Isopentane	5.7	Not Detected	17	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	98	70-130



Air Toxics

Client Sample ID: VMP-15-21.5-012820

Lab ID#: 2001664A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020423	Date of Collection:	1/28/20 8:54:00 AM
Dil. Factor:	2.84	Date of Analysis:	2/4/20 11:53 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.4	0.27 J	7.0	1.3 J
Freon 114	1.4	Not Detected	9.9	Not Detected
Chloromethane	14	Not Detected	29	Not Detected
Vinyl Chloride	1.4	Not Detected	3.6	Not Detected
1,3-Butadiene	1.4	Not Detected	3.1	Not Detected
Bromomethane	14	Not Detected	55	Not Detected
Chloroethane	5.7	Not Detected	15	Not Detected
Freon 11	1.4	Not Detected	8.0	Not Detected
Ethanol	5.7	Not Detected	11	Not Detected
Freon 113	1.4	Not Detected	11	Not Detected
1,1-Dichloroethene	1.4	Not Detected	5.6	Not Detected
Acetone	14	Not Detected	34	Not Detected
2-Propanol	5.7	Not Detected	14	Not Detected
Carbon Disulfide	5.7	Not Detected	18	Not Detected
3-Chloropropene	5.7	Not Detected	18	Not Detected
Methylene Chloride	14	Not Detected	49	Not Detected
Methyl tert-butyl ether	5.7	Not Detected	20	Not Detected
trans-1,2-Dichloroethene	1.4	Not Detected	5.6	Not Detected
Hexane	1.4	Not Detected	5.0	Not Detected
1,1-Dichloroethane	1.4	Not Detected	5.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.7	Not Detected	17	Not Detected
cis-1,2-Dichloroethene	1.4	Not Detected	5.6	Not Detected
Tetrahydrofuran	1.4	Not Detected	4.2	Not Detected
Chloroform	1.4	Not Detected	6.9	Not Detected
1,1,1-Trichloroethane	1.4	Not Detected	7.7	Not Detected
Cyclohexane	1.4	Not Detected	4.9	Not Detected
Carbon Tetrachloride	1.4	Not Detected	8.9	Not Detected
2,2,4-Trimethylpentane	1.4	69	6.6	320
Benzene	1.4	0.30 J	4.5	0.95 J
1,2-Dichloroethane	1.4	Not Detected	5.7	Not Detected
Heptane	1.4	Not Detected	5.8	Not Detected
Trichloroethene	1.4	Not Detected	7.6	Not Detected
1,2-Dichloropropane	1.4	Not Detected	6.6	Not Detected
1,4-Dioxane	5.7	Not Detected	20	Not Detected
Bromodichloromethane	1.4	Not Detected	9.5	Not Detected
cis-1,3-Dichloropropene	1.4	Not Detected	6.4	Not Detected
4-Methyl-2-pentanone	1.4	Not Detected	5.8	Not Detected
Toluene	1.4	Not Detected	5.4	Not Detected
trans-1,3-Dichloropropene	1.4	Not Detected	6.4	Not Detected
1,1,2-Trichloroethane	1.4	Not Detected	7.7	Not Detected
Tetrachloroethene	1.4	Not Detected	9.6	Not Detected
2-Hexanone	5.7	Not Detected	23	Not Detected



Air Toxics

Client Sample ID: VMP-15-21.5-012820

Lab ID#: 2001664A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020423	Date of Collection:	1/28/20 8:54:00 AM
Dil. Factor:	2.84	Date of Analysis:	2/4/20 11:53 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.4	Not Detected	12	Not Detected
1,2-Dibromoethane (EDB)	1.4	Not Detected	11	Not Detected
Chlorobenzene	1.4	Not Detected	6.5	Not Detected
Ethyl Benzene	1.4	Not Detected	6.2	Not Detected
m,p-Xylene	1.4	Not Detected	6.2	Not Detected
o-Xylene	1.4	Not Detected	6.2	Not Detected
Styrene	1.4	Not Detected	6.0	Not Detected
Bromoform	1.4	Not Detected	15	Not Detected
Cumene	1.4	Not Detected	7.0	Not Detected
1,1,2,2-Tetrachloroethane	1.4	Not Detected	9.7	Not Detected
Propylbenzene	1.4	Not Detected	7.0	Not Detected
4-Ethyltoluene	1.4	Not Detected	7.0	Not Detected
1,3,5-Trimethylbenzene	1.4	Not Detected	7.0	Not Detected
1,2,4-Trimethylbenzene	1.4	Not Detected	7.0	Not Detected
1,3-Dichlorobenzene	1.4	Not Detected	8.5	Not Detected
1,4-Dichlorobenzene	1.4	Not Detected	8.5	Not Detected
alpha-Chlorotoluene	1.4	Not Detected	7.4	Not Detected
1,2-Dichlorobenzene	1.4	Not Detected	8.5	Not Detected
1,2,4-Trichlorobenzene	5.7	Not Detected	42	Not Detected
Hexachlorobutadiene	5.7	Not Detected	60	Not Detected
Butane	5.7	Not Detected	14	Not Detected
Isopentane	5.7	Not Detected	17	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	98	70-130



