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February 11, 2020

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 (not sampled 4th Quarter 2019)

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
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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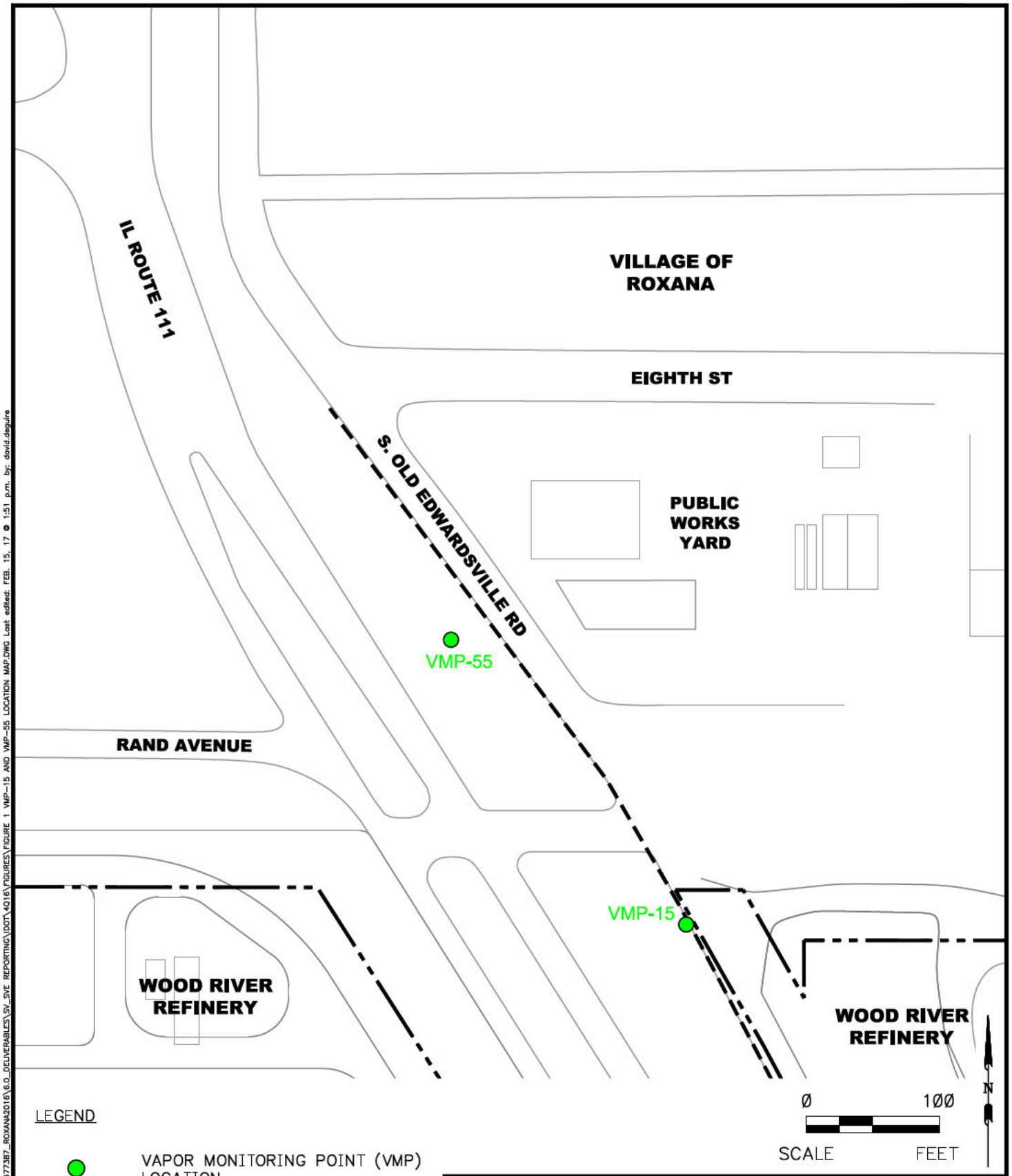

SHELL OIL PRODUCTS US
SOIL VAPOR MONITORING PROGRAM
ROXANA, ILLINOIS

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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11/5/2019
Ms. Elizabeth Kunkel
AECOM
100 N. Broadway, 20th Floor

St. Louis MO 63102

Project Name: Roxana Quarterly Soil Vapor
Project #: 60592794-1.04.004
Workorder #: 1910573A

Dear Ms. Elizabeth Kunkel

The following report includes the data for the above referenced project for sample(s) received on 10/23/2019 at Air Toxics Ltd.

