8976 Wellington Road
Manassas, VA 20109

May 2, 2019

R. Scott Deyette
New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau C
625 Broadway, 11th Floor
Albany, New York 12233-7014

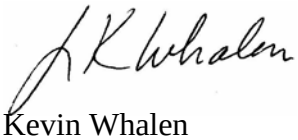
Re: Subslab Depressurization System Shutdown Testing Results
Former IBM Leased Building 982 (Neptune Commerce Center)
Poughkeepsie, Dutchess County, New York
NYSDEC Site No. 314076

Dear Mr. Deyette:

The enclosed document presents the results of shutdown testing associated with the subslab depressurization system at the former IBM leased Building 982 located at the Neptune Commerce Center on Neptune Road, Poughkeepsie, New York. The work described herein was conducted in accordance with the work plan submitted on February 15, 2019.

If you have any questions, please contact me at (540) 535-8993.

Sincerely,
International Business Machines Corporation



Kevin Whalen
Program Manager, Corporate Environmental Affairs

Enclosure: Summary Report

cc: T. Perretta (NYSDOH)
D. Kaminski (NCI)

SANBORN HEAD ENGINEERING

Building Trust. Engineering Success.

Subslab Depressurization System Shutdown Testing Results

Former IBM Leased Building 982 (Neptune Commerce Center)

Poughkeepsie, NY
NYSDEC Site No. 314076

"I, David Shea, certify that I am currently a NYS registered professional engineer and that this report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10)."

Prepared for IBM Corporation
File No. 4593.00
May 2019

SANBORN HEAD ENGINEERING
Building Trust. Engineering Success.

20 Foundry Street
Concord, NH 03301

Kevin Whalen
IBM Corporation
8976 Wellington Road
Manassas, VA 20109

May 2, 2019
File No. 4593.00

Re: Subslab Depressurization System Shutdown Testing Results
Former IBM Leased Building 982 (Neptune Commerce Center)
Poughkeepsie, Dutchess County, New York
NYSDEC Site No. 314076

Dear Mr. Whalen:

This letter documents the results of indoor air and subslab vapor sampling that was conducted to evaluate potential termination of subslab depressurization system (SSDS) operations at the former IBM leased Building 982 located at the Neptune Commerce Center in Poughkeepsie, New York (the site). IBM elected to install the SSD system in 2013 as a pro-active, pre-emptive mitigation measure to address potential soil vapor intrusion. Although IBM is not the owner of the site, IBM is conducting the remediation activities for the site. We understand this letter will be submitted to the New York State Department of Environmental Conservation (NYSDEC) and the Department of Health (NYSDOH) (the Departments) for review and comment.

The work described herein was conducted on behalf of IBM by Sanborn, Head Engineering P.C. in accordance with the February 15, 2019 Work Plan[1] submitted to the Departments, which incorporated responses to Department comments received by IBM on February 15, 2019. The services conducted, and this letter, are subject to the standard limitations for this type of work described in Attachment 1.

BACKGROUND

The former IBM leased Building 982 was redeveloped in 2013-2014 by its current owner, Neptune Capital Investors, LLC. It houses Bounce, a commercial indoor trampoline recreational facility, in the western half of the building, and Crunch, a commercial gymnasium, in the eastern half of the building.

The SSDS for the entire building was installed in the fall of 2013, put into operation on December 13, 2013, and has operated continuously since then. The SSDS installation and start-up was completed in accordance with IBM's 2013 SSDS Work Plan[2] and 2013 SSDS

[1] *Work Plan for Subslab Depressurization System Shutdown Testing, Former IBM Leased Building 982 (Neptune Commerce Center), Poughkeepsie, Dutchess County, New York, NYSDEC Site No. 314076,* IBM Corporation and Sanborn, Head Engineering P.C., February 15, 2019.

[2] *Subslab Depressurization System (SSDS) Design Work Plan, Former Building 982 – Neptune Road, Poughkeepsie, New York, NYSDEC Site No. 314076*, IBM Corporation and Sanborn, Head Engineering P.C., September 26, 2013.

Design Report[3] for these activities. The start-up and performance testing of the SSDS was documented in a February 2014 report (2014 SSDS Startup Report)[4], which was approved by the Departments in an April 25, 2014 letter to IBM.

As documented in the 2014 SSDS Startup Report, the results of indoor air sampling prior to the installation of the SSDS indicated that indoor air had not been affected by soil vapor intrusion; the SSDS was installed by IBM as a pre-emptive measure to facilitate building redevelopment by its owner. The SSDS Startup Report also indicated that IBM, in consultation with the Departments, may conduct a temporary shut-down of the SSDS to evaluate the need for continued operations to mitigate potential soil vapor intrusion.

A recent evaluation of the volatile organic compound (VOC) mass captured by the SSDS, which is included as Attachment 2, indicates that VOC mass capture rates have been consistently low for the past four years. The rate of VOC capture is less than thresholds that would require VOC emissions controls (the SSDS is equipped with vapor-phase granular activated carbon treatment). Furthermore, the consistently low VOC capture rate by the SSDS is such that this mass, if uncaptured and allowed to enter the building, would be unlikely to result in exceedances of NYSDOH's indoor air concentration guidelines, as described in Attachment 2.

Given these evaluations, and consistent with Section 4.5 of NYSDOH's "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" dated October 2006, IBM elected to perform a trial shutdown of the SSDS to evaluate whether the SSDS is needed to address current or potential exposures to VOCs in indoor air related to soil vapor intrusion. This letter summarizes the results of the SSDS shutdown testing.

SUBSLAB VAPOR AND INDOOR AIR SAMPLING

On February 27, 2019, the SSDS was shut down in accordance with the February 15, 2019 work plan. Prior to shutdown, differential pressures were recorded at subslab vapor monitoring ports (SSV ports) planned for sampling to document pre-shutdown conditions. These differential pressures are posted on Figure 1.

On March 28, 2019, 29 days following shutdown, subslab vapor and indoor air sample pairs were collected from six locations previously sampled: three in the Bounce trampoline business on the west side of the building, and three in the Crunch gymnasium on the east side. Three of the SSV ports planned for sampling could not be located due to floor coverings; therefore, the closest accessible ports were sampled instead. The indoor air and subslab vapor sample pair locations, which are shown on Figure 1, provide representative coverage of the building.

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[3] *Subslab Depressurization System (SSDS) Design Report, Former Building 982 – Neptune Road, Poughkeepsie, New York, NYSDEC Site No. 314076*, IBM Corporation and Sanborn, Head Engineering P.C., September 24, 2013.

[4] *Subslab Depressurization System Start-up and Performance Testing Report, Former Building 982 – Neptune Road, Poughkeepsie, New York, NYSDEC Site No. 314076*, IBM Corporation and Sanborn, Head Engineering P.C., February 2014.

The subslab vapor and indoor air samples were collected concurrently using individually certified-clean, 6-liter, pre-evacuated, stainless-steel canisters (Summa® canisters) equipped with flow controllers to obtain 8-hour time-averaged samples. The samples were collected with the HVAC system operating consistent with normal business operations. Subslab vapor samples were collected from the SSV ports using Teflon® tubing. Indoor air samples were collected from a height of three to four feet above the floor. A photographic log of sampling locations is provided as Attachment 3, and a summary of field sampling information is provided in Table 1.

For quality assurance/quality control purposes, several samples were collected concurrently with the subslab vapor and indoor air samples, including: one outdoor air sample (AA-1); one blind duplicate indoor air sample collected at location IA-1017 (FD-01); one blind duplicate subslab vapor sample collected at location SSV-1017 (FD-02); and one field blank sample (FB-01) consisting of a sample canister filled on-site with laboratory-grade nitrogen. Outdoor air sample AA-01 was collected in the parking to the north of B982 to assess the presence of background conditions that could impact indoor air quality.

The samples were submitted to Eurofins/Air Toxics of Folsom, California for analysis of 23 site-specific VOCs listed in the 2013 SSDS Work Plan using USEPA Method TO-15 in selective ion monitoring (SIM) mode. The laboratory reports are included as Attachment 4.

After the sampling was complete, the SSDS was re-started on March 28, 2019.

SAMPLING RESULTS

The indoor air and subslab vapor sample results are presented in Tables 2 and 3, respectively, and summarized on Figure 1. The tables include the results of samples collected in September 2013 prior to SSDS startup.

As described in Section 3.4 of the October 2006 NYSDOH Soil Vapor Intrusion guidance document, subslab vapor/indoor air matrices were developed by NYSDOH to summarize recommended actions to address potential soil vapor intrusion in the event certain guideline concentrations are exceeded. Matrices A, B, and C were updated in May 2017 to include eight VOCs with guideline concentrations for subslab vapor and indoor air. Each matrix and the associated VOCs are listed in the table below:

Subslab Vapor/Indoor Air Matrix	VOC
Matrix A	Carbon tetrachloride 1,1-dichloroethene Cis-1,2-dichloroethene trichloroethene
Matrix B	Methylene chloride* Tetrachloroethene 1,1,1-trichlorethene
Matric C	Vinyl chloride

*not analyzed because this compound is not a historical site contaminant

The results of the subslab vapor/indoor air sample pairs were evaluated in comparison to the guidelines concentrations on each matrix. According to the matrices, the subslab vapor/indoor air concentrations for each of the VOCs for each of the six sample pairs falls under the "no further action" category, with only one exception: in sample pair SSV-1017/IA-1017, trichloroethene (TCE) was detected at 6.2 µg/m^3 in subslab vapor and 0.3 µg/m^3 in indoor air, which according to Matrix A yields a recommendation of "monitor". However, for the field duplicate sample pair collected at the same location, TCE in subslab vapor (FD-02) was 5.0 µg/m^3, and TCE in indoor air (FD-01) was <0.18 µg/m^3, which according to Matrix A yields a recommendation of "no further action."

Other key observations on the sample results are as follows:

- Consistent with the 2013 results, TCE was not detected in any of the 2019 indoor air samples, except for the one low-level detection of 0.3 µg/m^3 noted above. Compared to the 2013 subslab vapor sample results, the maximum TCE concentration decreased from 378 µg/m^3 to 39 µg/m^3.

- Consistent with the 2013 results, 1,1,1-Trichlorethane (TCA) was not detected in any of the 2019 indoor air samples. TCA was the predominant compound detected in the subslab vapor samples, but all results for TCA in 2019 are less than the Matrix B threshold of 100 µg/m^3. Compared to the 2013 subslab vapor sample results, the maximum TCA concentration decreased from 3,020 µg/m^3 to 72 µg/m^3.

- Other VOCs not specified in the NYSDOH matrices that were detected in indoor air were at concentrations less than 1.2 µg/m^3, with the exception of acetone, which was detected at a range of 13 to 61 µg/m^3, and isopropanol, which was detected at a range of 6.2 to 33 µg/m^3. Compared to the 2013 indoor air sample results, the maximum acetone concentration decreased from 390 µg/m^3 to 61 µg/m^3. Isopropanol was not detected in the 2013 samples either in subslab vapor or indoor air. The 2019 sample concentrations of acetone and isopropanol in subslab vapor were generally less than their corresponding indoor air samples, which suggests that the presence of acetone and isopropanol in indoor is not attributable to vapor intrusion.

- Low-level concentrations of other VOCs detected in indoor air were similar in concentration to those in outdoor air, which indicates those VOCs were likely present as background conditions.

- Concentrations of other VOCs detected in subslab vapor were generally similar or substantially lower than those from the September 2013 sampling event, an observation consistent with the decrease in VOC concentrations in subslab vapor captured by the SSD system.

Overall, the 2019 subslab vapor and indoor air sample results confirm the 2013 results, which indicate that indoor air has not been affected by soil vapor intrusion, even without the operation of the SSDS.

Quality Assurance/Quality Control

The analytical data were provided to New Environmental Horizons, Inc. (NEH) of Skillman, NJ for an independent, third-party data usability review (i.e., data validation) in accordance with the Work Plan. The data usability summary reports (DUSRs) are provided in Attachment 5. The review found that all results were considered usable for the project objectives/decisions.

CONCLUSIONS AND NEXT STEPS

The trial SSDS shutdown testing was conducted to evaluate whether the SSDS is needed to address current or potential exposures to VOCs in indoor air related to soil vapor intrusion. When evaluated in comparison to the concentration thresholds in the NYSDOH May 2017 matrices, the results of the trial SSDS shutdown sampling indicate that the SSDS is not needed to mitigate the vapor intrusion pathway.

With the approval of the Departments, we understand that IBM would like to conduct a longer-term trial shutdown of the SSDS, beginning in May 2019 and continuing into the 2019-2020 heating season. In late 2019, sampling of subslab vapor and indoor air would be repeated to confirm the conclusion of this report that the SSDS is no longer needed to mitigate soil vapor intrusion and can be permanently shutdown.

The subslab vapor and indoor air sampling results presented in this report will be provided to the site owner for communication to its tenants consistent with the requirements of New York Environmental Conservation Law ENV Section 27-2405.

Very truly yours,
SANBORN, HEAD ENGINEERING, P.C.

David Shea, P.E.
Principal Engineer

Joseph W. Corsello
Project Manager

Encl. Figure 1 – Summary of 8-Hour Indoor Air & Subslab Vapor Sampling Results
Table 1 – Summary of Indoor Air Sample Information
Table 2 – Summary of 8-Hour Indoor Air Sampling Results
Table 3 – Summary of 8-Hour Subslab Vapor Sampling Results
Attachment 1 – Limitations
Attachment 2 – VOC Air Emissions Screening Model Evaluation Memorandum
Attachment 3 – Photograph Log
Attachment 4 – Analytical Laboratory Reports
Attachment 5 – Data Usability Summary Reports

P:\4500s\4593.00\Source Files\Neptune Rd Shutdown Report\Summary Report.docx

FIGURE

Figure 1

Summary of 8-Hour Indoor Air & Subslab Vapor Sampling Results

SSDS Shutdown Testing

Former Building 982 - Neptune Road
Poughkeepsie, New York

Drawn By: E. Wright
Designed By: J. Corsello
Reviewed By: D. Shea
Project No: 4593.00
Date: May 2019

Figure Narrative

This figure shows the results of indoor air and subslab vapor sampling conducted on March 28, 2019, 29 days after a trial shutdown of the subslab depressurization system (SSDS). The samples were collected as 8-hour time-averaged samples using 6-L SUMMA canisters. Results are shown in micrograms per cubic meter ($\mu g/m^3$).

This figure also shows the subslab vacuum reading (inches of water column) collected with a digital micromanometer prior to the subslab depressurization system shutdown on February 27, 2019.