Air Toxics

Client Sample ID: VMP-15-25.5-012820

Lab ID#: 2001664A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020427	Date of Collection:	1/28/20 9:08:00 AM
Dil. Factor:	13.6	Date of Analysis:	2/5/20 08:04 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	6.8	Not Detected	34	Not Detected
Freon 114	6.8	Not Detected	48	Not Detected
Chloromethane	68	Not Detected	140	Not Detected
Vinyl Chloride	6.8	Not Detected	17	Not Detected
1,3-Butadiene	6.8	Not Detected	15	Not Detected
Bromomethane	68	Not Detected	260	Not Detected
Chloroethane	27	Not Detected	72	Not Detected
Freon 11	6.8	Not Detected	38	Not Detected
Ethanol	27	Not Detected	51	Not Detected
Freon 113	6.8	Not Detected	52	Not Detected
1,1-Dichloroethene	6.8	Not Detected	27	Not Detected
Acetone	68	Not Detected	160	Not Detected
2-Propanol	27	Not Detected	67	Not Detected
Carbon Disulfide	27	Not Detected	85	Not Detected
3-Chloropropene	27	Not Detected	85	Not Detected
Methylene Chloride	68	Not Detected	240	Not Detected
Methyl tert-butyl ether	27	Not Detected	98	Not Detected
trans-1,2-Dichloroethene	6.8	Not Detected	27	Not Detected
Hexane	6.8	Not Detected	24	Not Detected
1,1-Dichloroethane	6.8	Not Detected	28	Not Detected
2-Butanone (Methyl Ethyl Ketone)	27	Not Detected	80	Not Detected
cis-1,2-Dichloroethene	6.8	Not Detected	27	Not Detected
Tetrahydrofuran	6.8	Not Detected	20	Not Detected
Chloroform	6.8	Not Detected	33	Not Detected
1,1,1-Trichloroethane	6.8	Not Detected	37	Not Detected
Cyclohexane	6.8	Not Detected	23	Not Detected
Carbon Tetrachloride	6.8	Not Detected	43	Not Detected
2,2,4-Trimethylpentane	6.8	1700	32	7900
Benzene	6.8	2.5 J	22	7.9 J
1,2-Dichloroethane	6.8	Not Detected	28	Not Detected
Heptane	6.8	Not Detected	28	Not Detected
Trichloroethene	6.8	Not Detected	36	Not Detected
1,2-Dichloropropane	6.8	Not Detected	31	Not Detected
1,4-Dioxane	27	Not Detected	98	Not Detected
Bromodichloromethane	6.8	Not Detected	46	Not Detected
cis-1,3-Dichloropropene	6.8	Not Detected	31	Not Detected
4-Methyl-2-pentanone	6.8	Not Detected	28	Not Detected
Toluene	6.8	Not Detected	26	Not Detected
trans-1,3-Dichloropropene	6.8	Not Detected	31	Not Detected
1,1,2-Trichloroethane	6.8	Not Detected	37	Not Detected
Tetrachloroethene	6.8	Not Detected	46	Not Detected
2-Hexanone	27	Not Detected	110	Not Detected



Air Toxics

Client Sample ID: VMP-15-25.5-012820

Lab ID#: 2001664A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020427	Date of Collection:	1/28/20 9:08:00 AM
Dil. Factor:	13.6	Date of Analysis:	2/5/20 08:04 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	6.8	Not Detected	58	Not Detected
1,2-Dibromoethane (EDB)	6.8	Not Detected	52	Not Detected
Chlorobenzene	6.8	Not Detected	31	Not Detected
Ethyl Benzene	6.8	Not Detected	30	Not Detected
m,p-Xylene	6.8	Not Detected	30	Not Detected
o-Xylene	6.8	Not Detected	30	Not Detected
Styrene	6.8	Not Detected	29	Not Detected
Bromoform	6.8	Not Detected	70	Not Detected
Cumene	6.8	Not Detected	33	Not Detected
1,1,2,2-Tetrachloroethane	6.8	Not Detected	47	Not Detected
Propylbenzene	6.8	Not Detected	33	Not Detected
4-Ethyltoluene	6.8	Not Detected	33	Not Detected
1,3,5-Trimethylbenzene	6.8	Not Detected	33	Not Detected
1,2,4-Trimethylbenzene	6.8	Not Detected	33	Not Detected
1,3-Dichlorobenzene	6.8	Not Detected	41	Not Detected
1,4-Dichlorobenzene	6.8	Not Detected	41	Not Detected
alpha-Chlorotoluene	6.8	Not Detected	35	Not Detected
1,2-Dichlorobenzene	6.8	Not Detected	41	Not Detected
1,2,4-Trichlorobenzene	27	Not Detected	200	Not Detected
Hexachlorobutadiene	27	Not Detected	290	Not Detected
Butane	27	57	65	140
Isopentane	27	15 J	80	44 J

J = Estimated value.

Container Type: 1 Liter Summa Canister

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



Air Toxics

Client Sample ID: VMP-15-25.5-012820

Lab ID#: 2001664A-03B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020424	Date of Collection:	1/28/20 9:08:00 AM
Dil. Factor:	6.82	Date of Analysis:	2/5/20 12:17 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	3.4	Not Detected	17	Not Detected
Freon 114	3.4	Not Detected	24	Not Detected
Chloromethane	34	Not Detected	70	Not Detected
Vinyl Chloride	3.4	Not Detected	8.7	Not Detected
1,3-Butadiene	3.4	Not Detected	7.5	Not Detected
Bromomethane	34	Not Detected	130	Not Detected
Chloroethane	14	Not Detected	36	Not Detected
Freon 11	3.4	Not Detected	19	Not Detected
Ethanol	14	Not Detected	26	Not Detected
Freon 113	3.4	Not Detected	26	Not Detected
1,1-Dichloroethene	3.4	Not Detected	14	Not Detected
Acetone	34	Not Detected	81	Not Detected
2-Propanol	14	Not Detected	34	Not Detected
Carbon Disulfide	14	Not Detected	42	Not Detected
3-Chloropropene	14	Not Detected	43	Not Detected
Methylene Chloride	34	Not Detected	120	Not Detected
Methyl tert-butyl ether	14	Not Detected	49	Not Detected
trans-1,2-Dichloroethene	3.4	Not Detected	14	Not Detected
Hexane	3.4	Not Detected	12	Not Detected
1,1-Dichloroethane	3.4	Not Detected	14	Not Detected
2-Butanone (Methyl Ethyl Ketone)	14	Not Detected	40	Not Detected
cis-1,2-Dichloroethene	3.4	Not Detected	14	Not Detected
Tetrahydrofuran	3.4	Not Detected	10	Not Detected
Chloroform	3.4	Not Detected	17	Not Detected
1,1,1-Trichloroethane	3.4	Not Detected	19	Not Detected
Cyclohexane	3.4	Not Detected	12	Not Detected
Carbon Tetrachloride	3.4	Not Detected	21	Not Detected
2,2,4-Trimethylpentane	3.4	1600 E	16	7300 E
Benzene	3.4	2.3 J	11	7.5 J
1,2-Dichloroethane	3.4	Not Detected	14	Not Detected
Heptane	3.4	Not Detected	14	Not Detected
Trichloroethene	3.4	Not Detected	18	Not Detected
1,2-Dichloropropane	3.4	Not Detected	16	Not Detected
1,4-Dioxane	14	Not Detected	49	Not Detected
Bromodichloromethane	3.4	Not Detected	23	Not Detected
cis-1,3-Dichloropropene	3.4	Not Detected	15	Not Detected
4-Methyl-2-pentanone	3.4	Not Detected	14	Not Detected
Toluene	3.4	Not Detected	13	Not Detected
trans-1,3-Dichloropropene	3.4	Not Detected	15	Not Detected
1,1,2-Trichloroethane	3.4	Not Detected	19	Not Detected
Tetrachloroethene	3.4	Not Detected	23	Not Detected
2-Hexanone	14	Not Detected	56	Not Detected