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

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: 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 #: 1910573A

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. #**	110116ACM
FAX:		**PROJECT #**	60592794-1.04.004 Roxana Quarterly Soil Vapor
DATE RECEIVED:	10/23/2019	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	11/05/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VMP-15-5-102219	TO-15	4.5 "Hg	15.5 psi
02A	VMP-15-21.5-102219	TO-15	4.9 "Hg	15.4 psi
03A	Lab Blank	TO-15	NA	NA
04A	CCV	TO-15	NA	NA
05A	LCS	TO-15	NA	NA
05AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 11/05/19

Technical Director

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

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# 1910573A

Two 1 Liter Summa Canister samples were received on October 23, 2019. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

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

Receiving Notes

The Chain of Custody (COC) information for sample VMP-15-5-102219 did not match the entry on the sample tag with regard to sample identification. The information on the COC was used to process and report the sample.

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.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Dilution was performed on sample VMP-15-21.5-102219 due to the presence of high level target species.

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-15-5-102219

Lab ID#: 1910573A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.57 J	6.0	2.8 J
Freon 11	1.2	0.39 J	6.8	2.2 J
Ethanol	4.8	5.0 J0	9.1	9.4 J0
Acetone	12	4.6 J	29	11 J
Chloroform	1.2	0.27 J	5.9	1.3 J

Client Sample ID: VMP-15-21.5-102219

Lab ID#: 1910573A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	120	240	290	570
Chloroform	12	11 J	60	54 J
2,2,4-Trimethylpentane	12	2700	57	13000
Butane	49	72	120	170
Isopentane	49	100	140	300

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Client Sample ID: VMP-15-5-102219

Lab ID#: 1910573A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j102825**	**Date of Collection:**	**10/22/19 9:52:00 AM**
Dil. Factor:	**2.42**	**Date of Analysis:**	**10/28/19 11:16 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.57 J	6.0	2.8 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	0.39 J	6.8	2.2 J
Ethanol	4.8	5.0 J0	9.1	9.4 J0
Freon 113	1.2	Not Detected	9.3	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Acetone	12	4.6 J	29	11 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	0.27 J	5.9	1.3 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	Not Detected	5.6	Not Detected
Benzene	1.2	Not Detected	3.9	Not Detected
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-15-5-102219

Lab ID#: 1910573A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j102825**	**Date of Collection:**	**10/22/19 9:52:00 AM**
Dil. Factor:	**2.42**	**Date of Analysis:**	**10/28/19 11:16 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.
J0 = Estimated value due to bias in the CCV.
Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	118	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: VMP-15-21.5-102219

