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August 1, 2017

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

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

Dear Mr. Brown,

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

- VMP-15
- VMP-55

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

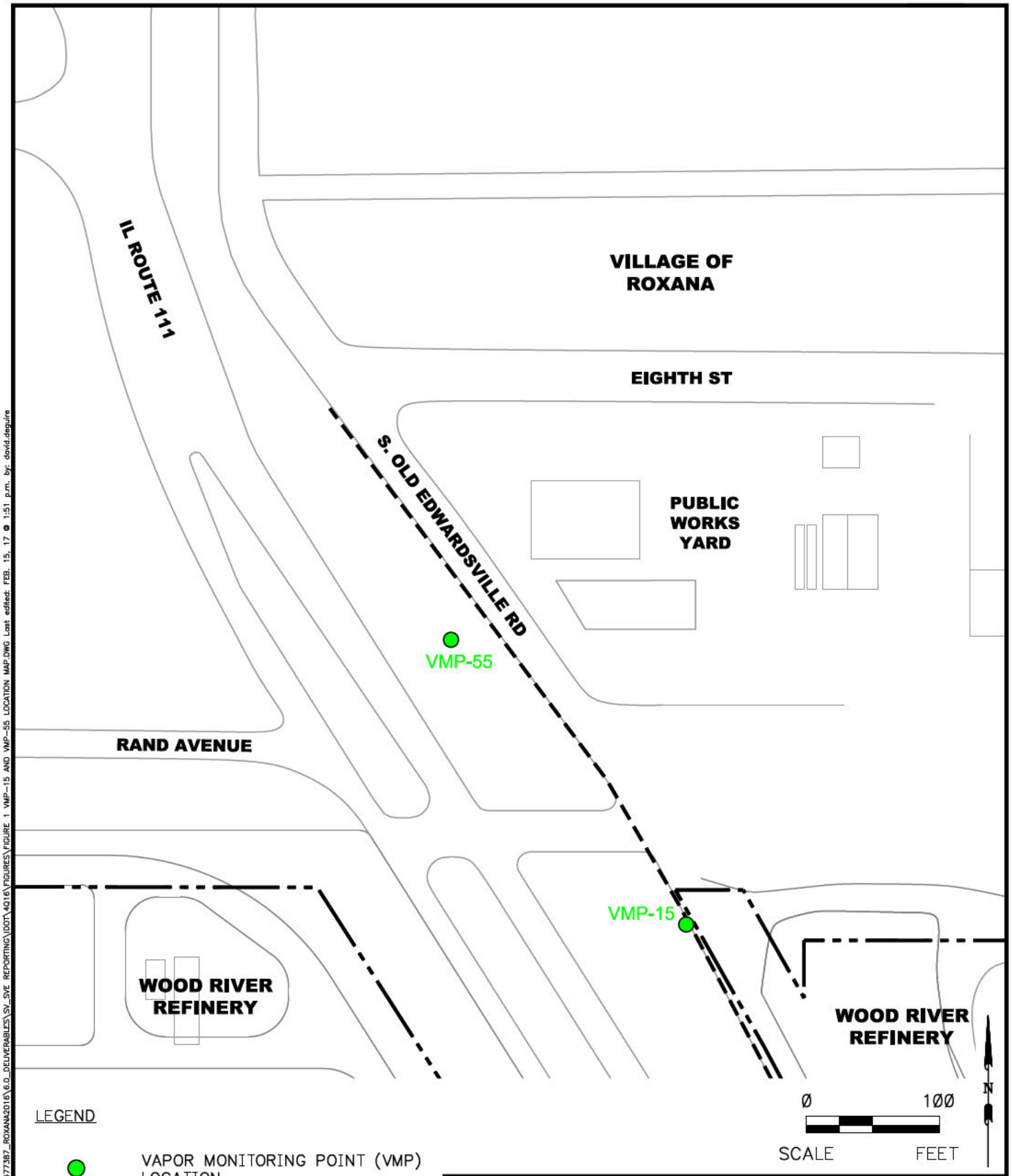
Sincerely,
AECOM, on behalf of Shell Oil Products US

Samuel Fisher
Environmental Scientist

Robert E. Mooshegian, STS
Senior Program Manager

Attachments

cc: Kevin Dyer, SOPUS
Repositories – Roxana Village Hall, Roxana Public Library, website
Project File



SHELL OIL PRODUCTS US
SOIL VAPOR MONITORING PROGRAM
ROXANA, ILLINOIS

PROJECT NO.
60527968

AECOM

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

VMP-15 and VMP-55
Location Map

FIG. NO.
1

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

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5/16/2017
Ms. Elizabeth Kunkel
URS Corporation
1001 Highlands Plaza Dr. West
Suite 300
St. Louis MO 63110

Project Name: Roxana Quarterly Soil Vapor
Project #: 60527968 - 1.04.002
Workorder #: 1705092A

Dear Ms. Elizabeth Kunkel

The following report includes the data for the above referenced project for sample(s) received on 5/3/2017 at Air Toxics Ltd.

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

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

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1705092A

Work Order Summary

CLIENT:	Ms. Elizabeth Kunkel AECOM 1001 Highlands Plaza Dr. West Suite 300 St. Louis, MO 63110	**BILL TO:**	Accounts Payable Austin AECOM PO Box 203970 Austin, TX 78720
PHONE:	314-743-4179	**P.O. #**	60527968-104002
FAX:		**PROJECT #**	60527968 - 1.04.002 Roxana Quarterly Soil Vapor
DATE RECEIVED:	05/03/2017	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	05/15/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VMP-15-5-050117	TO-15	2.5 "Hg	15 psi
02A	VMP-15-21.5-050117	TO-15	3.5 "Hg	15 psi
03A	VMP-15-25.5-020117	TO-15	0.5 "Hg	15 psi
04A	VMP-15-25.5-050117-DUP	TO-15	1.5 "Hg	15 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: Heidi Hayes DATE: 05/16/17

Technical Director

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

LABORATORY NARRATIVE
EPA Method TO-15
URS Corporation
Workorder# 1705092A

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

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

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

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

Dilution was performed on samples VMP-15-21.5-050117, VMP-15-25.5-020117 and VMP-15-25.5-050117-DUP due to the presence of high level target species.

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.

Definition of Data Qualifying Flags

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

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

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

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

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

N - The identification is based on presumptive evidence.

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

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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

Client Sample ID: VMP-15-5-050117

Lab ID#: 1705092A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.1	0.65 J	5.4	3.2 J
Freon 11	1.1	0.19 J	6.2	1.1 J
Ethanol	4.4	4.3 J	8.3	8.1 J
Acetone	11	4.5 J	26	11 J
2-Propanol	4.4	1.2 J	11	3.1 J
Carbon Disulfide	4.4	1.7 J	14	5.4 J
Chloroform	1.1	0.26 J	5.4	1.3 J

Client Sample ID: VMP-15-21.5-050117

Lab ID#: 1705092A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	23	3.9 J	54	9.2 J
2,2,4-Trimethylpentane	2.3	580	11	2700
Benzene	2.3	1.2 J	7.3	3.7 J
Butane	9.1	8.8 J	22	21 J
Isopentane	9.1	21	27	63

Client Sample ID: VMP-15-25.5-020117

Lab ID#: 1705092A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	41	40 J	77	75 J
Acetone	41	11 J	97	26 J
Cyclohexane	10	600	35	2100
2,2,4-Trimethylpentane	10	5300	48	25000
Butane	41	430	97	1000
Isopentane	41	1900	120	5500

Client Sample ID: VMP-15-25.5-050117-DUP

Lab ID#: 1705092A-04A

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

Client Sample ID: VMP-15-25.5-050117-DUP

Lab ID#: 1705092A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	43	22 J	80	41 J
Cyclohexane	11	700	37	2400
2,2,4-Trimethylpentane	11	6000	50	28000
Butane	43	490	100	1200
Isopentane	43	2100	120	6300

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Client Sample ID: VMP-15-5-050117