Air Toxics

Client Sample ID: VMP-15-25.5-012820

Lab ID#: 2001664A-03B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020424	Date of Collection:	1/28/20 9:08:00 AM
Dil. Factor:	6.82	Date of Analysis:	2/5/20 12:17 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	3.4	Not Detected	29	Not Detected
1,2-Dibromoethane (EDB)	3.4	Not Detected	26	Not Detected
Chlorobenzene	3.4	Not Detected	16	Not Detected
Ethyl Benzene	3.4	Not Detected	15	Not Detected
m,p-Xylene	3.4	Not Detected	15	Not Detected
o-Xylene	3.4	Not Detected	15	Not Detected
Styrene	3.4	Not Detected	14	Not Detected
Bromoform	3.4	Not Detected	35	Not Detected
Cumene	3.4	Not Detected	17	Not Detected
1,1,2,2-Tetrachloroethane	3.4	Not Detected	23	Not Detected
Propylbenzene	3.4	Not Detected	17	Not Detected
4-Ethyltoluene	3.4	Not Detected	17	Not Detected
1,3,5-Trimethylbenzene	3.4	Not Detected	17	Not Detected
1,2,4-Trimethylbenzene	3.4	Not Detected	17	Not Detected
1,3-Dichlorobenzene	3.4	Not Detected	20	Not Detected
1,4-Dichlorobenzene	3.4	Not Detected	20	Not Detected
alpha-Chlorotoluene	3.4	Not Detected	18	Not Detected
1,2-Dichlorobenzene	3.4	Not Detected	20	Not Detected
1,2,4-Trichlorobenzene	14	Not Detected	100	Not Detected
Hexachlorobutadiene	14	Not Detected	140	Not Detected
Butane	14	45	32	110
Isopentane	14	12 J	40	36 J

E = Exceeds instrument calibration range.

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	101	70-130



Air Toxics

Client Sample ID: VMP-55-20-012820

Lab ID#: 2001664A-04A

EPA METHOD TO-15 GC/MS

File Name:	14020620	Date of Collection:	1/28/20 9:48:00 AM
Dil. Factor:	2.97	Date of Analysis:	2/6/20 04:45 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	15	Not Detected	73	Not Detected
Freon 114	15	Not Detected	100	Not Detected
Chloromethane	59	Not Detected	120	Not Detected
Vinyl Chloride	15	Not Detected	38	Not Detected
1,3-Butadiene	15	Not Detected	33	Not Detected
Bromomethane	59	Not Detected	230	Not Detected
Chloroethane	59	Not Detected	160	Not Detected
Freon 11	15	Not Detected	83	Not Detected
Ethanol	59	Not Detected	110	Not Detected
Freon 113	15	Not Detected	110	Not Detected
1,1-Dichloroethene	15	Not Detected	59	Not Detected
Acetone	59	Not Detected	140	Not Detected
2-Propanol	59	Not Detected	140	Not Detected
Carbon Disulfide	59	Not Detected	180	Not Detected
3-Chloropropene	59	Not Detected	180	Not Detected
Methylene Chloride	59	Not Detected	210	Not Detected
Methyl tert-butyl ether	15	5.1 J	54	18 J
trans-1,2-Dichloroethene	15	Not Detected	59	Not Detected
Hexane	15	Not Detected	52	Not Detected
1,1-Dichloroethane	15	Not Detected	60	Not Detected
2-Butanone (Methyl Ethyl Ketone)	59	Not Detected	180	Not Detected
cis-1,2-Dichloroethene	15	Not Detected	59	Not Detected
Tetrahydrofuran	15	Not Detected	44	Not Detected
Chloroform	15	Not Detected	72	Not Detected
1,1,1-Trichloroethane	15	Not Detected	81	Not Detected
Cyclohexane	15	Not Detected	51	Not Detected
Carbon Tetrachloride	15	Not Detected	93	Not Detected
2,2,4-Trimethylpentane	15	22000	69	100000
Benzene	15	Not Detected	47	Not Detected
1,2-Dichloroethane	15	Not Detected	60	Not Detected
Heptane	15	Not Detected	61	Not Detected
Trichloroethene	15	Not Detected	80	Not Detected
1,2-Dichloropropane	15	Not Detected	69	Not Detected
1,4-Dioxane	59	Not Detected	210	Not Detected
Bromodichloromethane	15	Not Detected	100	Not Detected
cis-1,3-Dichloropropene	15	Not Detected	67	Not Detected
4-Methyl-2-pentanone	15	Not Detected	61	Not Detected
Toluene	15	Not Detected	56	Not Detected
trans-1,3-Dichloropropene	15	Not Detected	67	Not Detected
1,1,2-Trichloroethane	15	Not Detected	81	Not Detected
Tetrachloroethene	15	Not Detected	100	Not Detected
2-Hexanone	59	Not Detected	240	Not Detected