Notes

1. The exploration locations were surveyed by Berger Engineering and Land Surveying, PLLC.

2. Proposed building layout details were provided by the site owner (Neptune Capital Investors, LLC).

Legend

SSV-1002 — Subslab vapor sampling location

IA-1016 — Indoor air monitoring location

-0.096 — Subslab vacuum reading (in. wc) prior to shut down on 2/27/19

SSV-1016		
CTC	Matrix A	0.40
1,1-DCE		ND
cDCE		ND
TCE		0.23
PCE	Matrix B	0.44
1,1,1 TCA		11
VC	Matrix C	ND

Subslab vapor sample results
( ) indicates duplicate sample
ND indicates not detected

IA-1016		
CTC	Matrix A	0.41
1,1-DCE		ND
cDCE		ND
TCE		ND
PCE	Matrix B	0.37
1,1,1 TCA		ND
VC	Matrix C	ND

Indoor air sample results
( ) indicates duplicate sample
ND indicates not detected

Matrix A, B, and C refer to the May 2017 NYSDOH tables (matrices) on which the VOCs are listed with their guideline concentrations. Refer to Tables 2 and 3 for the results of all VOCs analyzed.

Abbreviations
PCE = Tetrachloroethene
TCE = Trichloroethene
cDCE = cis-1,2-Dichloroethene
1,1-DCE = 1,1-Dichloroethene
VC = Vinyl Chloride
1,1,1-TCA = 1,1,1-Trichloroethane
CTC = Carbon Tetrachloride

10' 5' 0 10' 20' Feet

SANBORN HEAD ENGINEERING

SSV-1001		
CTC	Matrix A	0.40
1,1-DCE		1.9
cDCE		0.27
TCE		39
PCE	Matrix B	0.35
1,1,1 TCA		30
VC	Matrix C	ND

SSV-1001 -4.8

IA-1005		
CTC	Matrix A	0.63
1,1-DCE		ND
cDCE		ND
TCE		ND
PCE	Matrix B	0.22
1,1,1 TCA		ND
VC	Matrix C	ND

SSV-1005 Not Found — IA-1005

-3.9 SSV-1002 — IA-1002

SSV-1002		
CTC	Matrix A	0.49
1,1-DCE		ND
cDCE		0.30
TCE		22
PCE	Matrix B	1.8
1,1,1 TCA		24
VC	Matrix C	ND

IA-1002		
CTC	Matrix A	0.55
1,1-DCE		ND
cDCE		ND
TCE		ND
PCE	Matrix B	ND
1,1,1 TCA		ND
VC	Matrix C	ND

-2.2 SSV-1009

SSV-1009		
CTC	Matrix A	0.48
1,1-DCE		24
cDCE		2.3
TCE		25
PCE	Matrix B	22
1,1,1 TCA		72
VC	Matrix C	ND

IA-1013		
CTC	Matrix A	0.53
1,1-DCE		ND
cDCE		ND
TCE		ND
PCE	Matrix B	0.21
1,1,1 TCA		ND
VC	Matrix C	ND

SSV-1013 Not Found — IA-1013

-0.051 SSV-1033 — IA-1015

IA-1015		
CTC	Matrix A	0.47
1,1-DCE		ND
cDCE		ND
TCE		ND
PCE	Matrix B	ND
1,1,1 TCA		ND
VC	Matrix C	ND

SSV-1033		
CTC	Matrix A	0.36
1,1-DCE		0.12
cDCE		0.13
TCE		ND
PCE	Matrix B	0.27
1,1,1 TCA		2.6
VC	Matrix C	ND

SSV-1015 Not Found

-0.096 SSV-1016 — IA-1016

SSV-1016		
CTC	Matrix A	0.40
1,1-DCE		ND
cDCE		ND
TCE		0.23
PCE	Matrix B	0.44
1,1,1 TCA		11
VC	Matrix C	ND

IA-1016		
CTC	Matrix A	0.41
1,1-DCE		ND
cDCE		ND
TCE		ND
PCE	Matrix B	0.37
1,1,1 TCA		ND
VC	Matrix C	ND

-2.1 SSV-1017 — IA-1017

SSV-1017		
CTC	Matrix A	0.25(0.26)
1,1-DCE		9.1(8.6)
cDCE		0.50(0.53)
TCE		6.2(5.0)
PCE	Matrix B	0.88(0.42)
1,1,1 TCA		47(45)
VC	Matrix C	ND(ND)

IA-1017		
CTC	Matrix A	0.48(0.46)
1,1-DCE		ND(ND)
cDCE		ND(ND)
TCE		0.30(ND)
PCE	Matrix B	ND(0.27)
1,1,1 TCA		ND(ND)
VC	Matrix C	ND(ND)

Crunch Gymnasium

Bounce

SSDS Shutdown 2/27/19 at 15:00
Restart 3/28/19

Subslab Depressurization System Equipment Room

Temp. Office
Unfinished Space
Restroom and Showers
Utility Room
EQUIPMENT BUILDING
RAMP UP (1:12)
LANDING
36" Deck
Dodgeball Court #1
Foam Pits
Main Court
Kiddie Court
Foam Pit
BB Dunk
PARTY ROOM #3
STORAGE
OFFICE
MNGR'S TOILET
BOOK KEEPER OFFICE
RECEPTION
WAITING
STORAGE CUBBIES
PICNIC TABLES
J.C. & STORAGE
MEN'S
PARENT'S LOUNGE
ARCADE AREA
AIR HOCKEY
ELECT.
STORAGE AND ELECT.
PARTY ROOM #2
EXIT #2
STAFF BREAK-ROOM
PARTY ROOM #1

File P:\490s\4593.00\Graphics Files\CAD\SSDS Shutdown Testing\ShutdownTestingResults.dwg Plot Date: 5-2-19

TABLES

TABLE 1
Summary of Sample Information
Former IBM Leased Building 982
Poughkeepsie, New York

Sample Location	Sample Date	Building	Sample Matrix	Canister Number	Sample Height (ft above floor)	Start Time (hours)	Start Pressure (mm Hg)	Stop Time (hours)	Stop Pressure (mm Hg)	Temperature (°F)	Location Description	Notes
IA-1002	3/28/2019	B982	Indoor Air	6L1271	3.5	6:36	-29.0	14:32	-3.5	65	Crunch, near entrance	
IA-1005				6L1001	3.5	6:37	-30.0	14:37	-6.5	65	Crunch, near treadmills	
IA-1013				6L0762	3.5	6:35	-29.0	14:33	-3.5	65	Crunch, near free weights	
IA-1015				9225	3.5	6:04	-26.0	12:50	-3.5	65	Bounce, near main court	
IA-1016				6L1884	3.5	6:03	-27.0	12:49	-4.0	65	Bounce, near kiddie court	
IA-1017				6L0011	3.5	6:06	-30.0	12:51	-6.5	65	Bounce, near dodgeball	
FD-01				9194	3.5	6:06	-29.0	12:51	-6.5	65	IA-1017	Field Duplicate Sample
AA-01		Exterior	Ambient Air	6L1378	0.0	6:51	-28.0	14:51	-5.0	55	Parking lot, near car dealership	Ambient Air Sample
Field Blank		Interior	Nitrogen	9236	0.0	6:55	-28.5	14:55	-13.0	55	Parking lot, near car dealership	Equipment Blank Sample

Notes:

1. Samples were collected by Sanborn Head personnel on the dates indicated.

2. Samples were collected into 6-liter, stainless steel, pre-evacuated SUMMA® canisters using 8-hour metering regulators. Each canister and regulator was laboratory-certified clean (100% certification). The samples were submitted to Eurofins/Air Toxics of Folsom, California for analysis of the 23 project-specific analytes using modified USEPA Method TO-15 using a combination of full scan and selective ion monitoring (SIM) mode.

TABLE 2
Summary of Analytical Results - Indoor and Ambient (Outdoor) Air
Former IBM Leased Building 982
Poughkeepsie, New York

Concentrations in µg/m³

Analyte	AA-1						IA-1002					
	AA1			AA1			IA1002			IA1002		
	09/06/13			03/28/19			09/06/13			03/28/19		
	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias
Acetone	6.79			3.0			148			61		
Butanone (2-) (MEK)	<1.47	U		<2.1	U		<1.47	U		<2.3	U	
Carbon disulfide	0.791			<2.2	U		<0.623	U		<2.4	U	
Carbon tetrachloride	0.396			0.42			0.365			0.55		
Chloroform (Trichloromethane)	0.122			<0.14	U		0.400			0.24		
Dichlorodifluoromethane (CFC12)	1.60			2.4			1.26	J	I	2.4		
Dichloroethane (1,1-)	<0.081	U		<0.12	U		<0.081	U		<0.12	U	
Dichloroethene (1,1-)	<0.079	U		<0.057	U		<0.079	U		<0.061	U	
Dichloroethene (cis-1,2-)	<0.079	U		<0.11	U		<0.079	U		<0.12	U	
Ethane, 1,1,2-trichloro-1,2,2-trifluoro- (CFC113)	0.552			<1.1	U		0.537			<1.2	U	
Ethylbenzene	0.096	EB	H	<0.12	U		0.334	EB	H	0.17		
Isopropyl Alcohol (Isopropanol)	<1.23	U		<1.8	U		<1.23	U		30		
Methyl-2-pentanone (4-) (MIBK)	<2.05	U		<0.59	U		<2.05	U		0.70		
Propene	<0.861	U		<2.5	U		<0.861	U		<2.6	U	
Tetrachloroethene (PCE)	<0.136	U		<0.20	U		<0.136	U		<0.21	U	
Toluene	0.607			0.71			1.15			1.1		
Trichloroethane (1,1,1-)	<0.109	U		<0.16	U		<0.109	U		<0.17	U	
Trichloroethene (TCE)	<0.107	U		<0.16	U		<0.107	U		<0.16	U	
Trichlorofluoromethane	1.27			1.2			1.23			1.2		
Trimethylbenzene (1,2,4-)	0.133	EB	H	<0.71	U		0.324	EB	H	<0.76	U	
Vinyl chloride	<0.051	U		<0.037	U		<0.051	U		<0.039	U	
Xylene (m,p-)	0.295			0.28			1.48			0.45		
Xylene (o-)	0.117			0.15			0.608			0.18		

Analyte	IA-1005						IA-1013					
	IA1005			IA1005			IA1013			IA1013		
	09/06/13			03/28/19			09/06/13			03/28/19		
	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias
Acetone	161			61			137			57		
Butanone (2-) (MEK)	<1.47	U		<2.3	U		<1.47	U		<2.2	U	
Carbon disulfide	<0.623	U		<2.5	U		<0.623	U		<2.3	U	
Carbon tetrachloride	0.359			0.63			0.346			0.53		
Chloroform (Trichloromethane)	0.171			0.26			0.181			0.25		
Dichlorodifluoromethane (CFC12)	1.65			2.4			1.14			2.4		
Dichloroethane (1,1-)	<0.081	U		<0.13	U		<0.081	U		<0.12	U	
Dichloroethene (1,1-)	<0.079	U		<0.063	U		<0.079	U		<0.058	U	
Dichloroethene (cis-1,2-)	<0.079	U		<0.13	U		<0.079	U		<0.12	U	
Ethane, 1,1,2-trichloro-1,2,2-trifluoro- (CFC113)	0.544			<1.2	U		0.544			<1.1	U	
Ethylbenzene	0.343	EB	H	0.16			0.317	EB	H	0.19		
Isopropyl Alcohol (Isopropanol)	<1.23	U		33			<1.23	U		28		
Methyl-2-pentanone (4-) (MIBK)	<2.05	U		0.76			<2.05	U		0.70		
Propene	<0.861	U		<2.7	U		<0.861	U		<2.5	U	
Tetrachloroethene (PCE)	<0.136	U		0.22			<0.136	U		0.21		
Toluene	1.20			1.2			1.10			1.70		
Trichloroethane (1,1,1-)	<0.109	U		<0.17	U		<0.109	U		<0.16	U	
Trichloroethene (TCE)	<0.107	U		<0.17	U		<0.107	U		<0.16	U	
Trichlorofluoromethane	1.25			1.3			1.24			1.2		
Trimethylbenzene (1,2,4-)	0.320	EB	H	<0.78	U		0.305	EB	H	<0.72	U	
Vinyl chloride	<0.051	U		<0.041	U		<0.051	U		<0.038	U	
Xylene (m,p-)	1.55			0.47			1.39			0.50		
Xylene (o-)	0.652			0.22			0.573			0.20		

Analyte	IA-1015								
	IA1015			DUP1			IA1015		
	09/06/13			09/06/13			03/28/19		
	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias
Acetone	166			172			24		
Butanone (2-) (MEK)	<1.47	U		<1.47	U		<2.5	U	
Carbon disulfide	<0.623	U		<0.623	U		<2.6	U	
Carbon tetrachloride	0.384			0.352			0.47		
Chloroform (Trichloromethane)	0.190			0.244			<0.17	U	
Dichlorodifluoromethane (CFC12)	1.47	J	I	1.19	J	I	2.3		
Dichloroethane (1,1-)	<0.081	U		<0.081	U		<0.14	U	
Dichloroethene (1,1-)	<0.079	U		<0.079	U		<0.067	U	
Dichloroethene (cis-1,2-)	<0.079	U		<0.079	U		<0.13	U	
Ethane, 1,1,2-trichloro-1,2,2-trifluoro- (CFC113)	0.544			0.552			<1.3	U	
Ethylbenzene	0.326	EB	H	0.321	EB	H	0.16		
Isopropyl Alcohol (Isopropanol)	<1.23	U		<1.23	U		6.8		
Methyl-2-pentanone (4-) (MIBK)	<2.05	U		<2.05	U		<0.70	U	
Propene	<0.861	U		<0.861	U		<2.9	U	
Tetrachloroethene (PCE)	<0.136	U		0.183			<0.23	U	
Toluene	1.06			1.07			0.92		
Trichloroethane (1,1,1-)	<0.109	U		<0.109	U		<0.18	U	
Trichloroethene (TCE)	<0.107	U		<0.107	U		<0.18	U	
Trichlorofluoromethane	1.25			1.25			1.2		
Trimethylbenzene (1,2,4-)	0.334	EB	H	0.310	EB	H	<0.84	U	
Vinyl chloride	<0.051	U		<0.051	U		<0.043	U	
Xylene (m,p-)	1.42			1.42			0.50		
Xylene (o-)	0.591			0.586			0.25		