Lab ID#: 1705092A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a050925**	**Date of Collection:**	**5/1/17 9:17:00 AM**
Dil. Factor:	**2.20**	**Date of Analysis:**	**5/10/17 12:51 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.1	0.65 J	5.4	3.2 J
Freon 114	1.1	Not Detected	7.7	Not Detected
Chloromethane	11	Not Detected	23	Not Detected
Vinyl Chloride	1.1	Not Detected	2.8	Not Detected
1,3-Butadiene	1.1	Not Detected	2.4	Not Detected
Bromomethane	11	Not Detected	43	Not Detected
Chloroethane	4.4	Not Detected	12	Not Detected
Freon 11	1.1	0.19 J	6.2	1.1 J
Ethanol	4.4	4.3 J	8.3	8.1 J
Freon 113	1.1	Not Detected	8.4	Not Detected
1,1-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Acetone	11	4.5 J	26	11 J
2-Propanol	4.4	1.2 J	11	3.1 J
Carbon Disulfide	4.4	1.7 J	14	5.4 J
3-Chloropropene	4.4	Not Detected	14	Not Detected
Methylene Chloride	11	Not Detected	38	Not Detected
Methyl tert-butyl ether	4.4	Not Detected	16	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Hexane	1.1	Not Detected	3.9	Not Detected
1,1-Dichloroethane	1.1	Not Detected	4.4	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.4	Not Detected	13	Not Detected
cis-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Tetrahydrofuran	1.1	Not Detected	3.2	Not Detected
Chloroform	1.1	0.26 J	5.4	1.3 J
1,1,1-Trichloroethane	1.1	Not Detected	6.0	Not Detected
Cyclohexane	1.1	Not Detected	3.8	Not Detected
Carbon Tetrachloride	1.1	Not Detected	6.9	Not Detected
2,2,4-Trimethylpentane	1.1	Not Detected	5.1	Not Detected
Benzene	1.1	Not Detected	3.5	Not Detected
1,2-Dichloroethane	1.1	Not Detected	4.4	Not Detected
Heptane	1.1	Not Detected	4.5	Not Detected
Trichloroethene	1.1	Not Detected	5.9	Not Detected
1,2-Dichloropropane	1.1	Not Detected	5.1	Not Detected
1,4-Dioxane	4.4	Not Detected	16	Not Detected
Bromodichloromethane	1.1	Not Detected	7.4	Not Detected
cis-1,3-Dichloropropene	1.1	Not Detected	5.0	Not Detected
4-Methyl-2-pentanone	1.1	Not Detected	4.5	Not Detected
Toluene	1.1	Not Detected	4.1	Not Detected
trans-1,3-Dichloropropene	1.1	Not Detected	5.0	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	6.0	Not Detected
Tetrachloroethene	1.1	Not Detected	7.5	Not Detected
2-Hexanone	4.4	Not Detected	18	Not Detected

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Client Sample ID: VMP-15-5-050117

Lab ID#: 1705092A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a050925**	**Date of Collection:**	**5/1/17 9:17:00 AM**
Dil. Factor:	**2.20**	**Date of Analysis:**	**5/10/17 12:51 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.1	Not Detected	9.4	Not Detected
1,2-Dibromoethane (EDB)	1.1	Not Detected	8.4	Not Detected
Chlorobenzene	1.1	Not Detected	5.1	Not Detected
Ethyl Benzene	1.1	Not Detected	4.8	Not Detected
m,p-Xylene	1.1	Not Detected	4.8	Not Detected
o-Xylene	1.1	Not Detected	4.8	Not Detected
Styrene	1.1	Not Detected	4.7	Not Detected
Bromoform	1.1	Not Detected	11	Not Detected
Cumene	1.1	Not Detected	5.4	Not Detected
1,1,2,2-Tetrachloroethane	1.1	Not Detected	7.6	Not Detected
Propylbenzene	1.1	Not Detected	5.4	Not Detected
4-Ethyltoluene	1.1	Not Detected	5.4	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.4	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.4	Not Detected
1,3-Dichlorobenzene	1.1	Not Detected	6.6	Not Detected
1,4-Dichlorobenzene	1.1	Not Detected	6.6	Not Detected
alpha-Chlorotoluene	1.1	Not Detected	5.7	Not Detected
1,2-Dichlorobenzene	1.1	Not Detected	6.6	Not Detected
1,2,4-Trichlorobenzene	4.4	Not Detected	33	Not Detected
Hexachlorobutadiene	4.4	Not Detected	47	Not Detected
Butane	4.4	Not Detected	10	Not Detected
Isopentane	4.4	Not Detected	13	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

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

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Client Sample ID: VMP-15-21.5-050117

Lab ID#: 1705092A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a050926**	**Date of Collection:**	**5/1/17 9:41:00 AM**
Dil. Factor:	**4.57**	**Date of Analysis:**	**5/10/17 01:16 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	2.3	Not Detected	11	Not Detected
Freon 114	2.3	Not Detected	16	Not Detected
Chloromethane	23	Not Detected	47	Not Detected
Vinyl Chloride	2.3	Not Detected	5.8	Not Detected
1,3-Butadiene	2.3	Not Detected	5.0	Not Detected
Bromomethane	23	Not Detected	89	Not Detected
Chloroethane	9.1	Not Detected	24	Not Detected
Freon 11	2.3	Not Detected	13	Not Detected
Ethanol	9.1	Not Detected	17	Not Detected
Freon 113	2.3	Not Detected	18	Not Detected
1,1-Dichloroethene	2.3	Not Detected	9.1	Not Detected
Acetone	23	3.9 J	54	9.2 J
2-Propanol	9.1	Not Detected	22	Not Detected
Carbon Disulfide	9.1	Not Detected	28	Not Detected
3-Chloropropene	9.1	Not Detected	29	Not Detected
Methylene Chloride	23	Not Detected	79	Not Detected
Methyl tert-butyl ether	9.1	Not Detected	33	Not Detected
trans-1,2-Dichloroethene	2.3	Not Detected	9.0	Not Detected
Hexane	2.3	Not Detected	8.0	Not Detected
1,1-Dichloroethane	2.3	Not Detected	9.2	Not Detected
2-Butanone (Methyl Ethyl Ketone)	9.1	Not Detected	27	Not Detected
cis-1,2-Dichloroethene	2.3	Not Detected	9.0	Not Detected
Tetrahydrofuran	2.3	Not Detected	6.7	Not Detected
Chloroform	2.3	Not Detected	11	Not Detected
1,1,1-Trichloroethane	2.3	Not Detected	12	Not Detected
Cyclohexane	2.3	Not Detected	7.9	Not Detected
Carbon Tetrachloride	2.3	Not Detected	14	Not Detected
2,2,4-Trimethylpentane	2.3	580	11	2700
Benzene	2.3	1.2 J	7.3	3.7 J
1,2-Dichloroethane	2.3	Not Detected	9.2	Not Detected
Heptane	2.3	Not Detected	9.4	Not Detected
Trichloroethene	2.3	Not Detected	12	Not Detected
1,2-Dichloropropane	2.3	Not Detected	10	Not Detected
1,4-Dioxane	9.1	Not Detected	33	Not Detected
Bromodichloromethane	2.3	Not Detected	15	Not Detected
cis-1,3-Dichloropropene	2.3	Not Detected	10	Not Detected
4-Methyl-2-pentanone	2.3	Not Detected	9.4	Not Detected
Toluene	2.3	Not Detected	8.6	Not Detected
trans-1,3-Dichloropropene	2.3	Not Detected	10	Not Detected
1,1,2-Trichloroethane	2.3	Not Detected	12	Not Detected
Tetrachloroethene	2.3	Not Detected	15	Not Detected
2-Hexanone	9.1	Not Detected	37	Not Detected

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Client Sample ID: VMP-15-21.5-050117

Lab ID#: 1705092A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a050926**	**Date of Collection:**	**5/1/17 9:41:00 AM**
Dil. Factor:	**4.57**	**Date of Analysis:**	**5/10/17 01:16 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	2.3	Not Detected	19	Not Detected
1,2-Dibromoethane (EDB)	2.3	Not Detected	18	Not Detected
Chlorobenzene	2.3	Not Detected	10	Not Detected
Ethyl Benzene	2.3	Not Detected	9.9	Not Detected
m,p-Xylene	2.3	Not Detected	9.9	Not Detected
o-Xylene	2.3	Not Detected	9.9	Not Detected
Styrene	2.3	Not Detected	9.7	Not Detected
Bromoform	2.3	Not Detected	24	Not Detected
Cumene	2.3	Not Detected	11	Not Detected
1,1,2,2-Tetrachloroethane	2.3	Not Detected	16	Not Detected
Propylbenzene	2.3	Not Detected	11	Not Detected
4-Ethyltoluene	2.3	Not Detected	11	Not Detected
1,3,5-Trimethylbenzene	2.3	Not Detected	11	Not Detected
1,2,4-Trimethylbenzene	2.3	Not Detected	11	Not Detected
1,3-Dichlorobenzene	2.3	Not Detected	14	Not Detected
1,4-Dichlorobenzene	2.3	Not Detected	14	Not Detected
alpha-Chlorotoluene	2.3	Not Detected	12	Not Detected
1,2-Dichlorobenzene	2.3	Not Detected	14	Not Detected
1,2,4-Trichlorobenzene	9.1	Not Detected	68	Not Detected
Hexachlorobutadiene	9.1	Not Detected	97	Not Detected
Butane	9.1	8.8 J	22	21 J
Isopentane	9.1	21	27	63