Client Sample ID: VMP-55-20-012820

Lab ID#: 2001664A-04A

EPA METHOD TO-15 GC/MS

File Name:	14020620	Date of Collection:	1/28/20 9:48:00 AM
Dil. Factor:	2.97	Date of Analysis:	2/6/20 04:45 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	15	Not Detected	130	Not Detected
1,2-Dibromoethane (EDB)	15	Not Detected	110	Not Detected
Chlorobenzene	15	Not Detected	68	Not Detected
Ethyl Benzene	15	Not Detected	64	Not Detected
m,p-Xylene	15	Not Detected	64	Not Detected
o-Xylene	15	Not Detected	64	Not Detected
Styrene	15	Not Detected	63	Not Detected
Bromoform	15	Not Detected	150	Not Detected
Cumene	15	Not Detected	73	Not Detected
1,1,2,2-Tetrachloroethane	15	Not Detected	100	Not Detected
Propylbenzene	15	Not Detected	73	Not Detected
4-Ethyltoluene	15	Not Detected	73	Not Detected
1,3,5-Trimethylbenzene	15	Not Detected	73	Not Detected
1,2,4-Trimethylbenzene	15	Not Detected	73	Not Detected
1,3-Dichlorobenzene	15	Not Detected	89	Not Detected
1,4-Dichlorobenzene	15	Not Detected	89	Not Detected
alpha-Chlorotoluene	15	Not Detected	77	Not Detected
1,2-Dichlorobenzene	15	Not Detected	89	Not Detected
1,2,4-Trichlorobenzene	59	Not Detected	440	Not Detected
Hexachlorobutadiene	59	Not Detected	630	Not Detected
Butane	59	190	140	450
Isopentane	59	9900	180	29000

J = Estimated value.

Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	141 Q	70-130
Toluene-d8	108	70-130
4-Bromofluorobenzene	97	70-130



Air Toxics

Client Sample ID: VMP-55-20-012820

Lab ID#: 2001664A-04B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020425	Date of Collection:	1/28/20 9:48:00 AM
Dil. Factor:	59.4	Date of Analysis:	2/5/20 12:41 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	30	Not Detected	150	Not Detected
Freon 114	30	Not Detected	210	Not Detected
Chloromethane	300	Not Detected	610	Not Detected
Vinyl Chloride	30	Not Detected	76	Not Detected
1,3-Butadiene	30	Not Detected	66	Not Detected
Bromomethane	300	Not Detected	1200	Not Detected
Chloroethane	120	Not Detected	310	Not Detected
Freon 11	30	Not Detected	170	Not Detected
Ethanol	120	Not Detected	220	Not Detected
Freon 113	30	Not Detected	230	Not Detected
1,1-Dichloroethene	30	Not Detected	120	Not Detected
Acetone	300	Not Detected	700	Not Detected
2-Propanol	120	Not Detected	290	Not Detected
Carbon Disulfide	120	Not Detected	370	Not Detected
3-Chloropropene	120	Not Detected	370	Not Detected
Methylene Chloride	300	Not Detected	1000	Not Detected
Methyl tert-butyl ether	120	16 J	430	56 J
trans-1,2-Dichloroethene	30	Not Detected	120	Not Detected
Hexane	30	Not Detected	100	Not Detected
1,1-Dichloroethane	30	Not Detected	120	Not Detected
2-Butanone (Methyl Ethyl Ketone)	120	Not Detected	350	Not Detected
cis-1,2-Dichloroethene	30	Not Detected	120	Not Detected
Tetrahydrofuran	30	Not Detected	88	Not Detected
Chloroform	30	Not Detected	140	Not Detected
1,1,1-Trichloroethane	30	Not Detected	160	Not Detected
Cyclohexane	30	Not Detected	100	Not Detected
Carbon Tetrachloride	30	Not Detected	190	Not Detected
2,2,4-Trimethylpentane	30	20000 E	140	91000 E
Benzene	30	Not Detected	95	Not Detected
1,2-Dichloroethane	30	Not Detected	120	Not Detected
Heptane	30	Not Detected	120	Not Detected
Trichloroethene	30	Not Detected	160	Not Detected
1,2-Dichloropropane	30	Not Detected	140	Not Detected
1,4-Dioxane	120	Not Detected	430	Not Detected
Bromodichloromethane	30	Not Detected	200	Not Detected
cis-1,3-Dichloropropene	30	Not Detected	130	Not Detected
4-Methyl-2-pentanone	30	Not Detected	120	Not Detected
Toluene	30	Not Detected	110	Not Detected
trans-1,3-Dichloropropene	30	Not Detected	130	Not Detected
1,1,2-Trichloroethane	30	Not Detected	160	Not Detected
Tetrachloroethene	30	Not Detected	200	Not Detected
2-Hexanone	120	Not Detected	490	Not Detected



Air Toxics

Client Sample ID: VMP-55-20-012820

Lab ID#: 2001664A-04B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020425	Date of Collection:	1/28/20 9:48:00 AM
Dil. Factor:	59.4	Date of Analysis:	2/5/20 12:41 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	30	Not Detected	250	Not Detected
1,2-Dibromoethane (EDB)	30	Not Detected	230	Not Detected
Chlorobenzene	30	Not Detected	140	Not Detected
Ethyl Benzene	30	Not Detected	130	Not Detected
m,p-Xylene	30	Not Detected	130	Not Detected
o-Xylene	30	Not Detected	130	Not Detected
Styrene	30	Not Detected	130	Not Detected
Bromoform	30	Not Detected	310	Not Detected
Cumene	30	Not Detected	140	Not Detected
1,1,2,2-Tetrachloroethane	30	Not Detected	200	Not Detected
Propylbenzene	30	Not Detected	150	Not Detected
4-Ethyltoluene	30	Not Detected	150	Not Detected
1,3,5-Trimethylbenzene	30	Not Detected	150	Not Detected
1,2,4-Trimethylbenzene	30	Not Detected	140	Not Detected
1,3-Dichlorobenzene	30	Not Detected	180	Not Detected
1,4-Dichlorobenzene	30	Not Detected	180	Not Detected
alpha-Chlorotoluene	30	Not Detected	150	Not Detected
1,2-Dichlorobenzene	30	Not Detected	180	Not Detected
1,2,4-Trichlorobenzene	120	Not Detected	880	Not Detected
Hexachlorobutadiene	120	Not Detected	1300	Not Detected
Butane	120	220	280	530
Isopentane	120	7600	350	22000

J = Estimated value.