Analyte	IA-1016						IA-1017								
	IA1016			IA1016			IA1017			IA1017			FD-01		
	09/06/13			03/28/19			09/06/13			03/28/19			03/28/19		
	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias
Acetone	213			13			198			14			14		
Butanone (2-) (MEK)	<1.47	U		<2.4	U		<1.47	U		<2.5	U		<2.4	U	
Carbon disulfide	<0.623	U		<2.6	U		<0.623	U		<2.6	U		<2.6	U	
Carbon tetrachloride	0.346			0.41			0.352			0.48			0.46		
Chloroform (Trichloromethane)	0.166			<0.16	U		0.166			<0.16	U		<0.16	U	
Dichlorodifluoromethane (CFC12)	1.25			2.3			1.42			2.3			2.4		
Dichloroethane (1,1-)	<0.081	U		<0.13	U		<0.081	U		<0.14	U		<0.13	U	
Dichloroethene (1,1-)	<0.079	U		<0.066	U		<0.079	U		<0.067	U		<0.066	U	
Dichloroethene (cis-1,2-)	<0.079	U		<0.13	U		<0.079	U		<0.13	U		<0.13	U	
Ethane, 1,1,2-trichloro-1,2,2-trifluoro- (CFC113)	0.537			<1.3	U		0.552			<1.3	U		<1.3	U	
Ethylbenzene	0.304	EB	H	0.16			0.339	EB	H	0.19			0.16		
Isopropyl Alcohol (Isopropanol)	<1.23	U		7.6			<1.23	U		6.3			6.2		
Methyl-2-pentanone (4-) (MIBK)	<2.05	U		<0.68	U		<2.05	U		<0.69	U		<0.68	U	
Propene	<0.861	U		<2.8	U		<0.861	U		<2.9	U		<2.8	U	
Tetrachloroethene (PCE)	<0.136	U		0.37			<0.136	U		<0.23	U		0.27		
Toluene	1.07			1.0			1.11			1.7	J	I	4.2	J	I
Trichloroethane (1,1,1-)	<0.109	U		<0.18	U		<0.109	U		<0.18	U		<0.18	U	
Trichloroethene (TCE)	<0.107	U		<0.18	U		<0.107	U		0.30			<0.18	U	
Trichlorofluoromethane	1.24			1.2			1.25			1.2			1.2		
Trimethylbenzene (1,2,4-)	0.320	EB	H	<0.82	U		0.334	EB	H	1.2			<0.82	U	
Vinyl chloride	<0.051	U		<0.042	U		<0.051	U		<0.043	U		<0.042	U	
Xylene (m,p-)	1.34			0.50			1.54			0.54			0.56		
Xylene (o-)	0.565			0.24			0.617			0.25			0.22		

Concentrations in µg/m³

Analyte	2013 Indoor Air			2019 Indoor Air		
	Max	Min	Median	Max	Min	Median
Acetone	390	75.5	169	61	13	24
Butanone (2-) (MEK)	<1.47	<1.47	ND	<2.5	<2.2	ND
Carbon disulfide	<0.623	<0.623	ND	<2.6	<2.3	ND
Carbon tetrachloride	0.384	0.346	0.356	0.63	0.41	0.48
Chloroform (Trichloromethane)	0.400	0.166	0.174	0.26	0.24	0.25
Dichlorodifluoromethane (CFC12)	1.76	1.14	1.30	2.4	2.3	2.4
Dichloroethane (1,1-)	<0.081	<0.081	ND	<0.14	<0.12	ND
Dichloroethene (1,1-)	<0.079	<0.079	ND	<0.067	<0.058	ND
Dichloroethene (cis-1,2-)	<0.079	<0.079	ND	<0.13	<0.12	ND
Ethane, 1,1,2-trichloro-1,2,2-trifluoro- (CFC113)	0.567	0.537	0.544	<1.3	<1.1	ND
Ethylbenzene	0.365	0.304	0.330	0.19	0.16	0.16
Isopropyl Alcohol (Isopropanol)	<1.23	<1.23	ND	33	6.2	7.6
Methyl-2-pentanone (4-) (MIBK)	<2.05	<2.05	ND	0.76	0.70	0.70
Propene	<0.861	<0.861	ND	<2.9	<2.5	ND
Tetrachloroethene (PCE)	0.183	0.183	0.183	0.37	0.21	0.25
Toluene	1.25	1.06	1.10	4.2	0.92	1.2
Trichloroethane (1,1,1-)	<0.109	<0.109	ND	<0.18	<0.16	ND
Trichloroethene (TCE)	<0.107	<0.107	ND	0.30	<0.16	ND
Trichlorofluoromethane	1.25	1.23	1.25	1.3	1.2	1.2
Trimethylbenzene (1,2,4-)	0.393	0.305	0.324	1.2	<0.72	ND
Vinyl chloride	<0.051	<0.051	ND	<0.043	<0.038	ND
Xylene (m,p-)	1.58	1.33	1.45	0.56	0.45	0.50
Xylene (o-)	0.652	0.556	0.600	0.25	0.18	0.22

Notes:

1. Samples from 2013 were collected by Sanborn Head personnel on the dates indicated using 2.7-liter Summa canisters equipped with 8-hour flow controllers and analyzed by Alpha Analytical of Mansfield, Massachusetts for the project-specific list of volatile organic compounds (VOCs) using United States Environmental Protection Agency (USEPA) Method TO-15 in Selective Ion Monitoring (SIM) mode. Samples from 2019 were collected by Sanborn Head personnel on the dates indicated over an approximately 8-hour sampling interval using 6-liter Summa canisters. The samples were analyzed by Eurofins Air Toxics of Folsom, California by USEPA Method TO-15 using a combination of full scan and SIM mode. Location AA-1 is an outdoor ambient air sampling point. IA-series locations are indoor air sampling points.

2. “<” indicates the analyte was not detected at the reporting limit shown.

3. New Environmental Horizons, Inc. (NEH) performed an independent validation of the analytical data, which is provided in Attachment 5. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data:
"EB" - The analyte was also present in the field equipment blank.
"J" - The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"U" - The compound was analyzed for, but was not detected. The associated numerical value is the sample-specific reporting limit. The value is usable for project decisions as a non-detect result at the reporting limit.
"H" - high bias.
"I" - Indeterminate bias.

4. "Max" indicates the maximum detected concentration in the indoor air samples. For those analytes that were not detected in any of the samples, the maximum reporting limit value is presented.
"Min" indicates the minimum detected concentration in the indoor air samples. For those analytes that were not detected in any of the samples, the minimum reporting limit value is presented. For those analytes that were detected, the reporting limit values were not considered when calculating the minimum values.
"Median" indicates the median detected concentration in the indoor air samples.
Max/Min/Median values are shown with up to three significant digits.
"ND" indicates that the analyte was not detected above laboratory reporting limits in any of the indoor air samples.

TABLE 3
Summary of Analytical Results - Subslab Vapor
Former IBM Leased Building 982
Poughkeepsie, New York

Concentrations in μg/m³

Analyte	Field Blank						SSV-1001			SSV-1002					
	FB1			FB1			SSV1001			SSV1002			SSV1002		
	09/06/13			03/28/19			03/28/19			09/06/13			03/28/19		
	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias
Acetone	<13.1	U		<2.6	U		7.4			33.7			8.5	J	H
Butanone (2-) (MEK)	<4.07	U		<3.2	U		<2.5	U		14.3			<2.2	U	
Carbon disulfide	<1.71	U		<3.4	U		<2.7	U		2.59			<2.4	U	
Carbon tetrachloride	<0.346	U		<0.27	U		0.40			<0.506	U		0.49	J	H
Chloroform (Trichloromethane)	<0.269	U		<0.21	U		0.69			22.3			0.47	J	H
Dichlorodifluoromethane (CFC12)	<0.682	U		<0.22	U		2.8			21.0	J	I	2.7	J	H
Dichloroethane (1,1-)	<0.223	U		<0.18	U		0.63			26.6			0.70	J	H
Dichloroethene (1,1-)	<0.218	U		<0.086	U		1.9			53.1			<0.061	U	
Dichloroethene (cis-1,2-)	<0.218	U		<0.17	U		0.27			21.6			0.30	J	H
Ethane, 1,1,2-trichloro-1,2,2-trifluoro- (CFC113)	<1.06	U		<1.7	U		2.8			17.6			1.5	J	H
Ethylbenzene	0.452			<0.19	U		<0.15	U		0.873	EB	H	<0.13	U	
Isopropyl Alcohol (Isopropanol)	<3.39	U		<2.7	U		<2.1	U		<4.94	U		<1.9	U	
Methyl-2-pentanone (4-) (MIBK)	<5.66	U		<0.89	U		<0.70	U		<8.24	U		<0.63	U	
Propene	<2.38	U		<3.8	U		<2.9	U		<3.46	U		<2.6	U	
Tetrachloroethene (PCE)	<0.373	U		<0.30	U		0.35			4.75			1.8	J	H
Toluene	<0.520	U		0.18			0.17			3.02			<0.12	U	
Trichloroethane (1,1,1-)	<0.300	U		<0.24	U		30			726			24	J	H
Trichloroethene (TCE)	<0.296	U		<0.23	U		39			378			22	J	H
Trichlorofluoromethane	<0.776	U		<1.2	U		1.2			3.71			1.2	J	H
Trimethylbenzene (1,2,4-)	0.311			<1.1	U		<0.84	U		1.86	EB	H	<0.75	U	
Vinyl chloride	<0.141	U		<0.056	U		<0.044	U		<0.206	U		<0.039	U	
Xylene (m,p-)	<0.478	U		<0.38	U		<0.30	U		4.82			<0.26	U	
Xylene (o-)	<0.239	U		0.19	J	I	<0.15	U		1.78			<0.13	U	
Total VOCs	0.763			0.37			88			1,340			64		

Analyte	SSV-1005			SSV-1009			SSV-1013			SSV-1015			SSV-1016		
	SSV1005			SSV1009			SSV1013			SSV1015			SSV1016		
	09/06/13			03/28/19			09/06/13			09/06/13			09/06/13		
	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias
Acetone	<39.2	U		9.4			<23.6	U		16.9			75.8		
Butanone (2-) (MEK)	15.5			<2.3	U		<7.31	U		6.49			22.0		
Carbon disulfide	<5.14	U		<2.4	U		<3.09	U		2.45			4.83		
Carbon tetrachloride	<1.04	U		0.48			<0.625	U		<0.300	U		<0.969	U	
Chloroform (Trichloromethane)	12.9			4.1			13.4			5.42			5.71		
Dichlorodifluoromethane (CFC12)	6.68			2.7			6.18			12.5			8.06		
Dichloroethane (1,1-)	56.3			5.4			8.90			0.242			9.71		
Dichloroethene (1,1-)	303			24			1.55			0.208			19.3		
Dichloroethene (cis-1,2-)	0.916			2.3			<0.394	U		<0.189	U		<0.611	U	
Ethane, 1,1,2-trichloro-1,2,2-trifluoro- (CFC113)	63.2			<1.2	U		5.75			18.2			5.91		
Ethylbenzene	0.969	EB	H	0.19			0.691	EB	H	5.39	EB	H	0.669	EB	H
Isopropyl Alcohol (Isopropanol)	<10.1	U		<1.9	U		<6.10	U		<2.93	U		<9.46	U	
Methyl-2-pentanone (4-) (MIBK)	<16.9	U		<0.64	U		<10.2	U		<4.88	U		<15.8	U	
Propene	<7.09	U		<2.7	U		<4.27	U		<2.05	U		<6.63	U	
Tetrachloroethene (PCE)	3.69			22			1.52			6.59			5.07		
Toluene	1.68			0.40			<0.935	U		7.20			4.37		
Trichloroethane (1,1,1-)	1,640			72			1,280			414			1,520		
Trichloroethene (TCE)	65.0			25			2.64			<0.256	U		1.28		
Trichlorofluoromethane	3.99			1.5			9.05			5.03			6.57		
Trimethylbenzene (1,2,4-)	1.10	EB	H	<0.77	U		<0.488	U		2.12	EB	H	0.983	EB	H
Vinyl chloride	<0.422	U		<0.040	U		<0.254	U		<0.122	U		<0.394	U	
Xylene (m,p-)	4.60			0.38			3.47			5.39			1.77		
Xylene (o-)	2.22			<0.14	U		1.60			2.65			0.838		
Total VOCs	2,180			170			1,330			511			1,690		

Analyte	SSV-1016			SSV-1017									SSV-1033		
	SSV1016			SSV1017			SSV1017			FD-02			SSV1033		
	03/28/19			09/06/13			03/28/19			03/28/19			03/28/19		
	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias	Result	Qual	Bias
Acetone	10			<58.2	U		9.0	J	I	48	J	I	7.5		
Butanone (2-) (MEK)	<2.3	U		<18.0	U		<2.3	UJ	I	11	J	I	<2.4	U	
Carbon disulfide	<2.5	U		<7.63	U		<2.5	UJ	I	<2.4	U		<2.5	U	
Carbon tetrachloride	0.40			<1.54	U		0.25	J	I	0.26			0.36		
Chloroform (Trichloromethane)	0.21			37.2			2.9	J	I	2.8			0.16		
Dichlorodifluoromethane (CFC12)	2.7			7.81			2.7	J	I	2.6			2.6		
Dichloroethane (1,1-)	0.26			15.5			0.57	J	I	0.53			<0.13	U	
Dichloroethene (1,1-)	<0.063	U		351			9.1	J	I	8.6			0.12		
Dichloroethene (cis-1,2-)	<0.12	U		<0.971	U		0.50	J	I	0.53			0.13		
Ethane, 1,1,2-trichloro-1,2,2-trifluoro- (CFC113)	<1.2	U		62.2			4.8	J	I	3.6			<1.2	U	
Ethylbenzene	<0.14	U		<1.06	U		<0.14	UJ	I	0.20			<0.14	U	
Isopropyl Alcohol (Isopropanol)	<1.9	U		<15.0	U		<1.9	UJ	I	2.4			<2.0	U	
Methyl-2-pentanone (4-) (MIBK)	<0.65	U		<25.1	U		<0.65	UJ	I	0.82			<0.66	U	
Propene	<2.7	U		<10.5	U		<2.7	UJ	I	<2.7	U		<2.8	U	
Tetrachloroethene (PCE)	0.44			1.91			0.88	J	I	0.42			0.27		
Toluene	0.14			<2.31	U		0.27	J	I	0.63	J	I	<0.12	U	
Trichloroethane (1,1,1-)	11			3,020			47	J	I	45			2.6		
Trichloroethene (TCE)	0.23			<1.32	U		6.2	J	I	5.0			<0.17	U	
Trichlorofluoromethane	1.0			8.32			1.2	J	I	1.1			0.98		
Trimethylbenzene (1,2,4-)	<0.78	U		<1.20	U		<0.78	UJ	I	<0.76	U		<0.80	U	
Vinyl chloride	<0.040	U		<0.626	U		<0.040	UJ	I	<0.040	U		<0.041	U	
Xylene (m,p-)	<0.27	U		<2.12	U		<0.27	UJ	I	0.76			<0.28	U	
Xylene (o-)	<0.14	U		<1.06	U		0.25	J	I	0.28			<0.14	U	
Total VOCs	26			3,500			86			130			15		

Concentrations in μg/m³

Analyte	2013 Subslab Vapor			2019 Subslab Vapor		
	Max	Min	Median	Max	Min	Median
Acetone	75.8	16.9	42.0	48	7.4	9.0
Butanone (2-) (MEK)	22.0	6.25	15.4	11	<2.2	ND
Carbon disulfide	7.22	2.45	4.78	<2.7	<2.4	ND
Carbon tetrachloride	0.705	0.566	0.636	0.49	0.25	0.40
Chloroform (Trichloromethane)	37.2	5.42	15.9	4.1	0.16	0.69
Dichlorodifluoromethane (CFC12)	33.0	2.67	6.63	2.8	2.6	2.7
Dichloroethane (1,1-)	56.3	0.242	8.28	5.4	0.26	0.60
Dichloroethene (1,1-)	351	0.208	36.5	24	0.12	8.6
Dichloroethene (cis-1,2-)	21.6	0.324	0.696	2.3	0.13	0.40
Ethane, 1,1,2-trichloro-1,2,2-trifluoro- (CFC113)	63.2	2.10	14.3	4.8	1.5	3.2
Ethylbenzene	55.2	0.399	1.05	0.20	0.19	0.20
Isopropyl Alcohol (Isopropanol)	<15.2	<2.83	ND	2.4	<1.9	ND
Methyl-2-pentanone (4-) (MIBK)	<25.3	<4.71	ND	0.82	<0.64	ND
Propene	3.18	2.48	2.83	<2.9	<2.6	ND
Tetrachloroethene (PCE)	135	1.52	5.83	22	0.27	0.44
Toluene	11.1	1.11	3.06	0.63	0.14	0.27
Trichloroethane (1,1,1-)	3,020	13.6	925	72	2.6	30
Trichloroethene (TCE)	378	0.666	1.40	39	0.23	14
Trichlorofluoromethane	12.0	1.78	6.55	1.5	1.0	1.2
Trimethylbenzene (1,2,4-)	2.12	0.531	1.22	<0.84	<0.75	ND
Vinyl chloride	<0.631	<0.117	ND	<0.044	<0.039	ND
Xylene (m,p-)	269	1.01	4.82	0.76	0.38	0.57
Xylene (o-)	86.9	0.433	2.22	0.28	0.25	0.27
Total VOCs	3,500	476	1,305	170	15	86

Notes:

1. Samples from 2013 were collected by Sanborn Head personnel on the dates indicated using 1-liter Summa canisters equipped with 1-hour flow controllers and analyzed by Alpha Analytical of Mansfield, Massachusetts using United States Environmental Protection Agency (USEPA) Method TO-15 in Selective Ion Monitoring (SIM) mode. Samples from 2019 were collected by Sanborn Head personnel on the dates indicated over an approximately 8-hour sampling interval using 6-liter Summa canisters. The samples were analyzed by Eurofins Air Toxics of Folsom, California by USEPA Method TO-15 using a combination of full scan and SIM mode. SSV-series locations are subslab vapor sampling points.