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: VMP-15-25.5-020117

Lab ID#: 1705092A-03A

EPA METHOD TO-15 GC/MS

File Name:	**14051013**	**Date of Collection:**	**5/1/17 10:12:00 AM**
Dil. Factor:	**2.05**	**Date of Analysis:**	**5/10/17 03:06 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	10	Not Detected	51	Not Detected
Freon 114	10	Not Detected	72	Not Detected
Chloromethane	41	Not Detected	85	Not Detected
Vinyl Chloride	10	Not Detected	26	Not Detected
1,3-Butadiene	10	Not Detected	23	Not Detected
Bromomethane	41	Not Detected	160	Not Detected
Chloroethane	41	Not Detected	110	Not Detected
Freon 11	10	Not Detected	58	Not Detected
Ethanol	41	40 J	77	75 J
Freon 113	10	Not Detected	78	Not Detected
1,1-Dichloroethene	10	Not Detected	41	Not Detected
Acetone	41	11 J	97	26 J
2-Propanol	41	Not Detected	100	Not Detected
Carbon Disulfide	41	Not Detected	130	Not Detected
3-Chloropropene	41	Not Detected	130	Not Detected
Methylene Chloride	41	Not Detected	140	Not Detected
Methyl tert-butyl ether	10	Not Detected	37	Not Detected
trans-1,2-Dichloroethene	10	Not Detected	41	Not Detected
Hexane	10	Not Detected	36	Not Detected
1,1-Dichloroethane	10	Not Detected	41	Not Detected
2-Butanone (Methyl Ethyl Ketone)	41	Not Detected	120	Not Detected
cis-1,2-Dichloroethene	10	Not Detected	41	Not Detected
Tetrahydrofuran	10	Not Detected	30	Not Detected
Chloroform	10	Not Detected	50	Not Detected
1,1,1-Trichloroethane	10	Not Detected	56	Not Detected
Cyclohexane	10	600	35	2100
Carbon Tetrachloride	10	Not Detected	64	Not Detected
2,2,4-Trimethylpentane	10	5300	48	25000
Benzene	10	Not Detected	33	Not Detected
1,2-Dichloroethane	10	Not Detected	41	Not Detected
Heptane	10	Not Detected	42	Not Detected
Trichloroethene	10	Not Detected	55	Not Detected
1,2-Dichloropropane	10	Not Detected	47	Not Detected
1,4-Dioxane	41	Not Detected	150	Not Detected
Bromodichloromethane	10	Not Detected	69	Not Detected
cis-1,3-Dichloropropene	10	Not Detected	46	Not Detected
4-Methyl-2-pentanone	10	Not Detected	42	Not Detected
Toluene	10	Not Detected	39	Not Detected
trans-1,3-Dichloropropene	10	Not Detected	46	Not Detected
1,1,2-Trichloroethane	10	Not Detected	56	Not Detected
Tetrachloroethene	10	Not Detected	70	Not Detected
2-Hexanone	41	Not Detected	170	Not Detected

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Client Sample ID: VMP-15-25.5-020117

Lab ID#: 1705092A-03A

EPA METHOD TO-15 GC/MS

File Name:	**14051013**	**Date of Collection:**	**5/1/17 10:12:00 AM**
Dil. Factor:	**2.05**	**Date of Analysis:**	**5/10/17 03:06 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	10	Not Detected	87	Not Detected
1,2-Dibromoethane (EDB)	10	Not Detected	79	Not Detected
Chlorobenzene	10	Not Detected	47	Not Detected
Ethyl Benzene	10	Not Detected	44	Not Detected
m,p-Xylene	10	Not Detected	44	Not Detected
o-Xylene	10	Not Detected	44	Not Detected
Styrene	10	Not Detected	44	Not Detected
Bromoform	10	Not Detected	100	Not Detected
Cumene	10	Not Detected	50	Not Detected
1,1,2,2-Tetrachloroethane	10	Not Detected	70	Not Detected
Propylbenzene	10	Not Detected	50	Not Detected
4-Ethyltoluene	10	Not Detected	50	Not Detected
1,3,5-Trimethylbenzene	10	Not Detected	50	Not Detected
1,2,4-Trimethylbenzene	10	Not Detected	50	Not Detected
1,3-Dichlorobenzene	10	Not Detected	62	Not Detected
1,4-Dichlorobenzene	10	Not Detected	62	Not Detected
alpha-Chlorotoluene	10	Not Detected	53	Not Detected
1,2-Dichlorobenzene	10	Not Detected	62	Not Detected
1,2,4-Trichlorobenzene	41	Not Detected	300	Not Detected
Hexachlorobutadiene	41	Not Detected	440	Not Detected
Butane	41	430	97	1000
Isopentane	41	1900	120	5500

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: VMP-15-25.5-050117-DUP

Lab ID#: 1705092A-04A

EPA METHOD TO-15 GC/MS

File Name:	**14051014**	**Date of Collection:**	**5/1/17 10:12:00 AM**
Dil. Factor:	**2.13**	**Date of Analysis:**	**5/10/17 03:31 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	11	Not Detected	53	Not Detected
Freon 114	11	Not Detected	74	Not Detected
Chloromethane	43	Not Detected	88	Not Detected
Vinyl Chloride	11	Not Detected	27	Not Detected
1,3-Butadiene	11	Not Detected	24	Not Detected
Bromomethane	43	Not Detected	160	Not Detected
Chloroethane	43	Not Detected	110	Not Detected
Freon 11	11	Not Detected	60	Not Detected
Ethanol	43	22 J	80	41 J
Freon 113	11	Not Detected	82	Not Detected
1,1-Dichloroethene	11	Not Detected	42	Not Detected
Acetone	43	Not Detected	100	Not Detected
2-Propanol	43	Not Detected	100	Not Detected
Carbon Disulfide	43	Not Detected	130	Not Detected
3-Chloropropene	43	Not Detected	130	Not Detected
Methylene Chloride	43	Not Detected	150	Not Detected
Methyl tert-butyl ether	11	Not Detected	38	Not Detected
trans-1,2-Dichloroethene	11	Not Detected	42	Not Detected
Hexane	11	Not Detected	38	Not Detected
1,1-Dichloroethane	11	Not Detected	43	Not Detected
2-Butanone (Methyl Ethyl Ketone)	43	Not Detected	120	Not Detected
cis-1,2-Dichloroethene	11	Not Detected	42	Not Detected
Tetrahydrofuran	11	Not Detected	31	Not Detected
Chloroform	11	Not Detected	52	Not Detected
1,1,1-Trichloroethane	11	Not Detected	58	Not Detected
Cyclohexane	11	700	37	2400
Carbon Tetrachloride	11	Not Detected	67	Not Detected
2,2,4-Trimethylpentane	11	6000	50	28000
Benzene	11	Not Detected	34	Not Detected
1,2-Dichloroethane	11	Not Detected	43	Not Detected
Heptane	11	Not Detected	44	Not Detected
Trichloroethene	11	Not Detected	57	Not Detected
1,2-Dichloropropane	11	Not Detected	49	Not Detected
1,4-Dioxane	43	Not Detected	150	Not Detected
Bromodichloromethane	11	Not Detected	71	Not Detected
cis-1,3-Dichloropropene	11	Not Detected	48	Not Detected
4-Methyl-2-pentanone	11	Not Detected	44	Not Detected
Toluene	11	Not Detected	40	Not Detected
trans-1,3-Dichloropropene	11	Not Detected	48	Not Detected
1,1,2-Trichloroethane	11	Not Detected	58	Not Detected
Tetrachloroethene	11	Not Detected	72	Not Detected
2-Hexanone	43	Not Detected	170	Not Detected

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Client Sample ID: VMP-15-25.5-050117-DUP

Lab ID#: 1705092A-04A

EPA METHOD TO-15 GC/MS

File Name:	**14051014**	**Date of Collection:**	**5/1/17 10:12:00 AM**
Dil. Factor:	**2.13**	**Date of Analysis:**	**5/10/17 03:31 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	11	Not Detected	91	Not Detected
1,2-Dibromoethane (EDB)	11	Not Detected	82	Not Detected
Chlorobenzene	11	Not Detected	49	Not Detected
Ethyl Benzene	11	Not Detected	46	Not Detected
m,p-Xylene	11	Not Detected	46	Not Detected
o-Xylene	11	Not Detected	46	Not Detected
Styrene	11	Not Detected	45	Not Detected
Bromoform	11	Not Detected	110	Not Detected
Cumene	11	Not Detected	52	Not Detected
1,1,2,2-Tetrachloroethane	11	Not Detected	73	Not Detected
Propylbenzene	11	Not Detected	52	Not Detected
4-Ethyltoluene	11	Not Detected	52	Not Detected
1,3,5-Trimethylbenzene	11	Not Detected	52	Not Detected
1,2,4-Trimethylbenzene	11	Not Detected	52	Not Detected
1,3-Dichlorobenzene	11	Not Detected	64	Not Detected
1,4-Dichlorobenzene	11	Not Detected	64	Not Detected
alpha-Chlorotoluene	11	Not Detected	55	Not Detected
1,2-Dichlorobenzene	11	Not Detected	64	Not Detected
1,2,4-Trichlorobenzene	43	Not Detected	320	Not Detected
Hexachlorobutadiene	43	Not Detected	450	Not Detected
Butane	43	490	100	1200
Isopentane	43	2100	120	6300