E = Exceeds instrument calibration range.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	94	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	102	70-130



Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 2001664A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020405e	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	2/4/20 11:17 AM

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	Not Detected	12	Not Detected
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	0.19 J	2.7	1.0 J
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

Client Sample ID: Lab Blank

Lab ID#: 2001664A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020405e	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/4/20 11:17 AM

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	0.042 J	3.8	0.33 J
Chlorobenzene	0.50	0.055 J	2.3	0.25 J
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	0.053 J	2.1	0.23 J
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	0.12 J	2.4	0.56 J
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	0.26 J	2.4	1.3 J
1,2,4-Trimethylbenzene	0.50	0.20 J	2.4	0.99 J
1,3-Dichlorobenzene	0.50	0.10 J	3.0	0.62 J
1,4-Dichlorobenzene	0.50	0.11 J	3.0	0.64 J
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	0.11 J	3.0	0.64 J
1,2,4-Trichlorobenzene	2.0	0.15 J	15	1.1 J
Hexachlorobutadiene	2.0	0.16 J	21	1.7 J
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	99	70-130
4-Bromofluorobenzene	99	70-130



Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 2001664A-05B

EPA METHOD TO-15 GC/MS

File Name:	14020605a	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	2/6/20 11:02 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

Client Sample ID: Lab Blank

Lab ID#: 2001664A-05B

EPA METHOD TO-15 GC/MS

File Name:	14020605a	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/6/20 11:02 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	104	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	94	70-130

Client Sample ID: CCV

Lab ID#: 2001664A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020402	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/4/20 09:48 AM

Compound	%Recovery
Freon 12	99
Freon 114	101
Chloromethane	98
Vinyl Chloride	96
1,3-Butadiene	84
Bromomethane	96
Chloroethane	95
Freon 11	103
Ethanol	96
Freon 113	104
1,1-Dichloroethene	98
Acetone	102
2-Propanol	99
Carbon Disulfide	94
3-Chloropropene	92
Methylene Chloride	102
Methyl tert-butyl ether	93
trans-1,2-Dichloroethene	98
Hexane	94
1,1-Dichloroethane	98
2-Butanone (Methyl Ethyl Ketone)	96
cis-1,2-Dichloroethene	100
Tetrahydrofuran	96
Chloroform	97
1,1,1-Trichloroethane	99
Cyclohexane	95
Carbon Tetrachloride	108
2,2,4-Trimethylpentane	96
Benzene	97
1,2-Dichloroethane	102
Heptane	94
Trichloroethene	104
1,2-Dichloropropane	100
1,4-Dioxane	96
Bromodichloromethane	102
cis-1,3-Dichloropropene	100
4-Methyl-2-pentanone	95
Toluene	92
trans-1,3-Dichloropropene	100
1,1,2-Trichloroethane	102
Tetrachloroethene	104
2-Hexanone	97

Client Sample ID: CCV

Lab ID#: 2001664A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020402	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/4/20 09:48 AM

Compound	%Recovery
Dibromochloromethane	105
1,2-Dibromoethane (EDB)	104
Chlorobenzene	101
Ethyl Benzene	101
m,p-Xylene	103
o-Xylene	100
Styrene	98
Bromoform	109
Cumene	100
1,1,2,2-Tetrachloroethane	97
Propylbenzene	100
4-Ethyltoluene	100
1,3,5-Trimethylbenzene	99
1,2,4-Trimethylbenzene	99
1,3-Dichlorobenzene	103
1,4-Dichlorobenzene	102
alpha-Chlorotoluene	97
1,2-Dichlorobenzene	102
1,2,4-Trichlorobenzene	99
Hexachlorobutadiene	99
Butane	93
Isopentane	97

Container Type: NA - Not Applicable

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



Air Toxics

Client Sample ID: CCV

Lab ID#: 2001664A-06B

EPA METHOD TO-15 GC/MS

File Name:	14020602	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/6/20 09:53 AM

Compound	%Recovery
Freon 12	96
Freon 114	97
Chloromethane	107
Vinyl Chloride	95
1,3-Butadiene	104
Bromomethane	91
Chloroethane	95
Freon 11	108
Ethanol	103
Freon 113	98
1,1-Dichloroethene	102
Acetone	109
2-Propanol	101
Carbon Disulfide	96
3-Chloropropene	86
Methylene Chloride	110
Methyl tert-butyl ether	93
trans-1,2-Dichloroethene	88
Hexane	102
1,1-Dichloroethane	100
2-Butanone (Methyl Ethyl Ketone)	92
cis-1,2-Dichloroethene	102
Tetrahydrofuran	95
Chloroform	96
1,1,1-Trichloroethane	99
Cyclohexane	95
Carbon Tetrachloride	100
2,2,4-Trimethylpentane	103
Benzene	93
1,2-Dichloroethane	91
Heptane	86
Trichloroethene	92
1,2-Dichloropropane	90
1,4-Dioxane	90
Bromodichloromethane	88
cis-1,3-Dichloropropene	83
4-Methyl-2-pentanone	78
Toluene	89
trans-1,3-Dichloropropene	86
1,1,2-Trichloroethane	84
Tetrachloroethene	90
2-Hexanone	82

Client Sample ID: CCV

Lab ID#: 2001664A-06B

EPA METHOD TO-15 GC/MS

File Name:	14020602	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/6/20 09:53 AM

Compound	%Recovery
Dibromochloromethane	86
1,2-Dibromoethane (EDB)	90
Chlorobenzene	87
Ethyl Benzene	87
m,p-Xylene	89
o-Xylene	88
Styrene	90
Bromoform	85
Cumene	88
1,1,2,2-Tetrachloroethane	90
Propylbenzene	89
4-Ethyltoluene	89
1,3,5-Trimethylbenzene	94
1,2,4-Trimethylbenzene	84
1,3-Dichlorobenzene	91
1,4-Dichlorobenzene	90
alpha-Chlorotoluene	73
1,2-Dichlorobenzene	92
1,2,4-Trichlorobenzene	93
Hexachlorobutadiene	97
Butane	95
Isopentane	123

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	98	70-130



Air Toxics

Client Sample ID: LCS

Lab ID#: 2001664A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020403	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/4/20 10:13 AM