2. “<” indicates the analyte was not detected at the reporting limit shown.
"Total VOCs" indicates the sum of detected concentrations.

3. New Environmental Horizons, Inc. (NEH) performed an independent validation of the analytical data, which is provided in Attachment 5. All results were considered acceptable, with the understanding of the potential uncertainty (bias) in the qualified results. In some cases, NEH assigned the following qualifiers and biases to the data:
"EB" - The analyte was also present in the field equipment blank.
"J" - The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"U" - The compound was analyzed for, but was not detected. The associated numerical value is the sample-specific reporting limit. The value is usable for project decisions as a non-detect result at the reporting limit.
"H" - high bias.
"I" - Indeterminate bias.

5. "Max" indicates the maximum detected concentration in the subslab vapor samples. For those analytes that were not detected in any of the samples, the maximum reporting limit value is presented.
"Min" indicates the minimum detected concentration in the subslab vapor samples. For those analytes that were not detected in any of the samples, the minimum reporting limit value is presented. For those analytes that were detected, the reporting limit values were not considered when calculating the minimum values.
"Median" indicates the median detected concentration in the subslab vapor samples.
Max/Min/Median and Total VOC values are shown with up to three significant digits.
"ND" indicates that the analyte was not detected above laboratory reporting limits in any of the subslab vapor samples.

ATTACHMENT 1

LIMITATIONS

ATTACHMENT 1
SHPC LIMITATIONS

1. The findings and conclusions described in this report are based in part on the data obtained from a finite number of samples from widely spaced locations. The figures are intended to depict inferred conditions during a given period of time, consistent with available information. The actual conditions will vary from that shown, both spatially and temporally. Other interpretations are possible. The nature and extent of variations between sampling locations may not become evident until further investigation is initiated. If variations or other latent conditions then appear evident, it may be necessary to re-evaluate the conclusions of this report.

2. Quantitative laboratory testing was performed by others as part of the investigation as noted within the report. It must be noted that additional compounds not searched for during the current study may be present in indoor air at the site. Moreover, it should be noted that variations in the types and concentrations of contaminants and variations in their distribution within the indoor air may occur due to the passage of time, seasonal fluctuations, and other factors.

3. This report has been prepared for the exclusive use of the IBM Corporation for specific application to the former IBM leased Building 982 in accordance with generally accepted hydrogeologic and engineering practices. No warranty, expressed or implied, is made. The contents of this report should not be relied on by any other party without the express written consent of SHPC.

4. In preparing this report, SHPC has endeavored to conform to generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area. SHPC has attempted to observe a degree of care and skill generally exercised by the technical community under similar circumstances and conditions.

ATTACHMENT 2

VOC AIR EMISSIONS SCREENING MODEL EVALUATION MEMORANDUM

SANBORN HEAD ENGINEERING

SANBORN HEAD ENGINEERING
Building Trust. Engineering Success.

MEMORANDUM

To: Kevin Whalen

From: David Shea, P.E.
Joe Corsello, P.E. (Sanborn, Head & Associates, Inc.)

File: 3304.02

Date: December 18, 2018

Re: VOC Air Emissions Screening Model Evaluation for
Former Building 982 – Neptune Rd Subslab Depressurization System

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This memorandum presents the methods and results of an air emissions modeling evaluation to assess the potential need for air emissions controls (i.e., vapor phase carbon treatment) for the former Building 982 – Neptune Road (Neptune Rd) subslab depressurization (SSD) system. The Neptune Rd SSD system is located at the former IBM leased Building 982 at 2 Neptune Road in Poughkeepsie, New York. It also includes data on the volatile organic compound (VOC) concentrations and mass removed by the SSD system since its startup in December 2013.

VOC MASS REMOVAL

Total VOC concentrations, VOC mass removal rate, and cumulative VOC mass removed time series plots are shown below on Figures 1 and 2. Review of these plots indicates an exponential decay with the mass removal rate approaching an asymptote that represents the mass transfer limitations in the subsurface. These data show that the total VOC mass removal rates have been consistently low for the past four years of SSD operation and suggest that emissions controls are no longer required for the Neptune Rd SSD system.

Figure 1 – Total VOC Concentrations vs Time

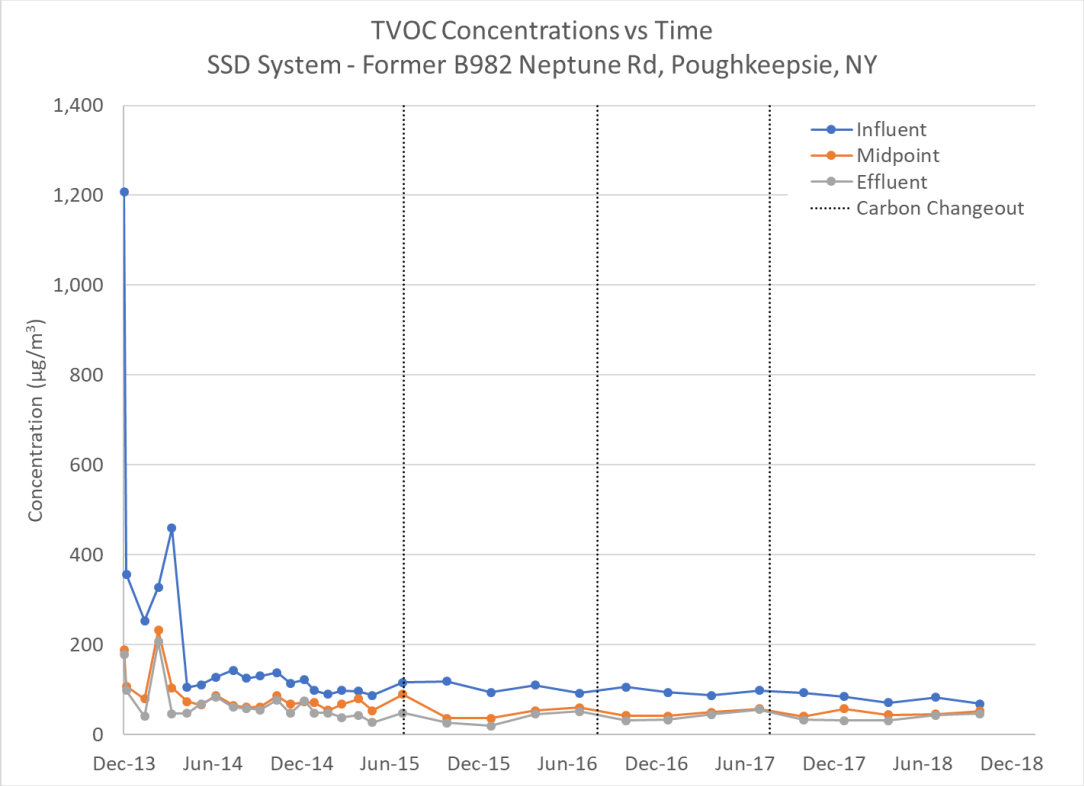
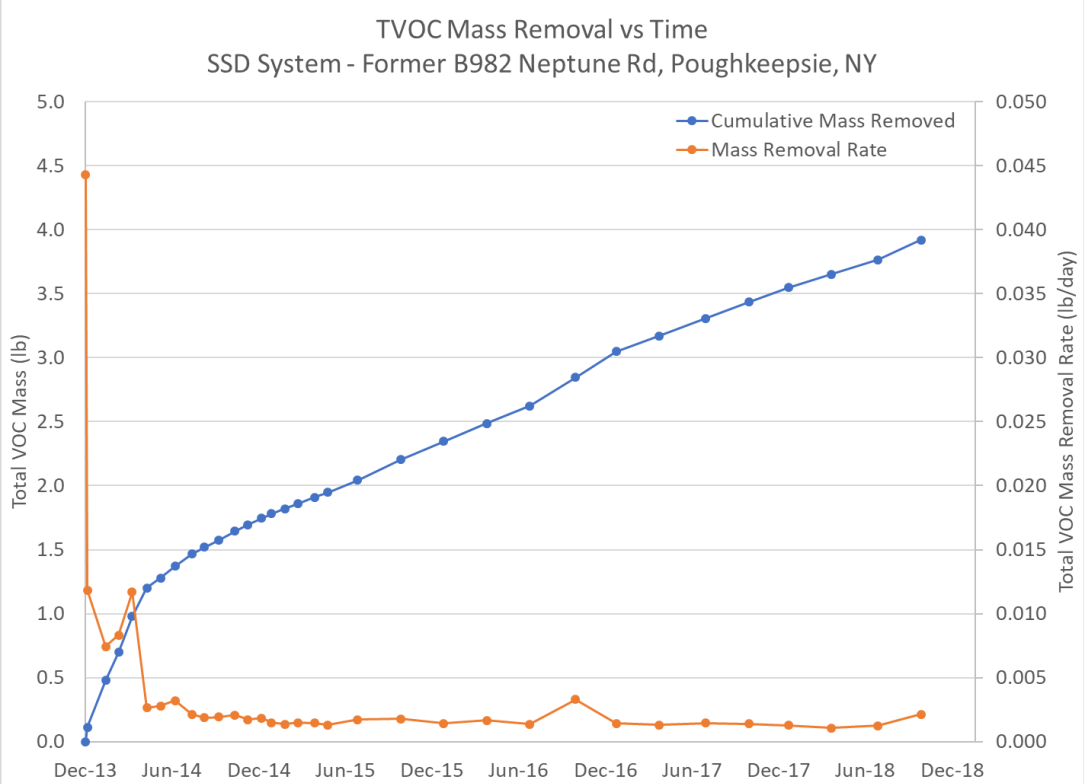


Figure 2 – Total VOC Mass Removal & Cumulative Mass Removed vs Time



VOC EMISSIONS CONTROL ASSESSMENT

In a February 28, 2003 memorandum, the New York State Department of Environmental Conservation (NYSDEC) has taken the position that air pollution controls are required for environmental remediation systems with an emission rate potential greater than 0.5 lbs/hr of total VOCs. In addition, the emission source cannot cause air pollution, which means the emissions cannot cause ambient air VOC levels at the property line, or farther off-site, to exceed ambient guideline concentrations. The ambient air VOC guideline concentrations are published in the New York State Division of Air Resources (DAR) Guidelines for the Control of Toxic Ambient Air Contaminants (known as DAR-1). DAR-1 contains both short-term (24-hr) guideline concentrations (referred to as SGCs) and long-term (annual) guideline concentrations (referred to as AGCs).

DAR-1 indicates that ambient air concentrations resulting from an emissions source should be assessed using air dispersion modeling software, such as USEPA's AERSCREEN model. Therefore, air emissions and dispersion modeling were conducted for the Neptune Rd SSD system using AERSCREEN to assess the maximum ambient VOC concentrations for comparison to the DAR-1 SGCs and AGCs. The following sections summarize the methods and results of the AERSCREEN modeling.

Methods

Table 1 provides the system-specific input parameters that were used in the AERSCREEN analysis. Although the total VOC emissions rate for the system is less than the NYSDEC threshold of 0.5 lbs/hr that would require emissions controls, the compounds detected within the extracted vapor stream were evaluated using AERSCREEN for comparison to their respective SGCs and AGCs. The emissions rates were estimated using the most recent sampling results of the captured vapor stream and the calculated flowrate at the system blower intake.

Table 1 – AERSCREEN Input Parameters

Neptune Rd	
Emissions Rate (lbs total VOCs/hr)	4.25×10^{-5}
Emissions Rate (lbs TCE/hr)	1.76×10^{-5}
Stack height (ft)	27
Exit velocity (ft/sec)	14
Stack diameter (in)	6
Discharge temperature (°F)	90

In addition to the parameters provided in Table 1, information on the surrounding buildings and terrain, along with default AERSCREEN meteorological data were used as model inputs.

Model Results

Table 2 summarizes the AERSCREEN model predictions for the maximum ambient air concentrations resulting from the emissions estimates in Table 1 and includes the SGCs and

AGCs for comparison. As shown in Table 2, neither the SGCs or AGCs were exceeded for any compound, indicating that emissions controls are not required for the Neptune Rd SSD system.