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1705092A-05A

EPA METHOD TO-15 GC/MS

File Name:	**14051006a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/10/17 10:36 AM**	

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

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Client Sample ID: Lab Blank

Lab ID#: 1705092A-05A

EPA METHOD TO-15 GC/MS

File Name:	**14051006a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/10/17 10:36 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	100	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1705092A-05B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a050909c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/9/17 01:52 PM**	

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

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Client Sample ID: Lab Blank

Lab ID#: 1705092A-05B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a050909c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/9/17 01:52 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	0.075 J	2.4	0.37 J
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected
Butane	2.0	Not Detected	4.8	Not Detected
Isopentane	2.0	Not Detected	5.9	Not Detected

J = Estimated value.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: CCV

Lab ID#: 1705092A-06A

EPA METHOD TO-15 GC/MS

File Name:	**14051002a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/10/17 08:18 AM**	

Compound	%Recovery
Freon 12	101
Freon 114	106
Chloromethane	104
Vinyl Chloride	108
1,3-Butadiene	101
Bromomethane	120
Chloroethane	99
Freon 11	113
Ethanol	113
Freon 113	112
1,1-Dichloroethene	112
Acetone	113
2-Propanol	106
Carbon Disulfide	104
3-Chloropropene	116
Methylene Chloride	114
Methyl tert-butyl ether	110
trans-1,2-Dichloroethene	101
Hexane	118
1,1-Dichloroethane	112
2-Butanone (Methyl Ethyl Ketone)	101
cis-1,2-Dichloroethene	110
Tetrahydrofuran	102
Chloroform	100
1,1,1-Trichloroethane	110
Cyclohexane	115
Carbon Tetrachloride	115
2,2,4-Trimethylpentane	113
Benzene	104
1,2-Dichloroethane	102
Heptane	101
Trichloroethene	94
1,2-Dichloropropane	100
1,4-Dioxane	103
Bromodichloromethane	100
cis-1,3-Dichloropropene	102
4-Methyl-2-pentanone	105
Toluene	97
trans-1,3-Dichloropropene	99
1,1,2-Trichloroethane	105
Tetrachloroethene	92
2-Hexanone	93

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Client Sample ID: CCV
Lab ID#: 1705092A-06A
EPA METHOD TO-15 GC/MS

File Name:	**14051002a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/10/17 08:18 AM**	

Compound	%Recovery
Dibromochloromethane	98
1,2-Dibromoethane (EDB)	98
Chlorobenzene	99
Ethyl Benzene	101
m,p-Xylene	92
o-Xylene	93
Styrene	96
Bromoform	97
Cumene	97
1,1,2,2-Tetrachloroethane	100
Propylbenzene	95
4-Ethyltoluene	97
1,3,5-Trimethylbenzene	102
1,2,4-Trimethylbenzene	94
1,3-Dichlorobenzene	90
1,4-Dichlorobenzene	93
alpha-Chlorotoluene	92
1,2-Dichlorobenzene	91
1,2,4-Trichlorobenzene	71
Hexachlorobutadiene	78
Butane	97
Isopentane	123

Container Type: NA - Not Applicable

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

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Client Sample ID: CCV

Lab ID#: 1705092A-06B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a050902**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 5/9/17 09:05 AM**

Compound	%Recovery
Freon 12	90
Freon 114	88
Chloromethane	106
Vinyl Chloride	101
1,3-Butadiene	95
Bromomethane	98
Chloroethane	98
Freon 11	88
Ethanol	87
Freon 113	90
1,1-Dichloroethene	97
Acetone	92
2-Propanol	96
Carbon Disulfide	101
3-Chloropropene	98
Methylene Chloride	96
Methyl tert-butyl ether	95
trans-1,2-Dichloroethene	101
Hexane	95
1,1-Dichloroethane	95
2-Butanone (Methyl Ethyl Ketone)	104
cis-1,2-Dichloroethene	101
Tetrahydrofuran	92
Chloroform	90
1,1,1-Trichloroethane	85
Cyclohexane	98
Carbon Tetrachloride	86
2,2,4-Trimethylpentane	93
Benzene	97
1,2-Dichloroethane	88
Heptane	99
Trichloroethene	90
1,2-Dichloropropane	94
1,4-Dioxane	96
Bromodichloromethane	92
cis-1,3-Dichloropropene	96
4-Methyl-2-pentanone	90
Toluene	93
trans-1,3-Dichloropropene	96
1,1,2-Trichloroethane	95
Tetrachloroethene	89
2-Hexanone	93

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Client Sample ID: CCV

Lab ID#: 1705092A-06B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a050902**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/9/17 09:05 AM**	

Compound	%Recovery
Dibromochloromethane	88
1,2-Dibromoethane (EDB)	90
Chlorobenzene	91
Ethyl Benzene	93
m,p-Xylene	96
o-Xylene	100
Styrene	94
Bromoform	89
Cumene	91
1,1,2,2-Tetrachloroethane	100
Propylbenzene	93
4-Ethyltoluene	90
1,3,5-Trimethylbenzene	89
1,2,4-Trimethylbenzene	90
1,3-Dichlorobenzene	87
1,4-Dichlorobenzene	88
alpha-Chlorotoluene	94
1,2-Dichlorobenzene	87
1,2,4-Trichlorobenzene	87
Hexachlorobutadiene	86
Butane	95
Isopentane	99

Container Type: NA - Not Applicable

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

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Client Sample ID: LCS

Lab ID#: 1705092A-07A

EPA METHOD TO-15 GC/MS

File Name:	**14051003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/10/17 08:54 AM**	

Compound	%Recovery	Method Limits
Freon 12	105	70-130
Freon 114	110	70-130
Chloromethane	116	70-130
Vinyl Chloride	116	70-130
1,3-Butadiene	106	70-130
Bromomethane	135 Q	70-130
Chloroethane	109	70-130
Freon 11	121	70-130
Ethanol	102	70-130
Freon 113	113	70-130
1,1-Dichloroethene	114	70-130
Acetone	110	70-130
2-Propanol	118	70-130
Carbon Disulfide	111	70-130
3-Chloropropene	118	70-130
Methylene Chloride	116	70-130
Methyl tert-butyl ether	116	70-130
trans-1,2-Dichloroethene	116	70-130
Hexane	124	70-130
1,1-Dichloroethane	111	70-130
2-Butanone (Methyl Ethyl Ketone)	116	70-130
cis-1,2-Dichloroethene	106	70-130
Tetrahydrofuran	107	70-130
Chloroform	104	70-130
1,1,1-Trichloroethane	115	70-130
Cyclohexane	128	70-130
Carbon Tetrachloride	118	70-130
2,2,4-Trimethylpentane	121	70-130
Benzene	106	70-130
1,2-Dichloroethane	100	70-130
Heptane	109	70-130
Trichloroethene	102	70-130
1,2-Dichloropropane	101	70-130
1,4-Dioxane	117	70-130
Bromodichloromethane	104	70-130
cis-1,3-Dichloropropene	111	70-130
4-Methyl-2-pentanone	118	70-130
Toluene	103	70-130
trans-1,3-Dichloropropene	110	70-130
1,1,2-Trichloroethane	112	70-130
Tetrachloroethene	100	70-130
2-Hexanone	117	70-130

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Client Sample ID: LCS

Lab ID#: 1705092A-07A

EPA METHOD TO-15 GC/MS

File Name:	**14051003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/10/17 08:54 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	106	70-130
1,2-Dibromoethane (EDB)	106	70-130
Chlorobenzene	105	70-130
Ethyl Benzene	106	70-130
m,p-Xylene	105	70-130
o-Xylene	109	70-130
Styrene	115	70-130
Bromoform	107	70-130
Cumene	108	70-130
1,1,2,2-Tetrachloroethane	104	70-130
Propylbenzene	105	70-130
4-Ethyltoluene	109	70-130
1,3,5-Trimethylbenzene	114	70-130
1,2,4-Trimethylbenzene	106	70-130
1,3-Dichlorobenzene	100	70-130
1,4-Dichlorobenzene	105	70-130
alpha-Chlorotoluene	109	70-130
1,2-Dichlorobenzene	97	70-130
1,2,4-Trichlorobenzene	74	70-130
Hexachlorobutadiene	77	70-130
Butane	102	60-140
Isopentane	123	60-140