Compound	%Recovery	Method Limits
Freon 12	96	70-130
Freon 114	96	70-130
Chloromethane	100	70-130
Vinyl Chloride	93	70-130
1,3-Butadiene	82	70-130
Bromomethane	96	70-130
Chloroethane	94	70-130
Freon 11	100	70-130
Ethanol	84	70-130
Freon 113	101	70-130
1,1-Dichloroethene	98	70-130
Acetone	99	70-130
2-Propanol	91	70-130
Carbon Disulfide	87	70-130
3-Chloropropene	89	70-130
Methylene Chloride	100	70-130
Methyl tert-butyl ether	93	70-130
trans-1,2-Dichloroethene	88	70-130
Hexane	93	70-130
1,1-Dichloroethane	98	70-130
2-Butanone (Methyl Ethyl Ketone)	91	70-130
cis-1,2-Dichloroethene	106	70-130
Tetrahydrofuran	91	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	98	70-130
Cyclohexane	94	70-130
Carbon Tetrachloride	107	70-130
2,2,4-Trimethylpentane	95	70-130
Benzene	93	70-130
1,2-Dichloroethane	100	70-130
Heptane	90	70-130
Trichloroethene	100	70-130
1,2-Dichloropropane	98	70-130
1,4-Dioxane	96	70-130
Bromodichloromethane	98	70-130
cis-1,3-Dichloropropene	99	70-130
4-Methyl-2-pentanone	91	70-130
Toluene	92	70-130
trans-1,3-Dichloropropene	99	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	103	70-130
2-Hexanone	92	70-130

Client Sample ID: LCS

Lab ID#: 2001664A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020403	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/4/20 10:13 AM

Compound	%Recovery	Method Limits
Dibromochloromethane	104	70-130
1,2-Dibromoethane (EDB)	102	70-130
Chlorobenzene	97	70-130
Ethyl Benzene	99	70-130
m,p-Xylene	101	70-130
o-Xylene	99	70-130
Styrene	93	70-130
Bromoform	103	70-130
Cumene	97	70-130
1,1,2,2-Tetrachloroethane	97	70-130
Propylbenzene	95	70-130
4-Ethyltoluene	95	70-130
1,3,5-Trimethylbenzene	96	70-130
1,2,4-Trimethylbenzene	95	70-130
1,3-Dichlorobenzene	98	70-130
1,4-Dichlorobenzene	97	70-130
alpha-Chlorotoluene	88	70-130
1,2-Dichlorobenzene	99	70-130
1,2,4-Trichlorobenzene	84	70-130
Hexachlorobutadiene	85	70-130
Butane	91	60-140
Isopentane	92	60-140

Container Type: NA - Not Applicable

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

Client Sample ID: LCSD

Lab ID#: 2001664A-07AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020404	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/4/20 10:38 AM

Compound	%Recovery	Method Limits
Freon 12	96	70-130
Freon 114	97	70-130
Chloromethane	101	70-130
Vinyl Chloride	94	70-130
1,3-Butadiene	82	70-130
Bromomethane	96	70-130
Chloroethane	93	70-130
Freon 11	102	70-130
Ethanol	81	70-130
Freon 113	100	70-130
1,1-Dichloroethene	96	70-130
Acetone	99	70-130
2-Propanol	92	70-130
Carbon Disulfide	88	70-130
3-Chloropropene	90	70-130
Methylene Chloride	100	70-130
Methyl tert-butyl ether	93	70-130
trans-1,2-Dichloroethene	87	70-130
Hexane	93	70-130
1,1-Dichloroethane	98	70-130
2-Butanone (Methyl Ethyl Ketone)	92	70-130
cis-1,2-Dichloroethene	106	70-130
Tetrahydrofuran	92	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	98	70-130
Cyclohexane	94	70-130
Carbon Tetrachloride	107	70-130
2,2,4-Trimethylpentane	96	70-130
Benzene	94	70-130
1,2-Dichloroethane	101	70-130
Heptane	90	70-130
Trichloroethene	100	70-130
1,2-Dichloropropane	98	70-130
1,4-Dioxane	95	70-130
Bromodichloromethane	98	70-130
cis-1,3-Dichloropropene	99	70-130
4-Methyl-2-pentanone	92	70-130
Toluene	93	70-130
trans-1,3-Dichloropropene	99	70-130
1,1,2-Trichloroethane	97	70-130
Tetrachloroethene	102	70-130
2-Hexanone	92	70-130

Client Sample ID: LCSD

Lab ID#: 2001664A-07AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3020404	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/4/20 10:38 AM

Compound	%Recovery	Method Limits
Dibromochloromethane	103	70-130
1,2-Dibromoethane (EDB)	100	70-130
Chlorobenzene	97	70-130
Ethyl Benzene	98	70-130
m,p-Xylene	100	70-130
o-Xylene	98	70-130
Styrene	92	70-130
Bromoform	103	70-130
Cumene	97	70-130
1,1,2,2-Tetrachloroethane	96	70-130
Propylbenzene	95	70-130
4-Ethyltoluene	93	70-130
1,3,5-Trimethylbenzene	96	70-130
1,2,4-Trimethylbenzene	95	70-130
1,3-Dichlorobenzene	99	70-130
1,4-Dichlorobenzene	97	70-130
alpha-Chlorotoluene	88	70-130
1,2-Dichlorobenzene	98	70-130
1,2,4-Trichlorobenzene	83	70-130
Hexachlorobutadiene	84	70-130
Butane	91	60-140
Isopentane	92	60-140

Container Type: NA - Not Applicable

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



Air Toxics

Client Sample ID: LCS

Lab ID#: 2001664A-07B

EPA METHOD TO-15 GC/MS

File Name:	14020603	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/6/20 10:16 AM