Table 2 – Summary of AERSCREEN Results

Compound	SGC (µg/m³)		AGC (µg/m³)	
	DAR-1 Ambient Air Guidelines	Model-Predicted Maximum Ambient Air Concentration	DAR-1 Ambient Air Guidelines	Model-Predicted Maximum Ambient Air Concentration
Trichloroethene	20	0.07	0.20	0.012
1,1,1-Trichloroethane	NA	0.02	1.4	0.003
1,1-Dichloroethene	NA	0.01	200	0.001
Freon 113	960,000	0.00	180,000	0.000
1,1-Dichloroethane	NA	0.00	0.63	0.000
cis-1,2-Dichloroethene	NA	0.00	63	0.001
Tetrachloroethene	300	0.00	4.0	0.000
Vinyl chloride	180,000	0.00	0.11	0.000
Acetone	180,000	0.01	30,000	0.002
Dichlorodifluoromethane	NA	0.01	12,000	0.001
Trichlorofluoromethane	9,000	0.00	5,000	0.001
Propylene	NA	0.00	3,000	0.001
Isopropanol	98,000	0.01	7,000	0.001
Carbon disulfide	6,200	0.00	700	0.001
2-Butanone	13,000	0.01	5,000	0.001
Chloroform	150	0.00	14.7	0.001
Carbon tetrachloride	1,900	0.00	0.17	0.000
4-Methyl-2-pentanone	31,000	0.01	3,000	0.002
Toluene	37,000	0.00	5,000	0.000
Ethylbenzene	NA	0.00	1,000	0.000
p/m-Xylene	22,000	0.00	100	0.000
o-Xylene	22,000	0.00	100	0.000
1,2,4-Trimethylbenzene	NA	0.00	6	0.000

Notes:
µg/m³ = micrograms per cubic meter.
NA = SGC or AGC not published.

POTENTIAL INDOOR AIR TCE CONCENTRATION EVALUATION

To evaluate if the Neptune Road SSD system could be shut down, indoor air TCE concentrations were estimated using the SSD system analytical data and building information. Theoretically, if the SSD system was shut down, all VOC mass captured by the SSD system could potentially enter the building. The amount of VOC mass entering the building can be approximated using the following equation:

$$Mass\ Load = Flow_{building} x\ Concentration_{building}$$

Where,

$Mass\ Load = Flow_{SSD\ system} x\ Concentration_{SSD\ system}$

$Flow_{building} = Air\ Exhance\ Rate\ x\ Volume_{building}$

Table 3 provides the input parameters used in this calculation based on the most recent set of analytical data collected from the SSD system in October 2018.

Table 3 – IA Concentration Evaluation Input Parameters

Neptune Rd	
Building footprint (sf)	43,700
Building height (ft)	20
Volume $_{building}$ (cf)	437,000*
Flow $_{SSD\ system}$ (cfm)	166
Concentration $_{SSD\ system}$ (µg TCE/m^3)	28.3
Mass Load (µg TCE/hr)	8,000

* The total building volume was divided by two to account for the interior partition wall.

The air exchange rate (AER) for the building is not known, therefore AERs ranging from 0.25 to 5 hr^{-1} were used to calculate a possible range of indoor air TCE concentrations. AERs can vary greatly between buildings and typically range from 1 to 5 depending on the building use, with lower values being more conservative. Table 4 below provides the resulting indoor air TCE concentrations based on varying AERs.

Table 4 – Calculated TCE Concentrations in Indoor Air

Air Exchange Rate (hr^{-1})	Indoor Air TCE Concentration (µg/m^3)
0.25	2.58
0.5	1.29
1	0.65
2	0.32
3	0.22
4	0.16
5	0.13

As shown in Table 4, concentrations of TCE in indoor air are expected to exceed the applicable New York State standard of 2 µg/m^3 only when an AER of 0.25 hr^{-1} is used. An AER of 0.25 hr^{-1} is at the low end of the spectrum and is therefore considered to be most conservative.

The TCE concentrations in Table 4 are likely over-estimated because the calculations assume that all TCE captured by the SSDS would enter the indoor air if the SSDS was shut down. In reality, the building floor/foundation acts as a barrier that acts to attenuate the rate of vapor

entry into the building. This attenuation factor is likely at least 0.1, which means that the concentrations in Table 4 would likely be lower by at least a factor of 10. Therefore, a test to see if the Neptune Rd SSD system could be shut down is worth attempting.

\\bosserv1\shdata\SHDATA\3600s\3623.00\Work\Vapor Extraction System\Air Modeling\201812 Neptune Rd Air Model Technical Memo.docx

ATTACHMENT 3

PHOTOGRAPH LOG

ATTACHMENT 3
Neptune Rd 8-Hour Indoor Air Sampling Photograph Log

Photo 1: Sample AA-01, located north of building in parking lot

Photo 2: Sample IA-1002, located in Crunch entrance area

Photo 3: Sample IA-1005, located in Crunch exercise area

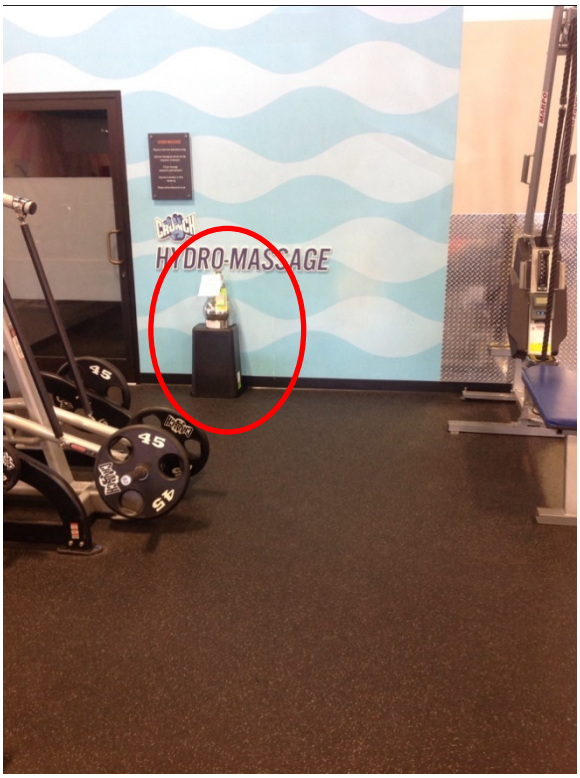


Photo 4: Sample IA-1013, located in Crunch exercise area

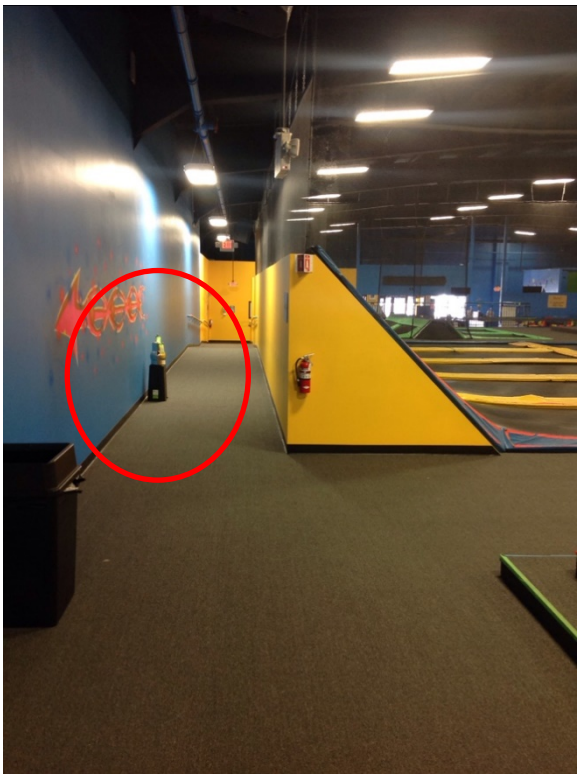


Photo 5: Sample IA-1015, located in Bounce activity area

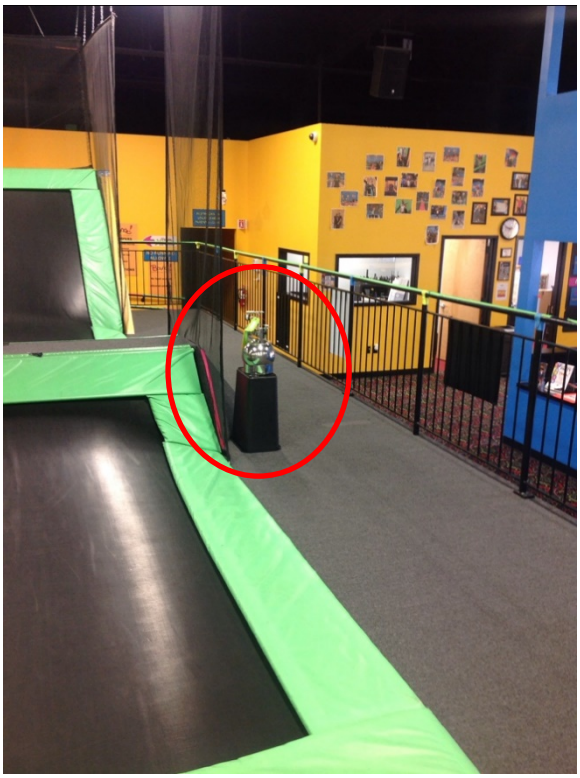


Photo 6: Sample IA-1016, located in Bounce activity area

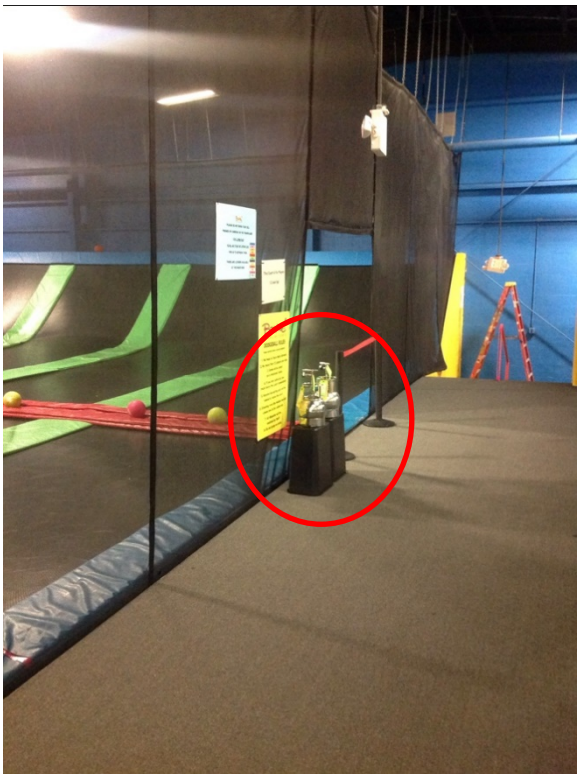


Photo 7: Samples IA-1017 & FD-01, located in Bounce activity area

ATTACHMENT 4

ANALYTICAL LABORATORY REPORTS

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4/6/2019
Mr. Joe Corsello
Sanborn, Head & Associates
20 Foundry Street

Concord NH 03301

Project Name: Neptune Road
Project #: 3304.02
Workorder #: 1904051

Dear Mr. Joe Corsello

The following report includes the data for the above referenced project for sample(s) received on 4/1/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified 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: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

eurofins | Air Toxics

WORK ORDER #: 1904051

Work Order Summary

CLIENT:	Mr. Joe Corsello Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301	**BILL TO:**	Accounts Payable Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301
PHONE:	603-229-1900	**P.O. #**	
FAX:	603-229-1919	**PROJECT #**	3304.02 Neptune Road
DATE RECEIVED:	04/01/2019	**CONTACT:**	Ausha Scott
DATE COMPLETED:	04/06/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	IA-1016_20190328	Modified TO-15	5.7 "Hg	5.1 psi
01B	IA-1016_20190328	Modified TO-15	5.7 "Hg	5.1 psi
02A	IA-1017_20190328	Modified TO-15	6.3 "Hg	4.9 psi
02B	IA-1017_20190328	Modified TO-15	6.3 "Hg	4.9 psi
03A	IA-1015_20190328	Modified TO-15	6.5 "Hg	4.9 psi
03B	IA-1015_20190328	Modified TO-15	6.5 "Hg	4.9 psi
04A	IA-1013_20190328	Modified TO-15	3.3 "Hg	4.6 psi
04B	IA-1013_20190328	Modified TO-15	3.3 "Hg	4.6 psi
05A	IA-1005_20190328	Modified TO-15	4.5 "Hg	5.2 psi
05B	IA-1005_20190328	Modified TO-15	4.5 "Hg	5.2 psi
06A	IA-1002_20190328	Modified TO-15	3.7 "Hg	5.2 psi
06B	IA-1002_20190328	Modified TO-15	3.7 "Hg	5.2 psi
07A	FD-01_20190328	Modified TO-15	6.3 "Hg	4.6 psi
07B	FD-01_20190328	Modified TO-15	6.3 "Hg	4.6 psi
08A	AA-01_20190328	Modified TO-15	2.6 "Hg	4.7 psi
08B	AA-01_20190328	Modified TO-15	2.6 "Hg	4.7 psi
09A	Lab Blank	Modified TO-15	NA	NA
09B	Lab Blank	Modified TO-15	NA	NA
10A	CCV	Modified TO-15	NA	NA
10B	CCV	Modified TO-15	NA	NA
11A	LCS	Modified TO-15	NA	NA
11AA	LCSD	Modified TO-15	NA	NA
11B	LCS	Modified TO-15	NA	NA

Continued on next page

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WORK ORDER #: 1904051

Work Order Summary

CLIENT:	Mr. Joe Corsello Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301	**BILL TO:**	Accounts Payable Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301
PHONE:	603-229-1900	**P.O. #**	
FAX:	603-229-1919	**PROJECT #**	3304.02 Neptune Road
DATE RECEIVED:	04/01/2019	**CONTACT:**	Ausha Scott
DATE COMPLETED:	04/06/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
11BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 04/06/19

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. 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) 985-1020

LABORATORY NARRATIVE
Modified TO-15 Full Scan/SIM
Sanborn, Head & Associates
Workorder# 1904051

Eight 6 Liter Summa Canister (SIM Certified) samples were received on April 01, 2019. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the Full Scan and SIM acquisition modes. The method involves concentrating up to 1.0 liters 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.

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

Requirement	***TO-15***	***ATL Modifications***
ICAL %RSD acceptance criteria	</=30% RSD with 2 compounds allowed out to < 40% RSD	For Full Scan: 30% RSD with 4 compounds allowed out to < 40% RSD For SIM: Project specific; default criteria is </=30% RSD with 10% of compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	For Full Scan: </= 30% Difference with four allowed out up to </=40%.; flag and narrate outliers For SIM: Project specific; default criteria is </= 30% Difference with 10% of compounds allowed out up to </=40%.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

Due to omission of the sampling date from the ID format on the sample tag, the information on the Chain of Custody (COC) for samples IA-1016_20190328, IA-1017_20190328, IA-1015_20190328, IA-1013_20190328, IA-1005_20190328, IA-1002_20190328, FD-01_20190328 and AA-01_20190328 was used to process and report the sample.

Analytical Notes

The results for each sample in this report were acquired from two separate data files originating from the same analytical run. The two data files have the same base file name and are differentiated with a

"sim" extension on the SIM data file.

Definition of Data Qualifying Flags

Nine 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.

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

N - The identification is based on presumptive evidence.