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	96	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCSD

Lab ID#: 1705092A-07AA

EPA METHOD TO-15 GC/MS

File Name:	**14051004**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/10/17 09:26 AM**	

Compound	%Recovery	Method Limits
Freon 12	107	70-130
Freon 114	113	70-130
Chloromethane	115	70-130
Vinyl Chloride	122	70-130
1,3-Butadiene	104	70-130
Bromomethane	141 Q	70-130
Chloroethane	113	70-130
Freon 11	126	70-130
Ethanol	104	70-130
Freon 113	118	70-130
1,1-Dichloroethene	120	70-130
Acetone	118	70-130
2-Propanol	121	70-130
Carbon Disulfide	114	70-130
3-Chloropropene	121	70-130
Methylene Chloride	122	70-130
Methyl tert-butyl ether	121	70-130
trans-1,2-Dichloroethene	118	70-130
Hexane	130	70-130
1,1-Dichloroethane	115	70-130
2-Butanone (Methyl Ethyl Ketone)	117	70-130
cis-1,2-Dichloroethene	112	70-130
Tetrahydrofuran	114	70-130
Chloroform	107	70-130
1,1,1-Trichloroethane	120	70-130
Cyclohexane	130	70-130
Carbon Tetrachloride	121	70-130
2,2,4-Trimethylpentane	124	70-130
Benzene	109	70-130
1,2-Dichloroethane	101	70-130
Heptane	115	70-130
Trichloroethene	104	70-130
1,2-Dichloropropane	103	70-130
1,4-Dioxane	113	70-130
Bromodichloromethane	104	70-130
cis-1,3-Dichloropropene	114	70-130
4-Methyl-2-pentanone	122	70-130
Toluene	103	70-130
trans-1,3-Dichloropropene	110	70-130
1,1,2-Trichloroethane	109	70-130
Tetrachloroethene	100	70-130
2-Hexanone	117	70-130

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Client Sample ID: LCSD

Lab ID#: 1705092A-07AA

EPA METHOD TO-15 GC/MS

File Name:	**14051004**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/10/17 09:26 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	105	70-130
1,2-Dibromoethane (EDB)	107	70-130
Chlorobenzene	104	70-130
Ethyl Benzene	107	70-130
m,p-Xylene	103	70-130
o-Xylene	108	70-130
Styrene	116	70-130
Bromoform	108	70-130
Cumene	108	70-130
1,1,2,2-Tetrachloroethane	103	70-130
Propylbenzene	105	70-130
4-Ethyltoluene	108	70-130
1,3,5-Trimethylbenzene	112	70-130
1,2,4-Trimethylbenzene	104	70-130
1,3-Dichlorobenzene	99	70-130
1,4-Dichlorobenzene	101	70-130
alpha-Chlorotoluene	109	70-130
1,2-Dichlorobenzene	97	70-130
1,2,4-Trichlorobenzene	76	70-130
Hexachlorobutadiene	77	70-130
Butane	108	60-140
Isopentane	128	60-140

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

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

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Client Sample ID: LCS

Lab ID#: 1705092A-07B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a050903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/9/17 09:30 AM**	

Compound	%Recovery	Method Limits
Freon 12	96	70-130
Freon 114	96	70-130
Chloromethane	113	70-130
Vinyl Chloride	109	70-130
1,3-Butadiene	98	70-130
Bromomethane	103	70-130
Chloroethane	108	70-130
Freon 11	94	70-130
Ethanol	86	70-130
Freon 113	93	70-130
1,1-Dichloroethene	99	70-130
Acetone	100	70-130
2-Propanol	101	70-130
Carbon Disulfide	111	70-130
3-Chloropropene	106	70-130
Methylene Chloride	100	70-130
Methyl tert-butyl ether	98	70-130
trans-1,2-Dichloroethene	116	70-130
Hexane	100	70-130
1,1-Dichloroethane	100	70-130
2-Butanone (Methyl Ethyl Ketone)	110	70-130
cis-1,2-Dichloroethene	108	70-130
Tetrahydrofuran	101	70-130
Chloroform	94	70-130
1,1,1-Trichloroethane	92	70-130
Cyclohexane	103	70-130
Carbon Tetrachloride	87	70-130
2,2,4-Trimethylpentane	100	70-130
Benzene	97	70-130
1,2-Dichloroethane	90	70-130
Heptane	102	70-130
Trichloroethene	90	70-130
1,2-Dichloropropane	94	70-130
1,4-Dioxane	98	70-130
Bromodichloromethane	94	70-130
cis-1,3-Dichloropropene	106	70-130
4-Methyl-2-pentanone	91	70-130
Toluene	91	70-130
trans-1,3-Dichloropropene	100	70-130
1,1,2-Trichloroethane	96	70-130
Tetrachloroethene	90	70-130
2-Hexanone	97	70-130

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Client Sample ID: LCS

Lab ID#: 1705092A-07B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a050903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/9/17 09:30 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	92	70-130
1,2-Dibromoethane (EDB)	92	70-130
Chlorobenzene	93	70-130
Ethyl Benzene	95	70-130
m,p-Xylene	98	70-130
o-Xylene	102	70-130
Styrene	97	70-130
Bromoform	95	70-130
Cumene	92	70-130
1,1,2,2-Tetrachloroethane	100	70-130
Propylbenzene	96	70-130
4-Ethyltoluene	92	70-130
1,3,5-Trimethylbenzene	92	70-130
1,2,4-Trimethylbenzene	92	70-130
1,3-Dichlorobenzene	90	70-130
1,4-Dichlorobenzene	91	70-130
alpha-Chlorotoluene	101	70-130
1,2-Dichlorobenzene	88	70-130
1,2,4-Trichlorobenzene	92	70-130
Hexachlorobutadiene	89	70-130
Butane	100	60-140
Isopentane	100	60-140

Container Type: NA - Not Applicable

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

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Client Sample ID: LCSD

Lab ID#: 1705092A-07BB

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a050904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/9/17 09:54 AM**	

Compound	%Recovery	Method Limits
Freon 12	95	70-130
Freon 114	95	70-130
Chloromethane	111	70-130
Vinyl Chloride	107	70-130
1,3-Butadiene	95	70-130
Bromomethane	104	70-130
Chloroethane	108	70-130
Freon 11	91	70-130
Ethanol	87	70-130
Freon 113	91	70-130
1,1-Dichloroethene	98	70-130
Acetone	94	70-130
2-Propanol	100	70-130
Carbon Disulfide	107	70-130
3-Chloropropene	104	70-130
Methylene Chloride	97	70-130
Methyl tert-butyl ether	96	70-130
trans-1,2-Dichloroethene	117	70-130
Hexane	98	70-130
1,1-Dichloroethane	97	70-130
2-Butanone (Methyl Ethyl Ketone)	110	70-130
cis-1,2-Dichloroethene	109	70-130
Tetrahydrofuran	98	70-130
Chloroform	94	70-130
1,1,1-Trichloroethane	88	70-130
Cyclohexane	101	70-130
Carbon Tetrachloride	84	70-130
2,2,4-Trimethylpentane	100	70-130
Benzene	100	70-130
1,2-Dichloroethane	91	70-130
Heptane	103	70-130
Trichloroethene	96	70-130
1,2-Dichloropropane	96	70-130
1,4-Dioxane	100	70-130
Bromodichloromethane	96	70-130
cis-1,3-Dichloropropene	106	70-130
4-Methyl-2-pentanone	94	70-130
Toluene	94	70-130
trans-1,3-Dichloropropene	101	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	93	70-130
2-Hexanone	99	70-130

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Client Sample ID: LCSD

Lab ID#: 1705092A-07BB

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a050904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/9/17 09:54 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	93	70-130
1,2-Dibromoethane (EDB)	93	70-130
Chlorobenzene	94	70-130
Ethyl Benzene	97	70-130
m,p-Xylene	97	70-130
o-Xylene	102	70-130
Styrene	98	70-130
Bromoform	95	70-130
Cumene	93	70-130
1,1,2,2-Tetrachloroethane	102	70-130
Propylbenzene	97	70-130
4-Ethyltoluene	94	70-130
1,3,5-Trimethylbenzene	94	70-130
1,2,4-Trimethylbenzene	93	70-130
1,3-Dichlorobenzene	90	70-130
1,4-Dichlorobenzene	92	70-130
alpha-Chlorotoluene	102	70-130
1,2-Dichlorobenzene	90	70-130
1,2,4-Trichlorobenzene	94	70-130
Hexachlorobutadiene	90	70-130
Butane	97	60-140
Isopentane	99	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	100	70-130

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5/19/2017

Ms. Elizabeth Kunkel
URS Corporation
1001 Highlands Plaza Dr. West
Suite 300
St. Louis MO 63110

Project Name: Roxana Quarterly Soil Vapor
Project #: 60527968 - 1.04.002
Workorder #: 1705078AR1

Dear Ms. Elizabeth Kunkel

The following report includes the data for the above referenced project for sample(s) received on 5/3/2017 at Air Toxics Ltd.