Compound	%Recovery	Method Limits
Freon 12	99	70-130
Freon 114	107	70-130
Chloromethane	115	70-130
Vinyl Chloride	104	70-130
1,3-Butadiene	114	70-130
Bromomethane	82	70-130
Chloroethane	99	70-130
Freon 11	114	70-130
Ethanol	108	70-130
Freon 113	106	70-130
1,1-Dichloroethene	106	70-130
Acetone	116	70-130
2-Propanol	105	70-130
Carbon Disulfide	103	70-130
3-Chloropropene	90	70-130
Methylene Chloride	113	70-130
Methyl tert-butyl ether	78	70-130
trans-1,2-Dichloroethene	104	70-130
Hexane	111	70-130
1,1-Dichloroethane	105	70-130
2-Butanone (Methyl Ethyl Ketone)	96	70-130
cis-1,2-Dichloroethene	99	70-130
Tetrahydrofuran	101	70-130
Chloroform	102	70-130
1,1,1-Trichloroethane	105	70-130
Cyclohexane	100	70-130
Carbon Tetrachloride	105	70-130
2,2,4-Trimethylpentane	111	70-130
Benzene	101	70-130
1,2-Dichloroethane	100	70-130
Heptane	99	70-130
Trichloroethene	102	70-130
1,2-Dichloropropane	98	70-130
1,4-Dioxane	96	70-130
Bromodichloromethane	98	70-130
cis-1,3-Dichloropropene	91	70-130
4-Methyl-2-pentanone	84	70-130
Toluene	97	70-130
trans-1,3-Dichloropropene	81	70-130
1,1,2-Trichloroethane	94	70-130
Tetrachloroethene	96	70-130
2-Hexanone	91	70-130

Client Sample ID: LCS

Lab ID#: 2001664A-07B

EPA METHOD TO-15 GC/MS

File Name:	14020603	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/6/20 10:16 AM

Compound	%Recovery	Method Limits
Dibromochloromethane	94	70-130
1,2-Dibromoethane (EDB)	95	70-130
Chlorobenzene	94	70-130
Ethyl Benzene	94	70-130
m,p-Xylene	96	70-130
o-Xylene	93	70-130
Styrene	97	70-130
Bromoform	95	70-130
Cumene	95	70-130
1,1,2,2-Tetrachloroethane	96	70-130
Propylbenzene	95	70-130
4-Ethyltoluene	98	70-130
1,3,5-Trimethylbenzene	99	70-130
1,2,4-Trimethylbenzene	88	70-130
1,3-Dichlorobenzene	97	70-130
1,4-Dichlorobenzene	98	70-130
alpha-Chlorotoluene	83	70-130
1,2-Dichlorobenzene	96	70-130
1,2,4-Trichlorobenzene	90	70-130
Hexachlorobutadiene	98	70-130
Butane	110	60-140
Isopentane	132	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	98	70-130



Air Toxics

Client Sample ID: LCSD

Lab ID#: 2001664A-07BB

EPA METHOD TO-15 GC/MS

File Name:	14020604	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/6/20 10:39 AM

Compound	%Recovery	Method Limits
Freon 12	102	70-130
Freon 114	104	70-130
Chloromethane	113	70-130
Vinyl Chloride	103	70-130
1,3-Butadiene	109	70-130
Bromomethane	104	70-130
Chloroethane	100	70-130
Freon 11	114	70-130
Ethanol	112	70-130
Freon 113	102	70-130
1,1-Dichloroethene	107	70-130
Acetone	113	70-130
2-Propanol	105	70-130
Carbon Disulfide	101	70-130
3-Chloropropene	100	70-130
Methylene Chloride	111	70-130
Methyl tert-butyl ether	97	70-130
trans-1,2-Dichloroethene	100	70-130
Hexane	110	70-130
1,1-Dichloroethane	105	70-130
2-Butanone (Methyl Ethyl Ketone)	91	70-130
cis-1,2-Dichloroethene	98	70-130
Tetrahydrofuran	102	70-130
Chloroform	102	70-130
1,1,1-Trichloroethane	103	70-130
Cyclohexane	98	70-130
Carbon Tetrachloride	105	70-130
2,2,4-Trimethylpentane	108	70-130
Benzene	98	70-130
1,2-Dichloroethane	96	70-130
Heptane	93	70-130
Trichloroethene	99	70-130
1,2-Dichloropropane	94	70-130
1,4-Dioxane	96	70-130
Bromodichloromethane	96	70-130
cis-1,3-Dichloropropene	96	70-130
4-Methyl-2-pentanone	81	70-130
Toluene	94	70-130
trans-1,3-Dichloropropene	93	70-130
1,1,2-Trichloroethane	90	70-130
Tetrachloroethene	94	70-130
2-Hexanone	93	70-130

Client Sample ID: LCSD

Lab ID#: 2001664A-07BB

EPA METHOD TO-15 GC/MS

File Name:	14020604	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/6/20 10:39 AM

Compound	%Recovery	Method Limits
Dibromochloromethane	98	70-130
1,2-Dibromoethane (EDB)	97	70-130
Chlorobenzene	94	70-130
Ethyl Benzene	95	70-130
m,p-Xylene	96	70-130
o-Xylene	94	70-130
Styrene	95	70-130
Bromoform	94	70-130
Cumene	94	70-130
1,1,2,2-Tetrachloroethane	97	70-130
Propylbenzene	95	70-130
4-Ethyltoluene	98	70-130
1,3,5-Trimethylbenzene	100	70-130
1,2,4-Trimethylbenzene	90	70-130
1,3-Dichlorobenzene	100	70-130
1,4-Dichlorobenzene	101	70-130
alpha-Chlorotoluene	92	70-130
1,2-Dichlorobenzene	101	70-130
1,2,4-Trichlorobenzene	104	70-130
Hexachlorobutadiene	107	70-130
Butane	109	60-140
Isopentane	129	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	98	70-130

2/11/2020

Ms. Elizabeth Kunkel
AECOM
100 N. Broadway, 20th Floor

St. Louis MO 63102

Project Name: Roxana Quarterly Soil Vapor
Project #: 60619901-1.04.001
Workorder #: 2001664B

Dear Ms. Elizabeth Kunkel

The following report includes the data for the above referenced project for sample(s) received on 1/29/2020 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

WORK ORDER #: 2001664B

Work Order Summary

CLIENT: Ms. Elizabeth Kunkel
 AECOM
 100 N. Broadway, 20th Floor
 St. Louis, MO 63102