Lab ID#: 1910573A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j102826**	**Date of Collection:**	**10/22/19 10:14:00 A**
Dil. Factor:	**24.5**	**Date of Analysis:**	**10/28/19 11:40 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	12	Not Detected	60	Not Detected
Freon 114	12	Not Detected	86	Not Detected
Chloromethane	120	Not Detected	250	Not Detected
Vinyl Chloride	12	Not Detected	31	Not Detected
1,3-Butadiene	12	Not Detected	27	Not Detected
Bromomethane	120	Not Detected	480	Not Detected
Chloroethane	49	Not Detected	130	Not Detected
Freon 11	12	Not Detected	69	Not Detected
Ethanol	49	Not Detected UJ	92	Not Detected UJ
Freon 113	12	Not Detected	94	Not Detected
1,1-Dichloroethene	12	Not Detected	48	Not Detected
Acetone	120	240	290	570
2-Propanol	49	Not Detected	120	Not Detected
Carbon Disulfide	49	Not Detected	150	Not Detected
3-Chloropropene	49	Not Detected	150	Not Detected
Methylene Chloride	120	Not Detected	420	Not Detected
Methyl tert-butyl ether	49	Not Detected	180	Not Detected
trans-1,2-Dichloroethene	12	Not Detected	48	Not Detected
Hexane	12	Not Detected	43	Not Detected
1,1-Dichloroethane	12	Not Detected	50	Not Detected
2-Butanone (Methyl Ethyl Ketone)	49	Not Detected	140	Not Detected
cis-1,2-Dichloroethene	12	Not Detected	48	Not Detected
Tetrahydrofuran	12	Not Detected	36	Not Detected
Chloroform	12	11 J	60	54 J
1,1,1-Trichloroethane	12	Not Detected	67	Not Detected
Cyclohexane	12	Not Detected	42	Not Detected
Carbon Tetrachloride	12	Not Detected	77	Not Detected
2,2,4-Trimethylpentane	12	2700	57	13000
Benzene	12	Not Detected	39	Not Detected
1,2-Dichloroethane	12	Not Detected	50	Not Detected
Heptane	12	Not Detected	50	Not Detected
Trichloroethene	12	Not Detected	66	Not Detected
1,2-Dichloropropane	12	Not Detected	57	Not Detected
1,4-Dioxane	49	Not Detected	180	Not Detected
Bromodichloromethane	12	Not Detected	82	Not Detected
cis-1,3-Dichloropropene	12	Not Detected	56	Not Detected
4-Methyl-2-pentanone	12	Not Detected	50	Not Detected
Toluene	12	Not Detected	46	Not Detected
trans-1,3-Dichloropropene	12	Not Detected	56	Not Detected
1,1,2-Trichloroethane	12	Not Detected	67	Not Detected
Tetrachloroethene	12	Not Detected	83	Not Detected
2-Hexanone	49	Not Detected	200	Not Detected

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Client Sample ID: VMP-15-21.5-102219

Lab ID#: 1910573A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j102826**	**Date of Collection:**	**10/22/19 10:14:00 A**
Dil. Factor:	**24.5**	**Date of Analysis:**	**10/28/19 11:40 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	12	Not Detected	100	Not Detected
1,2-Dibromoethane (EDB)	12	Not Detected	94	Not Detected
Chlorobenzene	12	Not Detected	56	Not Detected
Ethyl Benzene	12	Not Detected	53	Not Detected
m,p-Xylene	12	Not Detected	53	Not Detected
o-Xylene	12	Not Detected	53	Not Detected
Styrene	12	Not Detected	52	Not Detected
Bromoform	12	Not Detected	130	Not Detected
Cumene	12	Not Detected	60	Not Detected
1,1,2,2-Tetrachloroethane	12	Not Detected	84	Not Detected
Propylbenzene	12	Not Detected	60	Not Detected
4-Ethyltoluene	12	Not Detected	60	Not Detected
1,3,5-Trimethylbenzene	12	Not Detected	60	Not Detected
1,2,4-Trimethylbenzene	12	Not Detected	60	Not Detected
1,3-Dichlorobenzene	12	Not Detected	74	Not Detected
1,4-Dichlorobenzene	12	Not Detected	74	Not Detected
alpha-Chlorotoluene	12	Not Detected	63	Not Detected
1,2-Dichlorobenzene	12	Not Detected	74	Not Detected
1,2,4-Trichlorobenzene	49	Not Detected	360	Not Detected
Hexachlorobutadiene	49	Not Detected	520	Not Detected
Butane	49	72	120	170
Isopentane	49	100	140	300

UJ = Analyte associated with low bias in the CCV.
J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	108	70-130
1,2-Dichloroethane-d4	122	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1910573A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j102807c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/28/19 11:10 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 UJ	3.8	Not Detected UJ
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	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#: 1910573A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j102807c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/28/19 11:10 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	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