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

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

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1705078AR1

Work Order Summary

CLIENT:	Ms. Elizabeth Kunkel AECOM 1001 Highlands Plaza Dr. West Suite 300 St. Louis, MO 63110	**BILL TO:**	Accounts Payable Austin AECOM PO Box 203970 Austin, TX 78720
PHONE:	314-743-4179	**P.O. #**	60527968-104002
FAX:		**PROJECT #**	60527968 - 1.04.002 Roxana Quarterly Soil Vapor
DATE RECEIVED:	05/03/2017	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	05/15/2017		
DATE REISSUED:	05/19/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VMP-55-20-050117	TO-15	4.5 "Hg	15 psi
02A	Lab Blank	TO-15	NA	NA
03A	CCV	TO-15	NA	NA
04A	LCS	TO-15	NA	NA
04AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 05/19/17

Technical Director

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

LABORATORY NARRATIVE
EPA Method TO-15 Soil Gas
URS Corporation
Workorder# 1705078AR1

One 1 Liter Summa Canister sample was received on May 03, 2017. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 50 mLs of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

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

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

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

Dilution was performed on sample VMP-55-20-050117 due to the presence of high level target species.

The workorder was reissued on 05/19/17 to include the narrative below.

Due to the low concentration (below the reporting limit on-column) and the hydrocarbon matrix, Chloroform was identified in sample VMP-55-20-050117 as follows:

Chloroform has two mass ions characteristic 83 and 85. Mass 83 is the mass ion used for quantitation and 85 is the secondary ion. There is a mass 83 peak at the correct retention time for Chloroform, however, a very large hydrocarbon peak elutes just after Chloroform and contains a significant mass 85 peak as well as other mass fragments which overwhelm the pattern identification efforts based on pattern matching. Upon close inspection of the coeluting hydrocarbon NIST identification and spectra, no mass 83 is evident in the interfering peak which suggests that the 83 peak eluting at the time of Chloroform is attributed to Chloroform. Upon this evaluation, the peak was identified as Chloroform with an estimated flag due to its presence below the reporting limit. There is not sufficient information to make a definitive call on the presence or absence of Chloroform.

Definition of Data Qualifying Flags

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

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

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

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

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

N - The identification is based on presumptive evidence.

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

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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

Client Sample ID: VMP-55-20-050117

Lab ID#: 1705078AR1-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	600	79000	2100	280000
Chloroform	600	480 J	2900	2300 J
Cyclohexane	600	87000	2000	300000
2,2,4-Trimethylpentane	600	71000	2800	330000
Heptane	600	23000	2400	95000
Butane	2400	130000	5600	310000
Isopentane	2400	330000	7000	980000

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Client Sample ID: VMP-55-20-050117

Lab ID#: 1705078AR1-01A

EPA METHOD TO-15 GC/MS

File Name:	**14051228**	**Date of Collection:**	**5/1/17 11:06:00 AM**
Dil. Factor:	**119**	**Date of Analysis:**	**5/12/17 09:31 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	600	Not Detected	2900	Not Detected
Freon 114	600	Not Detected	4200	Not Detected
Chloromethane	2400	Not Detected	4900	Not Detected
Vinyl Chloride	600	Not Detected	1500	Not Detected
1,3-Butadiene	600	Not Detected	1300	Not Detected
Bromomethane	2400	Not Detected	9200	Not Detected
Chloroethane	2400	Not Detected	6300	Not Detected
Freon 11	600	Not Detected	3300	Not Detected
Ethanol	2400	Not Detected	4500	Not Detected
Freon 113	600	Not Detected	4600	Not Detected
1,1-Dichloroethene	600	Not Detected	2400	Not Detected
Acetone	2400	Not Detected	5600	Not Detected
2-Propanol	2400	Not Detected	5800	Not Detected
Carbon Disulfide	2400	Not Detected	7400	Not Detected
3-Chloropropene	2400	Not Detected	7400	Not Detected
Methylene Chloride	2400	Not Detected	8300	Not Detected
Methyl tert-butyl ether	600	Not Detected	2100	Not Detected
trans-1,2-Dichloroethene	600	Not Detected	2400	Not Detected
Hexane	600	79000	2100	280000
1,1-Dichloroethane	600	Not Detected	2400	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2400	Not Detected	7000	Not Detected
cis-1,2-Dichloroethene	600	Not Detected	2400	Not Detected
Tetrahydrofuran	600	Not Detected	1800	Not Detected
Chloroform	600	480 J	2900	2300 J
1,1,1-Trichloroethane	600	Not Detected	3200	Not Detected
Cyclohexane	600	87000	2000	300000
Carbon Tetrachloride	600	Not Detected	3700	Not Detected
2,2,4-Trimethylpentane	600	71000	2800	330000
Benzene	600	Not Detected	1900	Not Detected
1,2-Dichloroethane	600	Not Detected	2400	Not Detected
Heptane	600	23000	2400	95000
Trichloroethene	600	Not Detected	3200	Not Detected
1,2-Dichloropropane	600	Not Detected	2700	Not Detected
1,4-Dioxane	2400	Not Detected	8600	Not Detected
Bromodichloromethane	600	Not Detected	4000	Not Detected
cis-1,3-Dichloropropene	600	Not Detected	2700	Not Detected
4-Methyl-2-pentanone	600	Not Detected	2400	Not Detected
Toluene	600	Not Detected	2200	Not Detected
trans-1,3-Dichloropropene	600	Not Detected	2700	Not Detected
1,1,2-Trichloroethane	600	Not Detected	3200	Not Detected
Tetrachloroethene	600	Not Detected	4000	Not Detected
2-Hexanone	2400	Not Detected	9700	Not Detected

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Client Sample ID: VMP-55-20-050117

Lab ID#: 1705078AR1-01A

EPA METHOD TO-15 GC/MS

File Name:	**14051228**	**Date of Collection:**	**5/1/17 11:06:00 AM**
Dil. Factor:	**119**	**Date of Analysis:**	**5/12/17 09:31 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	600	Not Detected	5100	Not Detected
1,2-Dibromoethane (EDB)	600	Not Detected	4600	Not Detected
Chlorobenzene	600	Not Detected	2700	Not Detected
Ethyl Benzene	600	Not Detected	2600	Not Detected
m,p-Xylene	600	Not Detected	2600	Not Detected
o-Xylene	600	Not Detected	2600	Not Detected
Styrene	600	Not Detected	2500	Not Detected
Bromoform	600	Not Detected	6200	Not Detected
Cumene	600	Not Detected	2900	Not Detected
1,1,2,2-Tetrachloroethane	600	Not Detected	4100	Not Detected
Propylbenzene	600	Not Detected	2900	Not Detected
4-Ethyltoluene	600	Not Detected	2900	Not Detected
1,3,5-Trimethylbenzene	600	Not Detected	2900	Not Detected
1,2,4-Trimethylbenzene	600	Not Detected	2900	Not Detected
1,3-Dichlorobenzene	600	Not Detected	3600	Not Detected
1,4-Dichlorobenzene	600	Not Detected	3600	Not Detected
alpha-Chlorotoluene	600	Not Detected	3100	Not Detected
1,2-Dichlorobenzene	600	Not Detected	3600	Not Detected
1,2,4-Trichlorobenzene	2400	Not Detected	18000	Not Detected
Hexachlorobutadiene	2400	Not Detected	25000	Not Detected
Butane	2400	130000	5600	310000
Isopentane	2400	330000	7000	980000

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1705078AR1-02A

EPA METHOD TO-15 GC/MS

File Name:	**14051207a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/12/17 11:04 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	5.0 J	38	9.5 J
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	20	Not Detected	62	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	20	Not Detected	69	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1705078AR1-02A

EPA METHOD TO-15 GC/MS

File Name:	**14051207a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/12/17 11:04 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

J = Estimated value.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: CCV

Lab ID#: 1705078AR1-03A

EPA METHOD TO-15 GC/MS

File Name:	**14051202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/12/17 09:03 AM**	