BILL TO: Accounts Payable Austin
 AECOM
 PO Box 203970
 Austin, TX 78720

PHONE: 314-802-1171

P.O. # 121921

FAX:

PROJECT # 60619901-1.04.001 Roxana Quarterly

DATE RECEIVED: 01/29/2020

CONTACT: Soil Vapor
 Kelly Buettner

DATE COMPLETED: 02/11/2020

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	VMP-15-5-012820	Modified ASTM D-1946	8.4 "Hg	15.5 psi
02A	VMP-15-21.5-012820	Modified ASTM D-1946	7.8 "Hg	16.2 psi
03A	VMP-15-25.5-012820	Modified ASTM D-1946	6.9 "Hg	16.2 psi
04A	VMP-55-20-012820	Modified ASTM D-1946	9.4 "Hg	15.3 psi
05A	Lab Blank	Modified ASTM D-1946	NA	NA
05B	Lab Blank	Modified ASTM D-1946	NA	NA
06A	LCS	Modified ASTM D-1946	NA	NA
06AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY:



Technical Director

DATE: 02/11/20

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP – CA009332019-11, VA NELAP - 460197, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005-011, Effective date: 10/18/2019, Expiration date: 10/17/2020.

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

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LABORATORY NARRATIVE
Modified ASTM D-1946
AECOM
Workorder# 2001664B

Four 1 Liter Summa Canister samples were received on January 29, 2020. 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 EATL modifications.

<i>Requirement</i>	<i>ASTM D-1946</i>	<i>ATL Modifications</i>
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 $\geq 95\%$ 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 requirements, 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

Summary of Detected Compounds

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VMP-15-5-012820

Lab ID#: 2001664B-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.28	17
Nitrogen	0.28	82
Carbon Dioxide	0.028	1.4

Client Sample ID: VMP-15-21.5-012820

Lab ID#: 2001664B-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.28	1.5
Nitrogen	0.28	86
Methane	0.00028	0.25
Carbon Dioxide	0.028	12

Client Sample ID: VMP-15-25.5-012820

Lab ID#: 2001664B-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.27	1.4
Nitrogen	0.27	80
Methane	0.00027	0.65
Carbon Dioxide	0.027	18
Ethane	0.0027	0.00015 J

Client Sample ID: VMP-55-20-012820

Lab ID#: 2001664B-04A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.30	2.4
Nitrogen	0.30	76
Methane	0.00030	4.1
Carbon Dioxide	0.030	18
Ethane	0.0030	0.00095 J

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

Client Sample ID: VMP-55-20-012820

Lab ID#: 2001664B-04A

Helium	0.15	0.0090 J
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Air Toxics

Client Sample ID: VMP-15-5-012820

Lab ID#: 2001664B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10020409	Date of Collection:	1/28/20 8:44:00 AM
Dil. Factor:	2.85	Date of Analysis:	2/4/20 03:42 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.28	17
Nitrogen	0.28	82
Carbon Monoxide	0.028	Not Detected
Methane	0.00028	Not Detected
Carbon Dioxide	0.028	1.4
Ethane	0.0028	Not Detected
Ethene	0.0028	Not Detected
Helium	0.14	Not Detected

Container Type: 1 Liter Summa Canister



Air Toxics

Client Sample ID: VMP-15-21.5-012820

Lab ID#: 2001664B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10020410	Date of Collection:	1/28/20 8:54:00 AM
Dil. Factor:	2.83	Date of Analysis:	2/4/20 04:07 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.28	1.5
Nitrogen	0.28	86
Carbon Monoxide	0.028	Not Detected
Methane	0.00028	0.25
Carbon Dioxide	0.028	12
Ethane	0.0028	Not Detected
Ethene	0.0028	Not Detected
Helium	0.14	Not Detected

Container Type: 1 Liter Summa Canister



Air Toxics

Client Sample ID: VMP-15-25.5-012820

Lab ID#: 2001664B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10020411	Date of Collection:	1/28/20 9:08:00 AM
Dil. Factor:	2.73	Date of Analysis:	2/4/20 04:38 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.27	1.4
Nitrogen	0.27	80
Carbon Monoxide	0.027	Not Detected
Methane	0.00027	0.65
Carbon Dioxide	0.027	18
Ethane	0.0027	0.00015 J
Ethene	0.0027	Not Detected
Helium	0.14	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister



Air Toxics

Client Sample ID: VMP-55-20-012820

Lab ID#: 2001664B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10020412	Date of Collection:	1/28/20 9:48:00 AM
Dil. Factor:	2.97	Date of Analysis:	2/4/20 05:04 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.30	2.4
Nitrogen	0.30	76
Carbon Monoxide	0.030	Not Detected
Methane	0.00030	4.1
Carbon Dioxide	0.030	18
Ethane	0.0030	0.00095 J
Ethene	0.0030	Not Detected
Helium	0.15	0.0090 J

J = Estimated value.

Container Type: 1 Liter Summa Canister



Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 2001664B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10020404	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/4/20 01:28 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.10	Not Detected
Nitrogen	0.10	Not Detected
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

Container Type: NA - Not Applicable



Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 2001664B-05B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10020403c	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	2/4/20 01:04 PM

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

Container Type: NA - Not Applicable



Air Toxics

Client Sample ID: LCS

Lab ID#: 2001664B-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10020402	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/4/20 12:18 PM

Compound	%Recovery	Method Limits
Oxygen	98	85-115
Nitrogen	100	85-115
Carbon Monoxide	94	85-115
Methane	111	85-115
Carbon Dioxide	99	85-115
Ethane	107	85-115
Ethene	108	85-115
Helium	98	85-115

Container Type: NA - Not Applicable



Air Toxics

Client Sample ID: LCSD

Lab ID#: 2001664B-06AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10020429	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/5/20 10:38 AM

Compound	%Recovery	Method Limits
Oxygen	97	85-115
Nitrogen	100	85-115
Carbon Monoxide	93	85-115
Methane	108	85-115
Carbon Dioxide	98	85-115
Ethane	105	85-115
Ethene	106	85-115
Helium	98	85-115

Container Type: NA - Not Applicable