UJ = Analyte associated with low bias in the CCV.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	95	70-130
1,2-Dichloroethane-d4	113	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: CCV

Lab ID#: 1910573A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j102803**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 10/28/19 08:51 AM**

Compound	%Recovery
Freon 12	128
Freon 114	112
Chloromethane	88
Vinyl Chloride	84
1,3-Butadiene	87
Bromomethane	99
Chloroethane	86
Freon 11	128
Ethanol	68 Q
Freon 113	113
1,1-Dichloroethene	98
Acetone	82
2-Propanol	92
Carbon Disulfide	93
3-Chloropropene	98
Methylene Chloride	94
Methyl tert-butyl ether	110
trans-1,2-Dichloroethene	103
Hexane	92
1,1-Dichloroethane	96
2-Butanone (Methyl Ethyl Ketone)	95
cis-1,2-Dichloroethene	98
Tetrahydrofuran	82
Chloroform	109
1,1,1-Trichloroethane	118
Cyclohexane	93
Carbon Tetrachloride	112
2,2,4-Trimethylpentane	96
Benzene	83
1,2-Dichloroethane	106
Heptane	87
Trichloroethene	92
1,2-Dichloropropane	71
1,4-Dioxane	81
Bromodichloromethane	98
cis-1,3-Dichloropropene	90
4-Methyl-2-pentanone	81
Toluene	84
trans-1,3-Dichloropropene	100
1,1,2-Trichloroethane	84
Tetrachloroethene	104
2-Hexanone	83

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Client Sample ID: CCV

Lab ID#: 1910573A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j102803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/28/19 08:51 AM**	

Compound	%Recovery
Dibromochloromethane	101
1,2-Dibromoethane (EDB)	90
Chlorobenzene	91
Ethyl Benzene	97
m,p-Xylene	107
o-Xylene	103
Styrene	100
Bromoform	103
Cumene	108
1,1,2,2-Tetrachloroethane	77
Propylbenzene	99
4-Ethyltoluene	100
1,3,5-Trimethylbenzene	102
1,2,4-Trimethylbenzene	100
1,3-Dichlorobenzene	98
1,4-Dichlorobenzene	101
alpha-Chlorotoluene	101
1,2-Dichlorobenzene	99
1,2,4-Trichlorobenzene	100
Hexachlorobutadiene	113
Butane	86
Isopentane	72

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	123	70-130
4-Bromofluorobenzene	118	70-130

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Client Sample ID: LCS

Lab ID#: 1910573A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j102804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/28/19 09:15 AM**	

Compound	%Recovery	Method Limits
Freon 12	126	70-130
Freon 114	113	70-130
Chloromethane	90	70-130
Vinyl Chloride	87	70-130
1,3-Butadiene	82	70-130
Bromomethane	98	70-130
Chloroethane	84	70-130
Freon 11	125	70-130
Ethanol	65 Q	70-130
Freon 113	109	70-130
1,1-Dichloroethene	99	70-130
Acetone	73	70-130
2-Propanol	91	70-130
Carbon Disulfide	96	70-130
3-Chloropropene	96	70-130
Methylene Chloride	94	70-130
Methyl tert-butyl ether	109	70-130
trans-1,2-Dichloroethene	111	70-130
Hexane	92	70-130
1,1-Dichloroethane	92	70-130
2-Butanone (Methyl Ethyl Ketone)	90	70-130
cis-1,2-Dichloroethene	94	70-130
Tetrahydrofuran	78	70-130
Chloroform	109	70-130
1,1,1-Trichloroethane	120	70-130
Cyclohexane	96	70-130
Carbon Tetrachloride	106	70-130
2,2,4-Trimethylpentane	93	70-130
Benzene	87	70-130
1,2-Dichloroethane	108	70-130
Heptane	93	70-130
Trichloroethene	98	70-130
1,2-Dichloropropane	75	70-130
1,4-Dioxane	86	70-130
Bromodichloromethane	104	70-130
cis-1,3-Dichloropropene	98	70-130
4-Methyl-2-pentanone	85	70-130
Toluene	91	70-130
trans-1,3-Dichloropropene	98	70-130
1,1,2-Trichloroethane	86	70-130
Tetrachloroethene	103	70-130
2-Hexanone	82	70-130