Compound	%Recovery
Freon 12	102
Freon 114	106
Chloromethane	117
Vinyl Chloride	110
1,3-Butadiene	100
Bromomethane	107
Chloroethane	101
Freon 11	112
Ethanol	101
Freon 113	116
1,1-Dichloroethene	116
Acetone	115
2-Propanol	104
Carbon Disulfide	104
3-Chloropropene	101
Methylene Chloride	115
Methyl tert-butyl ether	111
trans-1,2-Dichloroethene	102
Hexane	116
1,1-Dichloroethane	113
2-Butanone (Methyl Ethyl Ketone)	104
cis-1,2-Dichloroethene	114
Tetrahydrofuran	104
Chloroform	102
1,1,1-Trichloroethane	108
Cyclohexane	118
Carbon Tetrachloride	109
2,2,4-Trimethylpentane	116
Benzene	102
1,2-Dichloroethane	100
Heptane	102
Trichloroethene	98
1,2-Dichloropropane	98
1,4-Dioxane	95
Bromodichloromethane	99
cis-1,3-Dichloropropene	101
4-Methyl-2-pentanone	99
Toluene	97
trans-1,3-Dichloropropene	102
1,1,2-Trichloroethane	106
Tetrachloroethene	95
2-Hexanone	95

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Client Sample ID: CCV
Lab ID#: 1705078AR1-03A
EPA METHOD TO-15 GC/MS

File Name:	**14051202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/12/17 09:03 AM**	

Compound	%Recovery
Dibromochloromethane	99
1,2-Dibromoethane (EDB)	101
Chlorobenzene	102
Ethyl Benzene	100
m,p-Xylene	95
o-Xylene	99
Styrene	99
Bromoform	98
Cumene	101
1,1,2,2-Tetrachloroethane	102
Propylbenzene	102
4-Ethyltoluene	101
1,3,5-Trimethylbenzene	105
1,2,4-Trimethylbenzene	98
1,3-Dichlorobenzene	95
1,4-Dichlorobenzene	100
alpha-Chlorotoluene	95
1,2-Dichlorobenzene	96
1,2,4-Trichlorobenzene	76
Hexachlorobutadiene	82
Butane	104
Isopentane	121

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCS

Lab ID#: 1705078AR1-04A

EPA METHOD TO-15 GC/MS

File Name:	**14051203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/12/17 09:33 AM**	

Compound	%Recovery	Method Limits
Freon 12	107	70-130
Freon 114	112	70-130
Chloromethane	113	70-130
Vinyl Chloride	117	70-130
1,3-Butadiene	105	70-130
Bromomethane	126	70-130
Chloroethane	111	70-130
Freon 11	122	70-130
Ethanol	99	70-130
Freon 113	119	70-130
1,1-Dichloroethene	116	70-130
Acetone	117	70-130
2-Propanol	114	70-130
Carbon Disulfide	113	70-130
3-Chloropropene	122	70-130
Methylene Chloride	116	70-130
Methyl tert-butyl ether	118	70-130
trans-1,2-Dichloroethene	118	70-130
Hexane	126	70-130
1,1-Dichloroethane	118	70-130
2-Butanone (Methyl Ethyl Ketone)	114	70-130
cis-1,2-Dichloroethene	110	70-130
Tetrahydrofuran	109	70-130
Chloroform	103	70-130
1,1,1-Trichloroethane	118	70-130
Cyclohexane	127	70-130
Carbon Tetrachloride	120	70-130
2,2,4-Trimethylpentane	122	70-130
Benzene	109	70-130
1,2-Dichloroethane	104	70-130
Heptane	116	70-130
Trichloroethene	106	70-130
1,2-Dichloropropane	108	70-130
1,4-Dioxane	113	70-130
Bromodichloromethane	111	70-130
cis-1,3-Dichloropropene	113	70-130
4-Methyl-2-pentanone	122	70-130
Toluene	104	70-130
trans-1,3-Dichloropropene	108	70-130
1,1,2-Trichloroethane	110	70-130
Tetrachloroethene	100	70-130
2-Hexanone	119	70-130

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Client Sample ID: LCS
Lab ID#: 1705078AR1-04A
EPA METHOD TO-15 GC/MS

File Name:	**14051203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/12/17 09:33 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	105	70-130
1,2-Dibromoethane (EDB)	106	70-130
Chlorobenzene	107	70-130
Ethyl Benzene	105	70-130
m,p-Xylene	106	70-130
o-Xylene	108	70-130
Styrene	116	70-130
Bromoform	107	70-130
Cumene	108	70-130
1,1,2,2-Tetrachloroethane	106	70-130
Propylbenzene	108	70-130
4-Ethyltoluene	109	70-130
1,3,5-Trimethylbenzene	114	70-130
1,2,4-Trimethylbenzene	104	70-130
1,3-Dichlorobenzene	102	70-130
1,4-Dichlorobenzene	107	70-130
alpha-Chlorotoluene	112	70-130
1,2-Dichlorobenzene	100	70-130
1,2,4-Trichlorobenzene	80	70-130
Hexachlorobutadiene	82	70-130
Butane	110	60-140
Isopentane	123	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCSD
Lab ID#: 1705078AR1-04AA
EPA METHOD TO-15 GC/MS

File Name:	**14051204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/12/17 09:53 AM**	

Compound	%Recovery	Method Limits
Freon 12	105	70-130
Freon 114	106	70-130
Chloromethane	110	70-130
Vinyl Chloride	114	70-130
1,3-Butadiene	102	70-130
Bromomethane	137 Q	70-130
Chloroethane	103	70-130
Freon 11	119	70-130
Ethanol	102	70-130
Freon 113	112	70-130
1,1-Dichloroethene	112	70-130
Acetone	110	70-130
2-Propanol	116	70-130
Carbon Disulfide	110	70-130
3-Chloropropene	126	70-130
Methylene Chloride	117	70-130
Methyl tert-butyl ether	114	70-130
trans-1,2-Dichloroethene	114	70-130
Hexane	122	70-130
1,1-Dichloroethane	113	70-130
2-Butanone (Methyl Ethyl Ketone)	112	70-130
cis-1,2-Dichloroethene	108	70-130
Tetrahydrofuran	107	70-130
Chloroform	102	70-130
1,1,1-Trichloroethane	114	70-130
Cyclohexane	130	70-130
Carbon Tetrachloride	116	70-130
2,2,4-Trimethylpentane	121	70-130
Benzene	109	70-130
1,2-Dichloroethane	102	70-130
Heptane	112	70-130
Trichloroethene	108	70-130
1,2-Dichloropropane	105	70-130
1,4-Dioxane	117	70-130
Bromodichloromethane	108	70-130
cis-1,3-Dichloropropene	112	70-130
4-Methyl-2-pentanone	113	70-130
Toluene	104	70-130
trans-1,3-Dichloropropene	108	70-130
1,1,2-Trichloroethane	108	70-130
Tetrachloroethene	101	70-130
2-Hexanone	116	70-130

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Client Sample ID: LCSD
Lab ID#: 1705078AR1-04AA
EPA METHOD TO-15 GC/MS

File Name:	**14051204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/12/17 09:53 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	105	70-130
1,2-Dibromoethane (EDB)	106	70-130
Chlorobenzene	107	70-130
Ethyl Benzene	107	70-130
m,p-Xylene	104	70-130
o-Xylene	106	70-130
Styrene	116	70-130
Bromoform	107	70-130
Cumene	106	70-130
1,1,2,2-Tetrachloroethane	107	70-130
Propylbenzene	107	70-130
4-Ethyltoluene	111	70-130
1,3,5-Trimethylbenzene	110	70-130
1,2,4-Trimethylbenzene	107	70-130
1,3-Dichlorobenzene	102	70-130
1,4-Dichlorobenzene	107	70-130
alpha-Chlorotoluene	115	70-130
1,2-Dichlorobenzene	102	70-130
1,2,4-Trichlorobenzene	87	70-130
Hexachlorobutadiene	87	70-130
Butane	108	60-140
Isopentane	124	60-140

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	100	70-130

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5/16/2017
Ms. Elizabeth Kunkel
URS Corporation
1001 Highlands Plaza Dr. West
Suite 300
St. Louis MO 63110

Project Name: Roxana Quarterly Soil Vapor
Project #: 60527968 - 1.04.002
Workorder #: 1705092B

Dear Ms. Elizabeth Kunkel

The following report includes the data for the above referenced project for sample(s) received on 5/3/2017 at Air Toxics Ltd.