CN - See case narrative explanation

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
MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

Client Sample ID: IA-1016_20190328

Lab ID#: 1904051-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.17	0.21	0.93	1.2
Acetone	0.83	5.6	2.0	13
2-Propanol	0.83	3.1	2.0	7.6

Client Sample ID: IA-1016_20190328

Lab ID#: 1904051-01B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.033	0.46	0.16	2.3
Carbon Tetrachloride	0.033	0.065	0.21	0.41
Toluene	0.033	0.28	0.12	1.0
Tetrachloroethene	0.033	0.054	0.22	0.37
Ethyl Benzene	0.033	0.037	0.14	0.16
m,p-Xylene	0.066	0.11	0.29	0.50
o-Xylene	0.033	0.056	0.14	0.24

Client Sample ID: IA-1017_20190328

Lab ID#: 1904051-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.17	0.22	0.95	1.2
Acetone	0.84	5.9	2.0	14
2-Propanol	0.84	2.6	2.1	6.3
1,2,4-Trimethylbenzene	0.17	0.24	0.83	1.2

Client Sample ID: IA-1017_20190328

Lab ID#: 1904051-02B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.034	0.47	0.17	2.3
Carbon Tetrachloride	0.034	0.076	0.21	0.48
Trichloroethene	0.034	0.056	0.18	0.30

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

Client Sample ID: IA-1017_20190328

Lab ID#: 1904051-02B

Toluene	0.034	0.46	0.13	1.7
Ethyl Benzene	0.034	0.043	0.15	0.19
m,p-Xylene	0.068	0.12	0.29	0.54
o-Xylene	0.034	0.058	0.15	0.25

Client Sample ID: IA-1015_20190328

Lab ID#: 1904051-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.17	0.21	0.96	1.2
Acetone	0.85	10	2.0	24
2-Propanol	0.85	2.8	2.1	6.8

Client Sample ID: IA-1015_20190328

Lab ID#: 1904051-03B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.034	0.47	0.17	2.3
Carbon Tetrachloride	0.034	0.074	0.21	0.47
Toluene	0.034	0.24	0.13	0.92
Ethyl Benzene	0.034	0.037	0.15	0.16
m,p-Xylene	0.068	0.12	0.30	0.50
o-Xylene	0.034	0.057	0.15	0.25

Client Sample ID: IA-1013_20190328

Lab ID#: 1904051-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.15	0.21	0.82	1.2
Acetone	0.74	24	1.7	57
2-Propanol	0.74	12	1.8	28
4-Methyl-2-pentanone	0.15	0.17	0.60	0.70

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

Client Sample ID: IA-1013_20190328

Lab ID#: 1904051-04B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.029	0.48	0.14	2.4
Chloroform	0.029	0.052	0.14	0.25
Carbon Tetrachloride	0.029	0.084	0.18	0.53
Toluene	0.029	0.44	0.11	1.7
Tetrachloroethene	0.029	0.030	0.20	0.21
Ethyl Benzene	0.029	0.044	0.13	0.19
m,p-Xylene	0.059	0.12	0.26	0.50
o-Xylene	0.029	0.046	0.13	0.20

Client Sample ID: IA-1005_20190328

Lab ID#: 1904051-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.23	0.89	1.3
Acetone	0.80	26	1.9	61
2-Propanol	0.80	13	2.0	33
4-Methyl-2-pentanone	0.16	0.19	0.65	0.76

Client Sample ID: IA-1005_20190328

Lab ID#: 1904051-05B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.032	0.48	0.16	2.4
Chloroform	0.032	0.053	0.16	0.26
Carbon Tetrachloride	0.032	0.10	0.20	0.63
Toluene	0.032	0.32	0.12	1.2
Tetrachloroethene	0.032	0.032	0.22	0.22
Ethyl Benzene	0.032	0.038	0.14	0.16
m,p-Xylene	0.064	0.11	0.28	0.47
o-Xylene	0.032	0.052	0.14	0.22

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

Client Sample ID: IA-1002_20190328

Lab ID#: 1904051-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.15	0.21	0.86	1.2
Acetone	0.77	26	1.8	61
2-Propanol	0.77	12	1.9	30
4-Methyl-2-pentanone	0.15	0.17	0.63	0.70

Client Sample ID: IA-1002_20190328

Lab ID#: 1904051-06B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.031	0.48	0.15	2.4
Chloroform	0.031	0.049	0.15	0.24
Carbon Tetrachloride	0.031	0.087	0.19	0.55
Toluene	0.031	0.29	0.12	1.1
Ethyl Benzene	0.031	0.039	0.13	0.17
m,p-Xylene	0.062	0.10	0.27	0.45
o-Xylene	0.031	0.042	0.13	0.18

Client Sample ID: FD-01_20190328

Lab ID#: 1904051-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.17	0.22	0.93	1.2
Acetone	0.83	6.0	2.0	14
2-Propanol	0.83	2.5	2.0	6.2

Client Sample ID: FD-01_20190328

Lab ID#: 1904051-07B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.033	0.49	0.16	2.4
Carbon Tetrachloride	0.033	0.073	0.21	0.46
Toluene	0.033	1.1	0.12	4.2

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

Client Sample ID: FD-01_20190328

Lab ID#: 1904051-07B

Tetrachloroethene	0.033	0.040	0.22	0.27
Ethyl Benzene	0.033	0.038	0.14	0.16
m,p-Xylene	0.066	0.13	0.29	0.56
o-Xylene	0.033	0.050	0.14	0.22

Client Sample ID: AA-01_20190328

Lab ID#: 1904051-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.14	0.22	0.81	1.2
Acetone	0.72	1.2	1.7	3.0

Client Sample ID: AA-01_20190328

Lab ID#: 1904051-08B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.029	0.48	0.14	2.4
Carbon Tetrachloride	0.029	0.067	0.18	0.42
Toluene	0.029	0.19	0.11	0.71
m,p-Xylene	0.058	0.066	0.25	0.28
o-Xylene	0.029	0.034	0.12	0.15

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Client Sample ID: IA-1016_20190328

Lab ID#: 1904051-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040307**	**Date of Collection:**	**3/28/19 12:49:00 PM**
Dil. Factor:	**1.66**	**Date of Analysis:**	**4/3/19 01:46 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.17	0.21	0.93	1.2
Freon 113	0.17	Not Detected	1.3	Not Detected
Acetone	0.83	5.6	2.0	13
2-Propanol	0.83	3.1	2.0	7.6
Carbon Disulfide	0.83	Not Detected	2.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.83	Not Detected	2.4	Not Detected
4-Methyl-2-pentanone	0.17	Not Detected	0.68	Not Detected
1,2,4-Trimethylbenzene	0.17	Not Detected	0.82	Not Detected
Propylene	1.7	Not Detected	2.8	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	115	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: IA-1016_20190328

Lab ID#: 1904051-01B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040307sim**	**Date of Collection:**	**3/28/19 12:49:00 PM**
Dil. Factor:	**1.66**	**Date of Analysis:**	**4/3/19 01:46 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.033	0.46	0.16	2.3
Vinyl Chloride	0.017	Not Detected	0.042	Not Detected
1,1-Dichloroethene	0.017	Not Detected	0.066	Not Detected
1,1-Dichloroethane	0.033	Not Detected	0.13	Not Detected
cis-1,2-Dichloroethene	0.033	Not Detected	0.13	Not Detected
Chloroform	0.033	Not Detected	0.16	Not Detected
1,1,1-Trichloroethane	0.033	Not Detected	0.18	Not Detected
Carbon Tetrachloride	0.033	0.065	0.21	0.41
Trichloroethene	0.033	Not Detected	0.18	Not Detected
Toluene	0.033	0.28	0.12	1.0
Tetrachloroethene	0.033	0.054	0.22	0.37
Ethyl Benzene	0.033	0.037	0.14	0.16
m,p-Xylene	0.066	0.11	0.29	0.50
o-Xylene	0.033	0.056	0.14	0.24

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: IA-1017_20190328

Lab ID#: 1904051-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040308**	**Date of Collection:**	**3/28/19 12:51:00 PM**
Dil. Factor:	**1.69**	**Date of Analysis:**	**4/3/19 02:36 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.17	0.22	0.95	1.2
Freon 113	0.17	Not Detected	1.3	Not Detected
Acetone	0.84	5.9	2.0	14
2-Propanol	0.84	2.6	2.1	6.3
Carbon Disulfide	0.84	Not Detected	2.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.84	Not Detected	2.5	Not Detected
4-Methyl-2-pentanone	0.17	Not Detected	0.69	Not Detected
1,2,4-Trimethylbenzene	0.17	0.24	0.83	1.2
Propylene	1.7	Not Detected	2.9	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: IA-1017_20190328

Lab ID#: 1904051-02B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040308sim**	**Date of Collection:**	**3/28/19 12:51:00 PM**
Dil. Factor:	**1.69**	**Date of Analysis:**	**4/3/19 02:36 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.034	0.47	0.17	2.3
Vinyl Chloride	0.017	Not Detected	0.043	Not Detected
1,1-Dichloroethene	0.017	Not Detected	0.067	Not Detected
1,1-Dichloroethane	0.034	Not Detected	0.14	Not Detected
cis-1,2-Dichloroethene	0.034	Not Detected	0.13	Not Detected
Chloroform	0.034	Not Detected	0.16	Not Detected
1,1,1-Trichloroethane	0.034	Not Detected	0.18	Not Detected
Carbon Tetrachloride	0.034	0.076	0.21	0.48
Trichloroethene	0.034	0.056	0.18	0.30
Toluene	0.034	0.46	0.13	1.7
Tetrachloroethene	0.034	Not Detected	0.23	Not Detected
Ethyl Benzene	0.034	0.043	0.15	0.19
m,p-Xylene	0.068	0.12	0.29	0.54
o-Xylene	0.034	0.058	0.15	0.25

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: IA-1015_20190328

Lab ID#: 1904051-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040309**	**Date of Collection:**	**3/28/19 12:50:00 PM**
Dil. Factor:	**1.70**	**Date of Analysis:**	**4/3/19 03:14 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.17	0.21	0.96	1.2
Freon 113	0.17	Not Detected	1.3	Not Detected
Acetone	0.85	10	2.0	24
2-Propanol	0.85	2.8	2.1	6.8
Carbon Disulfide	0.85	Not Detected	2.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.85	Not Detected	2.5	Not Detected
4-Methyl-2-pentanone	0.17	Not Detected	0.70	Not Detected
1,2,4-Trimethylbenzene	0.17	Not Detected	0.84	Not Detected
Propylene	1.7	Not Detected	2.9	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: IA-1015_20190328

Lab ID#: 1904051-03B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040309sim**	**Date of Collection:**	**3/28/19 12:50:00 PM**
Dil. Factor:	**1.70**	**Date of Analysis:**	**4/3/19 03:14 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.034	0.47	0.17	2.3
Vinyl Chloride	0.017	Not Detected	0.043	Not Detected
1,1-Dichloroethene	0.017	Not Detected	0.067	Not Detected
1,1-Dichloroethane	0.034	Not Detected	0.14	Not Detected
cis-1,2-Dichloroethene	0.034	Not Detected	0.13	Not Detected
Chloroform	0.034	Not Detected	0.17	Not Detected
1,1,1-Trichloroethane	0.034	Not Detected	0.18	Not Detected
Carbon Tetrachloride	0.034	0.074	0.21	0.47
Trichloroethene	0.034	Not Detected	0.18	Not Detected
Toluene	0.034	0.24	0.13	0.92
Tetrachloroethene	0.034	Not Detected	0.23	Not Detected
Ethyl Benzene	0.034	0.037	0.15	0.16
m,p-Xylene	0.068	0.12	0.30	0.50
o-Xylene	0.034	0.057	0.15	0.25

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: IA-1013_20190328

Lab ID#: 1904051-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040310**	**Date of Collection:**	**3/28/19 2:33:00 PM**
Dil. Factor:	**1.47**	**Date of Analysis:**	**4/3/19 03:52 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.15	0.21	0.82	1.2
Freon 113	0.15	Not Detected	1.1	Not Detected
Acetone	0.74	24	1.7	57
2-Propanol	0.74	12	1.8	28
Carbon Disulfide	0.74	Not Detected	2.3	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.74	Not Detected	2.2	Not Detected
4-Methyl-2-pentanone	0.15	0.17	0.60	0.70
1,2,4-Trimethylbenzene	0.15	Not Detected	0.72	Not Detected
Propylene	1.5	Not Detected	2.5	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: IA-1013_20190328

Lab ID#: 1904051-04B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040310sim**	**Date of Collection:**	**3/28/19 2:33:00 PM**
Dil. Factor:	**1.47**	**Date of Analysis:**	**4/3/19 03:52 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.029	0.48	0.14	2.4
Vinyl Chloride	0.015	Not Detected	0.038	Not Detected
1,1-Dichloroethene	0.015	Not Detected	0.058	Not Detected
1,1-Dichloroethane	0.029	Not Detected	0.12	Not Detected
cis-1,2-Dichloroethene	0.029	Not Detected	0.12	Not Detected
Chloroform	0.029	0.052	0.14	0.25
1,1,1-Trichloroethane	0.029	Not Detected	0.16	Not Detected
Carbon Tetrachloride	0.029	0.084	0.18	0.53
Trichloroethene	0.029	Not Detected	0.16	Not Detected
Toluene	0.029	0.44	0.11	1.7
Tetrachloroethene	0.029	0.030	0.20	0.21
Ethyl Benzene	0.029	0.044	0.13	0.19
m,p-Xylene	0.059	0.12	0.26	0.50
o-Xylene	0.029	0.046	0.13	0.20

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: IA-1005_20190328

Lab ID#: 1904051-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040311**	**Date of Collection:**	**3/28/19 2:37:00 PM**
Dil. Factor:	**1.59**	**Date of Analysis:**	**4/3/19 04:29 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.23	0.89	1.3
Freon 113	0.16	Not Detected	1.2	Not Detected
Acetone	0.80	26	1.9	61
2-Propanol	0.80	13	2.0	33
Carbon Disulfide	0.80	Not Detected	2.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.80	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.16	0.19	0.65	0.76
1,2,4-Trimethylbenzene	0.16	Not Detected	0.78	Not Detected
Propylene	1.6	Not Detected	2.7	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: IA-1005_20190328

Lab ID#: 1904051-05B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040311sim**	**Date of Collection: 3/28/19 2:37:00 PM**	
Dil. Factor:	**1.59**	**Date of Analysis: 4/3/19 04:29 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.032	0.48	0.16	2.4
Vinyl Chloride	0.016	Not Detected	0.041	Not Detected
1,1-Dichloroethene	0.016	Not Detected	0.063	Not Detected
1,1-Dichloroethane	0.032	Not Detected	0.13	Not Detected
cis-1,2-Dichloroethene	0.032	Not Detected	0.13	Not Detected
Chloroform	0.032	0.053	0.16	0.26
1,1,1-Trichloroethane	0.032	Not Detected	0.17	Not Detected
Carbon Tetrachloride	0.032	0.10	0.20	0.63
Trichloroethene	0.032	Not Detected	0.17	Not Detected
Toluene	0.032	0.32	0.12	1.2
Tetrachloroethene	0.032	0.032	0.22	0.22
Ethyl Benzene	0.032	0.038	0.14	0.16
m,p-Xylene	0.064	0.11	0.28	0.47
o-Xylene	0.032	0.052	0.14	0.22