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Client Sample ID: LCS

Lab ID#: 1910573A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j102804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/28/19 09:15 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	102	70-130
1,2-Dibromoethane (EDB)	92	70-130
Chlorobenzene	92	70-130
Ethyl Benzene	100	70-130
m,p-Xylene	107	70-130
o-Xylene	105	70-130
Styrene	113	70-130
Bromoform	106	70-130
Cumene	110	70-130
1,1,2,2-Tetrachloroethane	73	70-130
Propylbenzene	104	70-130
4-Ethyltoluene	105	70-130
1,3,5-Trimethylbenzene	109	70-130
1,2,4-Trimethylbenzene	106	70-130
1,3-Dichlorobenzene	97	70-130
1,4-Dichlorobenzene	103	70-130
alpha-Chlorotoluene	82	70-130
1,2-Dichlorobenzene	99	70-130
1,2,4-Trichlorobenzene	104	70-130
Hexachlorobutadiene	116	70-130
Butane	88	70-130
Isopentane	76	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	94	70-130
1,2-Dichloroethane-d4	126	70-130
4-Bromofluorobenzene	115	70-130

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Client Sample ID: LCSD

Lab ID#: 1910573A-05AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j102805**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/28/19 09:40 AM**	

Compound	%Recovery	Method Limits
Freon 12	126	70-130
Freon 114	115	70-130
Chloromethane	92	70-130
Vinyl Chloride	86	70-130
1,3-Butadiene	83	70-130
Bromomethane	99	70-130
Chloroethane	86	70-130
Freon 11	123	70-130
Ethanol	69 Q	70-130
Freon 113	111	70-130
1,1-Dichloroethene	100	70-130
Acetone	74	70-130
2-Propanol	92	70-130
Carbon Disulfide	97	70-130
3-Chloropropene	98	70-130
Methylene Chloride	92	70-130
Methyl tert-butyl ether	113	70-130
trans-1,2-Dichloroethene	111	70-130
Hexane	97	70-130
1,1-Dichloroethane	94	70-130
2-Butanone (Methyl Ethyl Ketone)	93	70-130
cis-1,2-Dichloroethene	91	70-130
Tetrahydrofuran	81	70-130
Chloroform	108	70-130
1,1,1-Trichloroethane	119	70-130
Cyclohexane	98	70-130
Carbon Tetrachloride	106	70-130
2,2,4-Trimethylpentane	94	70-130
Benzene	83	70-130
1,2-Dichloroethane	108	70-130
Heptane	94	70-130
Trichloroethene	96	70-130
1,2-Dichloropropane	74	70-130
1,4-Dioxane	86	70-130
Bromodichloromethane	101	70-130
cis-1,3-Dichloropropene	98	70-130
4-Methyl-2-pentanone	82	70-130
Toluene	86	70-130
trans-1,3-Dichloropropene	101	70-130
1,1,2-Trichloroethane	87	70-130
Tetrachloroethene	103	70-130
2-Hexanone	82	70-130