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

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

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1705092B

Work Order Summary

CLIENT:	Ms. Elizabeth Kunkel AECOM 1001 Highlands Plaza Dr. West Suite 300 St. Louis, MO 63110	**BILL TO:**	Accounts Payable Austin AECOM PO Box 203970 Austin, TX 78720
PHONE:	314-743-4179	**P.O. #**	60527968-104002
FAX:		**PROJECT #**	60527968 - 1.04.002 Roxana Quarterly Soil Vapor
DATE RECEIVED:	05/03/2017	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	05/16/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VMP-15-5-050117	Modified ASTM D-1946	2.5 "Hg	15 psi
02A	VMP-15-21.5-050117	Modified ASTM D-1946	3.5 "Hg	15 psi
03A	VMP-15-25.5-020117	Modified ASTM D-1946	0.5 "Hg	15 psi
04A	VMP-15-25.5-050117-DUP	Modified ASTM D-1946	1.5 "Hg	15 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: Heidi Hayes DATE: 05/16/17

Technical Director

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

LABORATORY NARRATIVE
Modified ASTM D-1946
URS Corporation
Workorder# 1705092B

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

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

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

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

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

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

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-15-5-050117

Lab ID#: 1705092B-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.22	15
Nitrogen	0.22	84
Carbon Dioxide	0.022	0.79

Client Sample ID: VMP-15-21.5-050117

Lab ID#: 1705092B-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	1.4
Nitrogen	0.23	83
Methane	0.00023	1.6
Carbon Dioxide	0.023	14
Ethane	0.0023	0.00026 J

Client Sample ID: VMP-15-25.5-020117

Lab ID#: 1705092B-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.20	2.9
Nitrogen	0.20	79
Methane	0.00020	4.0
Carbon Dioxide	0.020	14
Ethane	0.0020	0.0016 J

Client Sample ID: VMP-15-25.5-050117-DUP

Lab ID#: 1705092B-04A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.21	1.4
Nitrogen	0.21	78
Methane	0.00021	4.5
Carbon Dioxide	0.021	16

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

Client Sample ID: VMP-15-25.5-050117-DUP

Lab ID#: 1705092B-04A

Ethane	0.0021	0.0017 J

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Client Sample ID: VMP-15-5-050117

Lab ID#: 1705092B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10050612**	**Date of Collection: 5/1/17 9:17:00 AM**	
Dil. Factor:	**2.20**	**Date of Analysis: 5/6/17 12:04 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.22	15
Nitrogen	0.22	84
Carbon Monoxide	0.022	Not Detected
Methane	0.00022	Not Detected
Carbon Dioxide	0.022	0.79
Ethane	0.0022	Not Detected
Ethene	0.0022	Not Detected
Helium	0.11	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: VMP-15-21.5-050117

Lab ID#: 1705092B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10050613**	**Date of Collection: 5/1/17 9:41:00 AM**	
Dil. Factor:	**2.29**	**Date of Analysis: 5/6/17 12:26 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	1.4
Nitrogen	0.23	83
Carbon Monoxide	0.023	Not Detected
Methane	0.00023	1.6
Carbon Dioxide	0.023	14
Ethane	0.0023	0.00026 J
Ethene	0.0023	Not Detected
Helium	0.11	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

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Client Sample ID: VMP-15-25.5-020117

Lab ID#: 1705092B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10050614**	**Date of Collection: 5/1/17 10:12:00 AM**	
Dil. Factor:	**2.05**	**Date of Analysis: 5/6/17 12:57 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.20	2.9
Nitrogen	0.20	79
Carbon Monoxide	0.020	Not Detected
Methane	0.00020	4.0
Carbon Dioxide	0.020	14
Ethane	0.0020	0.0016 J
Ethene	0.0020	Not Detected
Helium	0.10	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

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Client Sample ID: VMP-15-25.5-050117-DUP

Lab ID#: 1705092B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10050615**	**Date of Collection: 5/1/17 10:12:00 AM**	
Dil. Factor:	**2.13**	**Date of Analysis: 5/6/17 01:21 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.21	1.4
Nitrogen	0.21	78
Carbon Monoxide	0.021	Not Detected
Methane	0.00021	4.5
Carbon Dioxide	0.021	16
Ethane	0.0021	0.0017 J
Ethene	0.0021	Not Detected
Helium	0.11	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1705092B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10050604a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/6/17 08:23 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.10	0.0058 J
Nitrogen	0.10	0.033 J
Carbon Monoxide	0.010	Not Detected
Methane	0.00010	Not Detected
Carbon Dioxide	0.010	Not Detected
Ethane	0.0010	Not Detected
Ethene	0.0010	Not Detected

J = Estimated value.

Container Type: NA - Not Applicable

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Client Sample ID: Lab Blank

Lab ID#: 1705092B-05B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10050603c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/6/17 07:59 AM**	

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

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1705092B-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10050602**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/6/17 07:31 AM**	

Compound	%Recovery	Method Limits
Oxygen	98	85-115
Nitrogen	88	85-115
Carbon Monoxide	91	85-115
Methane	101	85-115
Carbon Dioxide	97	85-115
Ethane	100	85-115
Ethene	100	85-115
Helium	100	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1705092B-06AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10050619**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/6/17 03:13 PM**	

Compound	%Recovery	Method Limits
Oxygen	98	85-115
Nitrogen	88	85-115
Carbon Monoxide	92	85-115
Methane	98	85-115
Carbon Dioxide	99	85-115
Ethane	97	85-115
Ethene	96	85-115
Helium	100	85-115

Container Type: NA - Not Applicable

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5/16/2017
Ms. Elizabeth Kunkel
URS Corporation
1001 Highlands Plaza Dr. West
Suite 300
St. Louis MO 63110

Project Name: Roxana Quarterly Soil Vapor
Project #: 60527968 - 1.04.002
Workorder #: 1705078B

Dear Ms. Elizabeth Kunkel

The following report includes the data for the above referenced project for sample(s) received on 5/3/2017 at Air Toxics Ltd.

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

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

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1705078B

Work Order Summary

CLIENT:	Ms. Elizabeth Kunkel AECOM 1001 Highlands Plaza Dr. West Suite 300 St. Louis, MO 63110	**BILL TO:**	Accounts Payable Austin AECOM PO Box 203970 Austin, TX 78720
PHONE:	314-743-4179	**P.O. #**	60527968-104002
FAX:		**PROJECT #**	60527968 - 1.04.002 Roxana Quarterly Soil Vapor
DATE RECEIVED:	05/03/2017	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	05/16/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VMP-55-20-050117	Modified ASTM D-1946	4.5 "Hg	15 psi
02A	Lab Blank	Modified ASTM D-1946	NA	NA
02B	Lab Blank	Modified ASTM D-1946	NA	NA
03A	LCS	Modified ASTM D-1946	NA	NA
03AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 05/16/17

Technical Director

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

LABORATORY NARRATIVE
Modified ASTM D-1946
URS Corporation
Workorder# 1705078B

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

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

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

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

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

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

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

Definition of Data Qualifying Flags

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

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

Client Sample ID: VMP-55-20-050117

Lab ID#: 1705078B-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	1.2
Nitrogen	0.24	73
Methane	0.00024	6.3
Carbon Dioxide	0.024	19
Ethane	0.0024	0.0021 J

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Client Sample ID: VMP-55-20-050117

Lab ID#: 1705078B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10050527**	**Date of Collection: 5/1/17 11:06:00 AM**	
Dil. Factor:	**2.38**	**Date of Analysis: 5/5/17 09:39 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	1.2
Nitrogen	0.24	73
Carbon Monoxide	0.024	Not Detected
Methane	0.00024	6.3
Carbon Dioxide	0.024	19
Ethane	0.0024	0.0021 J
Ethene	0.0024	Not Detected
Helium	0.12	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1705078B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10050504a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/5/17 09:57 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.10	0.012 J
Nitrogen	0.10	0.040 J
Carbon Monoxide	0.010	Not Detected
Methane	0.00010	Not Detected
Carbon Dioxide	0.010	Not Detected
Ethane	0.0010	Not Detected
Ethene	0.0010	Not Detected

J = Estimated value.

Container Type: NA - Not Applicable

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Client Sample ID: Lab Blank

Lab ID#: 1705078B-02B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10050505c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/5/17 10:21 AM**	

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

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1705078B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10050502**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/5/17 09:02 AM**	

Compound	%Recovery	Method Limits
Oxygen	98	85-115
Nitrogen	88	85-115
Carbon Monoxide	93	85-115
Methane	100	85-115
Carbon Dioxide	99	85-115
Ethane	99	85-115
Ethene	99	85-115
Helium	100	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1705078B-03AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10050530**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/5/17 10:54 PM**	

Compound	%Recovery	Method Limits
Oxygen	98	85-115
Nitrogen	88	85-115
Carbon Monoxide	90	85-115
Methane	98	85-115
Carbon Dioxide	98	85-115
Ethane	98	85-115
Ethene	97	85-115
Helium	101	85-115

Container Type: NA - Not Applicable