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: IA-1002_20190328

Lab ID#: 1904051-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040312**	**Date of Collection: 3/28/19 2:32:00 PM**	
Dil. Factor:	**1.54**	**Date of Analysis: 4/3/19 05:07 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.15	0.21	0.86	1.2
Freon 113	0.15	Not Detected	1.2	Not Detected
Acetone	0.77	26	1.8	61
2-Propanol	0.77	12	1.9	30
Carbon Disulfide	0.77	Not Detected	2.4	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.77	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.15	0.17	0.63	0.70
1,2,4-Trimethylbenzene	0.15	Not Detected	0.76	Not Detected
Propylene	1.5	Not Detected	2.6	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: IA-1002_20190328

Lab ID#: 1904051-06B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040312sim**	**Date of Collection:**	**3/28/19 2:32:00 PM**
Dil. Factor:	**1.54**	**Date of Analysis:**	**4/3/19 05:07 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.031	0.48	0.15	2.4
Vinyl Chloride	0.015	Not Detected	0.039	Not Detected
1,1-Dichloroethene	0.015	Not Detected	0.061	Not Detected
1,1-Dichloroethane	0.031	Not Detected	0.12	Not Detected
cis-1,2-Dichloroethene	0.031	Not Detected	0.12	Not Detected
Chloroform	0.031	0.049	0.15	0.24
1,1,1-Trichloroethane	0.031	Not Detected	0.17	Not Detected
Carbon Tetrachloride	0.031	0.087	0.19	0.55
Trichloroethene	0.031	Not Detected	0.16	Not Detected
Toluene	0.031	0.29	0.12	1.1
Tetrachloroethene	0.031	Not Detected	0.21	Not Detected
Ethyl Benzene	0.031	0.039	0.13	0.17
m,p-Xylene	0.062	0.10	0.27	0.45
o-Xylene	0.031	0.042	0.13	0.18

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: FD-01_20190328

Lab ID#: 1904051-07A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040313**	**Date of Collection:**	**3/28/19 12:51:00 PM**
Dil. Factor:	**1.66**	**Date of Analysis:**	**4/3/19 05:45 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.17	0.22	0.93	1.2
Freon 113	0.17	Not Detected	1.3	Not Detected
Acetone	0.83	6.0	2.0	14
2-Propanol	0.83	2.5	2.0	6.2
Carbon Disulfide	0.83	Not Detected	2.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.83	Not Detected	2.4	Not Detected
4-Methyl-2-pentanone	0.17	Not Detected	0.68	Not Detected
1,2,4-Trimethylbenzene	0.17	Not Detected	0.82	Not Detected
Propylene	1.7	Not Detected	2.8	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: FD-01_20190328

Lab ID#: 1904051-07B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040313sim**	**Date of Collection:**	**3/28/19 12:51:00 PM**
Dil. Factor:	**1.66**	**Date of Analysis:**	**4/3/19 05:45 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.033	0.49	0.16	2.4
Vinyl Chloride	0.017	Not Detected	0.042	Not Detected
1,1-Dichloroethene	0.017	Not Detected	0.066	Not Detected
1,1-Dichloroethane	0.033	Not Detected	0.13	Not Detected
cis-1,2-Dichloroethene	0.033	Not Detected	0.13	Not Detected
Chloroform	0.033	Not Detected	0.16	Not Detected
1,1,1-Trichloroethane	0.033	Not Detected	0.18	Not Detected
Carbon Tetrachloride	0.033	0.073	0.21	0.46
Trichloroethene	0.033	Not Detected	0.18	Not Detected
Toluene	0.033	1.1	0.12	4.2
Tetrachloroethene	0.033	0.040	0.22	0.27
Ethyl Benzene	0.033	0.038	0.14	0.16
m,p-Xylene	0.066	0.13	0.29	0.56
o-Xylene	0.033	0.050	0.14	0.22

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: AA-01_20190328

Lab ID#: 1904051-08A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040314**	**Date of Collection:**	**3/28/19 2:51:00 PM**
Dil. Factor:	**1.45**	**Date of Analysis:**	**4/3/19 06:22 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.14	0.22	0.81	1.2
Freon 113	0.14	Not Detected	1.1	Not Detected
Acetone	0.72	1.2	1.7	3.0
2-Propanol	0.72	Not Detected	1.8	Not Detected
Carbon Disulfide	0.72	Not Detected	2.2	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.72	Not Detected	2.1	Not Detected
4-Methyl-2-pentanone	0.14	Not Detected	0.59	Not Detected
1,2,4-Trimethylbenzene	0.14	Not Detected	0.71	Not Detected
Propylene	1.4	Not Detected	2.5	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: AA-01_20190328

Lab ID#: 1904051-08B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040314sim**	**Date of Collection: 3/28/19 2:51:00 PM**	
Dil. Factor:	**1.45**	**Date of Analysis: 4/3/19 06:22 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.029	0.48	0.14	2.4
Vinyl Chloride	0.014	Not Detected	0.037	Not Detected
1,1-Dichloroethene	0.014	Not Detected	0.057	Not Detected
1,1-Dichloroethane	0.029	Not Detected	0.12	Not Detected
cis-1,2-Dichloroethene	0.029	Not Detected	0.11	Not Detected
Chloroform	0.029	Not Detected	0.14	Not Detected
1,1,1-Trichloroethane	0.029	Not Detected	0.16	Not Detected
Carbon Tetrachloride	0.029	0.067	0.18	0.42
Trichloroethene	0.029	Not Detected	0.16	Not Detected
Toluene	0.029	0.19	0.11	0.71
Tetrachloroethene	0.029	Not Detected	0.20	Not Detected
Ethyl Benzene	0.029	Not Detected	0.12	Not Detected
m,p-Xylene	0.058	0.066	0.25	0.28
o-Xylene	0.029	0.034	0.12	0.15

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1904051-09A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040306a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 11:40 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.10	Not Detected	0.56	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.50	Not Detected	1.5	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
Propylene	1.0	Not Detected	1.7	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	91	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1904051-09B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040306sima**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 11:40 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.020	Not Detected	0.099	Not Detected
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
1,1-Dichloroethene	0.010	Not Detected	0.040	Not Detected
1,1-Dichloroethane	0.020	Not Detected	0.081	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Chloroform	0.020	Not Detected	0.098	Not Detected
1,1,1-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Carbon Tetrachloride	0.020	Not Detected	0.12	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Toluene	0.020	Not Detected	0.075	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
Ethyl Benzene	0.020	Not Detected	0.087	Not Detected
m,p-Xylene	0.040	Not Detected	0.17	Not Detected
o-Xylene	0.020	Not Detected	0.087	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: CCV

Lab ID#: 1904051-10A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 08:27 AM**	

Compound	%Recovery
Freon 11	98
Freon 113	93
Acetone	109
2-Propanol	89
Carbon Disulfide	111
2-Butanone (Methyl Ethyl Ketone)	102
4-Methyl-2-pentanone	113
1,2,4-Trimethylbenzene	97
Propylene	120

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: CCV

Lab ID#: 1904051-10B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040302sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 08:27 AM**	

Compound	%Recovery
Freon 12	93
Vinyl Chloride	99
1,1-Dichloroethene	93
1,1-Dichloroethane	107
cis-1,2-Dichloroethene	95
Chloroform	99
1,1,1-Trichloroethane	93
Carbon Tetrachloride	106
Trichloroethene	93
Toluene	95
Tetrachloroethene	97
Ethyl Benzene	96
m,p-Xylene	90
o-Xylene	89

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: LCS

Lab ID#: 1904051-11A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 09:19 AM**	

Compound	%Recovery	Method Limits
Freon 11	99	70-130
Freon 113	90	70-130
Acetone	118	70-130
2-Propanol	91	70-130
Carbon Disulfide	96	70-130
2-Butanone (Methyl Ethyl Ketone)	96	70-130
4-Methyl-2-pentanone	109	70-130
1,2,4-Trimethylbenzene	98	70-130
Propylene	115	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: LCSD

Lab ID#: 1904051-11AA

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 10:06 AM**	

Compound	%Recovery	Method Limits
Freon 11	99	70-130
Freon 113	90	70-130
Acetone	117	70-130
2-Propanol	92	70-130
Carbon Disulfide	97	70-130
2-Butanone (Methyl Ethyl Ketone)	95	70-130
4-Methyl-2-pentanone	112	70-130
1,2,4-Trimethylbenzene	97	70-130
Propylene	116	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: LCS

Lab ID#: 1904051-11B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040303sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 09:19 AM**	

Compound	%Recovery	Method Limits
Freon 12	95	70-130
Vinyl Chloride	101	70-130
1,1-Dichloroethene	92	70-130
1,1-Dichloroethane	105	70-130
cis-1,2-Dichloroethene	102	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	91	70-130
Carbon Tetrachloride	84	70-130
Trichloroethene	92	70-130
Toluene	94	70-130
Tetrachloroethene	98	70-130
Ethyl Benzene	96	70-130
m,p-Xylene	90	70-130
o-Xylene	92	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: LCSD

Lab ID#: 1904051-11BB

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040304sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 10:06 AM**	

Compound	%Recovery	Method Limits
Freon 12	95	70-130
Vinyl Chloride	101	70-130
1,1-Dichloroethene	92	70-130
1,1-Dichloroethane	106	70-130
cis-1,2-Dichloroethene	102	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	91	70-130
Carbon Tetrachloride	84	70-130
Trichloroethene	92	70-130
Toluene	93	70-130
Tetrachloroethene	97	70-130
Ethyl Benzene	95	70-130
m,p-Xylene	88	70-130
o-Xylene	90	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	93	70-130

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4/6/2019
Mr. Joe Corsello
Sanborn, Head & Associates
20 Foundry Street

Concord NH 03301

Project Name: Neptune Road
Project #: 3304.02
Workorder #: 1904052

Dear Mr. Joe Corsello

The following report includes the data for the above referenced project for sample(s) received on 4/1/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified 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: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

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WORK ORDER #: 1904052

Work Order Summary

CLIENT:	Mr. Joe Corsello Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301	**BILL TO:**	Accounts Payable Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301
PHONE:	603-229-1900	**P.O. #**	
FAX:	603-229-1919	**PROJECT #**	3304.02 Neptune Road
DATE RECEIVED:	04/01/2019	**CONTACT:**	Ausha Scott
DATE COMPLETED:	04/06/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SSV-1033_20190328	Modified TO-15	5.1 "Hg	5.1 psi
01B	SSV-1033_20190328	Modified TO-15	5.1 "Hg	5.1 psi
02A	SSV-1017_20190328	Modified TO-15	4.5 "Hg	5.1 psi
02B	SSV-1017_20190328	Modified TO-15	4.5 "Hg	5.1 psi
03A	SSV-1016_20190328	Modified TO-15	4.5 "Hg	5 psi
03B	SSV-1016_20190328	Modified TO-15	4.5 "Hg	5 psi
04A	SSV-1009_20190328	Modified TO-15	4.1 "Hg	5.1 psi
04B	SSV-1009_20190328	Modified TO-15	4.1 "Hg	5.1 psi
05A	SSV-1002_20190328	Modified TO-15	3.9 "Hg	4.9 psi
05B	SSV-1002_20190328	Modified TO-15	3.9 "Hg	4.9 psi
06A	SSV-1001_20190328	Modified TO-15	6.3 "Hg	5.1 psi
06B	SSV-1001_20190328	Modified TO-15	6.3 "Hg	5.1 psi
07A	FD-02_20190328	Modified TO-15	4.1 "Hg	5 psi
07B	FD-02_20190328	Modified TO-15	4.1 "Hg	5 psi
08A	Lab Blank	Modified TO-15	NA	NA
08B	Lab Blank	Modified TO-15	NA	NA
08C	Lab Blank	Modified TO-15	NA	NA
08D	Lab Blank	Modified TO-15	NA	NA
09A	CCV	Modified TO-15	NA	NA
09B	CCV	Modified TO-15	NA	NA
09C	CCV	Modified TO-15	NA	NA
09D	CCV	Modified TO-15	NA	NA
10A	LCS	Modified TO-15	NA	NA

Continued on next page

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WORK ORDER #: 1904052

Work Order Summary

CLIENT:	Mr. Joe Corsello Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301	**BILL TO:**	Accounts Payable Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301
PHONE:	603-229-1900	**P.O. #**	
FAX:	603-229-1919	**PROJECT #**	3304.02 Neptune Road
DATE RECEIVED:	04/01/2019	**CONTACT:**	Ausha Scott
DATE COMPLETED:	04/06/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
10AA	LCSD	Modified TO-15	NA	NA
10B	LCS	Modified TO-15	NA	NA
10BB	LCSD	Modified TO-15	NA	NA
10C	LCS	Modified TO-15	NA	NA
10CC	LCSD	Modified TO-15	NA	NA
10D	LCS	Modified TO-15	NA	NA
10DD	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:  DATE: 04/06/19

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. 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) 985-1020

LABORATORY NARRATIVE
Modified TO-15 Full Scan/SIM
Sanborn, Head & Associates
Workorder# 1904052

Seven 6 Liter Summa Canister (SIM Certified) samples were received on April 01, 2019. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the Full Scan and SIM acquisition modes. The method involves concentrating up to 1.0 liters 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.

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

Requirement	***TO-15***	***ATL Modifications***
ICAL %RSD acceptance criteria	</=30% RSD with 2 compounds allowed out to < 40% RSD	For Full Scan: 30% RSD with 4 compounds allowed out to < 40% RSD For SIM: Project specific; default criteria is </=30% RSD with 10% of compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	For Full Scan: </= 30% Difference with four allowed out up to </=40%.; flag and narrate outliers For SIM: Project specific; default criteria is </= 30% Difference with 10% of compounds allowed out up to </=40%.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

Due to omission of the sampling date from the ID format on the sample tag, the information on the Chain of Custody (COC) for samples SSV-1033_20190328, SSV-1017_20190328, SSV-1016_20190328, SSV-1009_20190328, SSV-1002_20190328, SSV-1001_20190328 and FD-02_20190328 was used to process and report the samples.

There was a difference (greater than or equal to 5.0" Hg) between the measured canister receipt vacuum and that which was reported on the Chain of Custody (COC) for sample SSV-1017_20190328. A leak test indicated that the valve was functioning properly.

A revised Chain of Custody (COC) was provided by the client on 4/3/19.

Analytical Notes

The results for each sample in this report were acquired from two separate data files originating from the same analytical run. The two data files have the same base file name and are differentiated with a "sim" extension on the SIM data file.

The recovery of surrogate 4-Bromofluorobenzene in samples SSV-1033_20190328 (01A) and SSV-1002_20190328 (05A/05B) was outside laboratory control limits due to high level matrix interference. The surrogate recovery is flagged.

Definition of Data Qualifying Flags

Nine 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.

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

N - The identification is based on presumptive evidence.