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Client Sample ID: LCSD

Lab ID#: 1910573A-05AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j102805**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/28/19 09:40 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	103	70-130
1,2-Dibromoethane (EDB)	94	70-130
Chlorobenzene	94	70-130
Ethyl Benzene	99	70-130
m,p-Xylene	109	70-130
o-Xylene	106	70-130
Styrene	115	70-130
Bromoform	106	70-130
Cumene	113	70-130
1,1,2,2-Tetrachloroethane	75	70-130
Propylbenzene	106	70-130
4-Ethyltoluene	108	70-130
1,3,5-Trimethylbenzene	119	70-130
1,2,4-Trimethylbenzene	109	70-130
1,3-Dichlorobenzene	96	70-130
1,4-Dichlorobenzene	101	70-130
alpha-Chlorotoluene	83	70-130
1,2-Dichlorobenzene	102	70-130
1,2,4-Trichlorobenzene	95	70-130
Hexachlorobutadiene	113	70-130
Butane	90	70-130
Isopentane	76	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	91	70-130
1,2-Dichloroethane-d4	118	70-130
4-Bromofluorobenzene	113	70-130

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11/5/2019
Ms. Elizabeth Kunkel
AECOM
100 N. Broadway, 20th Floor

St. Louis MO 63102

Project Name: Roxana Quarterly Soil Vapor
Project #: 60592794-1.04.004
Workorder #: 1910573B

Dear Ms. Elizabeth Kunkel

The following report includes the data for the above referenced project for sample(s) received on 10/23/2019 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 #: 1910573B

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. #**	110116ACM
FAX:		**PROJECT #**	60592794-1.04.004 Roxana Quarterly Soil Vapor
DATE RECEIVED:	10/23/2019	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	11/05/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VMP-15-5-102219	Modified ASTM D-1946	4.5 "Hg	15.5 psi
02A	VMP-15-21.5-102219	Modified ASTM D-1946	4.9 "Hg	15.4 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: 11/05/19

Technical Director

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

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

LABORATORY NARRATIVE
Modified ASTM D-1946
AECOM
Workorder# 1910573B

Two 1 Liter Summa Canister samples were received on October 23, 2019. 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

The Chain of Custody (COC) information for sample VMP-15-5-102219 did not match the entry on the sample tag with regard to sample identification. The information on the COC was used to process and report the sample.

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-15-5-102219

Lab ID#: 1910573B-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	16
Nitrogen	0.24	80
Carbon Dioxide	0.024	4.5
Helium	0.12	0.024 J

Client Sample ID: VMP-15-21.5-102219

Lab ID#: 1910573B-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	1.4
Nitrogen	0.24	78
Methane	0.00024	6.4
Carbon Dioxide	0.024	14

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Client Sample ID: VMP-15-5-102219

Lab ID#: 1910573B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10102532**	**Date of Collection: 10/22/19 9:52:00 AM**	
Dil. Factor:	**2.42**	**Date of Analysis: 10/25/19 06:37 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	4.5
Ethane	0.0024	Not Detected
Ethene	0.0024	Not Detected
Helium	0.12	0.024 J

J = Estimated value.

Container Type: 1 Liter Summa Canister

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Client Sample ID: VMP-15-21.5-102219

Lab ID#: 1910573B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10102533**	**Date of Collection:**	**10/22/19 10:14:00 A**
Dil. Factor:	**2.45**	**Date of Analysis:**	**10/25/19 07:00 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	1.4
Nitrogen	0.24	78
Carbon Monoxide	0.024	Not Detected
Methane	0.00024	6.4
Carbon Dioxide	0.024	14
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#: 1910573B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10102530**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/25/19 05:41 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

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Client Sample ID: Lab Blank

Lab ID#: 1910573B-03B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10102531c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/25/19 06:07 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#: 1910573B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10102529**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/25/19 05:17 PM**	

Compound	%Recovery	Method Limits
Oxygen	102	85-115
Nitrogen	98	85-115
Carbon Monoxide	90	85-115
Methane	101	85-115
Carbon Dioxide	98	85-115
Ethane	101	85-115
Ethene	99	85-115
Helium	99	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1910573B-04AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10102553**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/26/19 12:02 PM**	

Compound	%Recovery	Method Limits
Oxygen	102	85-115
Nitrogen	98	85-115
Carbon Monoxide	89	85-115
Methane	101	85-115
Carbon Dioxide	98	85-115
Ethane	101	85-115
Ethene	99	85-115
Helium	95	85-115

Container Type: NA - Not Applicable