CN - See case narrative explanation

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
MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

Client Sample ID: SSV-1033_20190328

Lab ID#: 1904052-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.18	0.91	0.98
Acetone	0.81	3.2	1.9	7.5

Client Sample ID: SSV-1033_20190328

Lab ID#: 1904052-01B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.032	0.53	0.16	2.6
1,1-Dichloroethene	0.016	0.032	0.064	0.12
cis-1,2-Dichloroethene	0.032	0.032	0.13	0.13
Chloroform	0.032	0.034	0.16	0.16
1,1,1-Trichloroethane	0.032	0.48	0.18	2.6
Carbon Tetrachloride	0.032	0.058	0.20	0.36
Tetrachloroethene	0.032	0.039	0.22	0.27

Client Sample ID: SSV-1017_20190328

Lab ID#: 1904052-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.22	0.89	1.2
Freon 113	0.16	0.62	1.2	4.8
Acetone	0.79	3.8	1.9	9.0

Client Sample ID: SSV-1017_20190328

Lab ID#: 1904052-02B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.032	0.55	0.16	2.7
1,1-Dichloroethene	0.016	2.3	0.063	9.1
1,1-Dichloroethane	0.032	0.14	0.13	0.57
cis-1,2-Dichloroethene	0.032	0.12	0.12	0.50
Chloroform	0.032	0.59	0.15	2.9

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

Client Sample ID: SSV-1017_20190328

Lab ID#: 1904052-02B

1,1,1-Trichloroethane	0.032	8.6	0.17	47
Carbon Tetrachloride	0.032	0.039	0.20	0.25
Trichloroethene	0.032	1.2	0.17	6.2
Toluene	0.032	0.072	0.12	0.27
Tetrachloroethene	0.032	0.13	0.21	0.88
o-Xylene	0.032	0.058	0.14	0.25

Client Sample ID: SSV-1016_20190328

Lab ID#: 1904052-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.18	0.89	1.0
Acetone	0.79	4.3	1.9	10

Client Sample ID: SSV-1016_20190328

Lab ID#: 1904052-03B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.032	0.54	0.16	2.7
1,1-Dichloroethane	0.032	0.065	0.13	0.26
Chloroform	0.032	0.044	0.15	0.21
1,1,1-Trichloroethane	0.032	2.0	0.17	11
Carbon Tetrachloride	0.032	0.063	0.20	0.40
Trichloroethene	0.032	0.044	0.17	0.23
Toluene	0.032	0.038	0.12	0.14
Tetrachloroethene	0.032	0.065	0.21	0.44

Client Sample ID: SSV-1009_20190328

Lab ID#: 1904052-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.26	0.88	1.5
Acetone	0.78	4.0	1.8	9.4

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

Client Sample ID: SSV-1009_20190328

Lab ID#: 1904052-04B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.031	0.54	0.15	2.7
1,1-Dichloroethene	0.016	6.0	0.062	24
1,1-Dichloroethane	0.031	1.3	0.13	5.4
cis-1,2-Dichloroethene	0.031	0.57	0.12	2.3
Chloroform	0.031	0.85	0.15	4.1
1,1,1-Trichloroethane	0.031	13	0.17	72
Carbon Tetrachloride	0.031	0.077	0.20	0.48
Trichloroethene	0.031	4.6	0.17	25
Toluene	0.031	0.10	0.12	0.40
Tetrachloroethene	0.031	3.3	0.21	22
Ethyl Benzene	0.031	0.044	0.14	0.19
m,p-Xylene	0.062	0.087	0.27	0.38

Client Sample ID: SSV-1002_20190328

Lab ID#: 1904052-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.15	0.22	0.86	1.2
Freon 113	0.15	0.19	1.2	1.5
Acetone	0.76	3.6	1.8	8.5

Client Sample ID: SSV-1002_20190328

Lab ID#: 1904052-05B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.031	0.54	0.15	2.7
1,1-Dichloroethane	0.031	0.17	0.12	0.70
cis-1,2-Dichloroethene	0.031	0.076	0.12	0.30
Chloroform	0.031	0.097	0.15	0.47
1,1,1-Trichloroethane	0.031	4.4	0.17	24
Carbon Tetrachloride	0.031	0.078	0.19	0.49
Trichloroethene	0.031	4.0	0.16	22
Tetrachloroethene	0.031	0.26	0.21	1.8

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

Client Sample ID: SSV-1002_20190328

Lab ID#: 1904052-05B

Client Sample ID: SSV-1001_20190328

Lab ID#: 1904052-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.17	0.21	0.96	1.2
Freon 113	0.17	0.36	1.3	2.8
Acetone	0.86	3.1	2.0	7.4

Client Sample ID: SSV-1001_20190328

Lab ID#: 1904052-06B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.034	0.56	0.17	2.8
1,1-Dichloroethene	0.017	0.49	0.068	1.9
1,1-Dichloroethane	0.034	0.15	0.14	0.63
cis-1,2-Dichloroethene	0.034	0.068	0.14	0.27
Chloroform	0.034	0.14	0.17	0.69
1,1,1-Trichloroethane	0.034	5.4	0.19	30
Carbon Tetrachloride	0.034	0.064	0.22	0.40
Trichloroethene	0.034	7.3	0.18	39
Toluene	0.034	0.044	0.13	0.17
Tetrachloroethene	0.034	0.052	0.23	0.35

Client Sample ID: FD-02_20190328

Lab ID#: 1904052-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.19	0.87	1.1
Freon 113	0.16	0.48	1.2	3.6
Acetone	0.78	20	1.8	48
2-Propanol	0.78	0.98	1.9	2.4
2-Butanone (Methyl Ethyl Ketone)	0.78	3.7	2.3	11
4-Methyl-2-pentanone	0.16	0.20	0.63	0.82

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

Client Sample ID: FD-02_20190328

Lab ID#: 1904052-07B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.031	0.54	0.15	2.6
1,1-Dichloroethene	0.016	2.2	0.061	8.6
1,1-Dichloroethane	0.031	0.13	0.12	0.53
cis-1,2-Dichloroethene	0.031	0.13	0.12	0.53
Chloroform	0.031	0.58	0.15	2.8
1,1,1-Trichloroethane	0.031	8.2	0.17	45
Carbon Tetrachloride	0.031	0.042	0.20	0.26
Trichloroethene	0.031	0.93	0.17	5.0
Toluene	0.031	0.17	0.12	0.63
Tetrachloroethene	0.031	0.061	0.21	0.42
Ethyl Benzene	0.031	0.046	0.13	0.20
m,p-Xylene	0.062	0.17	0.27	0.76
o-Xylene	0.031	0.065	0.13	0.28

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Client Sample ID: SSV-1033_20190328

Lab ID#: 1904052-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040312**	**Date of Collection: 3/28/19 1:11:00 PM**	
Dil. Factor:	**1.62**	**Date of Analysis: 4/3/19 04:45 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.18	0.91	0.98
Freon 113	0.16	Not Detected	1.2	Not Detected
Acetone	0.81	3.2	1.9	7.5
2-Propanol	0.81	Not Detected	2.0	Not Detected
Carbon Disulfide	0.81	Not Detected	2.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.81	Not Detected	2.4	Not Detected
4-Methyl-2-pentanone	0.16	Not Detected	0.66	Not Detected
1,2,4-Trimethylbenzene	0.16	Not Detected	0.80	Not Detected
Propylene	1.6	Not Detected	2.8	Not Detected

Q = Exceeds Quality Control limits.

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	120	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	131 Q	70-130

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Client Sample ID: SSV-1033_20190328

Lab ID#: 1904052-01B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040312sim**	**Date of Collection: 3/28/19 1:11:00 PM**	
Dil. Factor:	**1.62**	**Date of Analysis: 4/3/19 04:45 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.032	0.53	0.16	2.6
Vinyl Chloride	0.016	Not Detected	0.041	Not Detected
1,1-Dichloroethene	0.016	0.032	0.064	0.12
1,1-Dichloroethane	0.032	Not Detected	0.13	Not Detected
cis-1,2-Dichloroethene	0.032	0.032	0.13	0.13
Chloroform	0.032	0.034	0.16	0.16
1,1,1-Trichloroethane	0.032	0.48	0.18	2.6
Carbon Tetrachloride	0.032	0.058	0.20	0.36
Trichloroethene	0.032	Not Detected	0.17	Not Detected
Toluene	0.032	Not Detected	0.12	Not Detected
Tetrachloroethene	0.032	0.039	0.22	0.27
Ethyl Benzene	0.032	Not Detected	0.14	Not Detected
m,p-Xylene	0.065	Not Detected	0.28	Not Detected
o-Xylene	0.032	Not Detected	0.14	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	126	70-130

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Client Sample ID: SSV-1017_20190328

Lab ID#: 1904052-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040313**	**Date of Collection:**	**3/28/19 1:03:00 PM**
Dil. Factor:	**1.58**	**Date of Analysis:**	**4/3/19 05:25 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.22	0.89	1.2
Freon 113	0.16	0.62	1.2	4.8
Acetone	0.79	3.8	1.9	9.0
2-Propanol	0.79	Not Detected	1.9	Not Detected
Carbon Disulfide	0.79	Not Detected	2.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.79	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.16	Not Detected	0.65	Not Detected
1,2,4-Trimethylbenzene	0.16	Not Detected	0.78	Not Detected
Propylene	1.6	Not Detected	2.7	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: SSV-1017_20190328

Lab ID#: 1904052-02B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040313sim**	**Date of Collection: 3/28/19 1:03:00 PM**	
Dil. Factor:	**1.58**	**Date of Analysis: 4/3/19 05:25 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.032	0.55	0.16	2.7
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
1,1-Dichloroethene	0.016	2.3	0.063	9.1
1,1-Dichloroethane	0.032	0.14	0.13	0.57
cis-1,2-Dichloroethene	0.032	0.12	0.12	0.50
Chloroform	0.032	0.59	0.15	2.9
1,1,1-Trichloroethane	0.032	8.6	0.17	47
Carbon Tetrachloride	0.032	0.039	0.20	0.25
Trichloroethene	0.032	1.2	0.17	6.2
Toluene	0.032	0.072	0.12	0.27
Tetrachloroethene	0.032	0.13	0.21	0.88
Ethyl Benzene	0.032	Not Detected	0.14	Not Detected
m,p-Xylene	0.063	Not Detected	0.27	Not Detected
o-Xylene	0.032	0.058	0.14	0.25

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: SSV-1016_20190328

Lab ID#: 1904052-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040314**	**Date of Collection: 3/28/19 1:16:00 PM**	
Dil. Factor:	**1.58**	**Date of Analysis: 4/3/19 06:04 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.18	0.89	1.0
Freon 113	0.16	Not Detected	1.2	Not Detected
Acetone	0.79	4.3	1.9	10
2-Propanol	0.79	Not Detected	1.9	Not Detected
Carbon Disulfide	0.79	Not Detected	2.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.79	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.16	Not Detected	0.65	Not Detected
1,2,4-Trimethylbenzene	0.16	Not Detected	0.78	Not Detected
Propylene	1.6	Not Detected	2.7	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	128	70-130

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Client Sample ID: SSV-1016_20190328

Lab ID#: 1904052-03B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040314sim**	**Date of Collection:**	**3/28/19 1:16:00 PM**
Dil. Factor:	**1.58**	**Date of Analysis:**	**4/3/19 06:04 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.032	0.54	0.16	2.7
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
1,1-Dichloroethene	0.016	Not Detected	0.063	Not Detected
1,1-Dichloroethane	0.032	0.065	0.13	0.26
cis-1,2-Dichloroethene	0.032	Not Detected	0.12	Not Detected
Chloroform	0.032	0.044	0.15	0.21
1,1,1-Trichloroethane	0.032	2.0	0.17	11
Carbon Tetrachloride	0.032	0.063	0.20	0.40
Trichloroethene	0.032	0.044	0.17	0.23
Toluene	0.032	0.038	0.12	0.14
Tetrachloroethene	0.032	0.065	0.21	0.44
Ethyl Benzene	0.032	Not Detected	0.14	Not Detected
m,p-Xylene	0.063	Not Detected	0.27	Not Detected
o-Xylene	0.032	Not Detected	0.14	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	126	70-130

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Client Sample ID: SSV-1009_20190328

Lab ID#: 1904052-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040315**	**Date of Collection: 3/28/19 3:15:00 PM**	
Dil. Factor:	**1.56**	**Date of Analysis: 4/3/19 06:43 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.26	0.88	1.5
Freon 113	0.16	Not Detected	1.2	Not Detected
Acetone	0.78	4.0	1.8	9.4
2-Propanol	0.78	Not Detected	1.9	Not Detected
Carbon Disulfide	0.78	Not Detected	2.4	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.78	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.16	Not Detected	0.64	Not Detected
1,2,4-Trimethylbenzene	0.16	Not Detected	0.77	Not Detected
Propylene	1.6	Not Detected	2.7	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	116	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	129	70-130

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Client Sample ID: SSV-1009_20190328

Lab ID#: 1904052-04B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040315sim**	**Date of Collection:**	**3/28/19 3:15:00 PM**
Dil. Factor:	**1.56**	**Date of Analysis:**	**4/3/19 06:43 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.031	0.54	0.15	2.7
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
1,1-Dichloroethene	0.016	6.0	0.062	24
1,1-Dichloroethane	0.031	1.3	0.13	5.4
cis-1,2-Dichloroethene	0.031	0.57	0.12	2.3
Chloroform	0.031	0.85	0.15	4.1
1,1,1-Trichloroethane	0.031	13	0.17	72
Carbon Tetrachloride	0.031	0.077	0.20	0.48
Trichloroethene	0.031	4.6	0.17	25
Toluene	0.031	0.10	0.12	0.40
Tetrachloroethene	0.031	3.3	0.21	22
Ethyl Benzene	0.031	0.044	0.14	0.19
m,p-Xylene	0.062	0.087	0.27	0.38
o-Xylene	0.031	Not Detected	0.14	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	129	70-130

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Client Sample ID: SSV-1002_20190328

Lab ID#: 1904052-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040316**	**Date of Collection: 3/28/19 1:40:00 PM**	
Dil. Factor:	**1.53**	**Date of Analysis: 4/3/19 07:23 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.15	0.22	0.86	1.2
Freon 113	0.15	0.19	1.2	1.5
Acetone	0.76	3.6	1.8	8.5
2-Propanol	0.76	Not Detected	1.9	Not Detected
Carbon Disulfide	0.76	Not Detected	2.4	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.76	Not Detected	2.2	Not Detected
4-Methyl-2-pentanone	0.15	Not Detected	0.63	Not Detected
1,2,4-Trimethylbenzene	0.15	Not Detected	0.75	Not Detected
Propylene	1.5	Not Detected	2.6	Not Detected

Q = Exceeds Quality Control limits.

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	119	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	134 Q	70-130

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Client Sample ID: SSV-1002_20190328

Lab ID#: 1904052-05B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040316sim**	**Date of Collection: 3/28/19 1:40:00 PM**	
Dil. Factor:	**1.53**	**Date of Analysis: 4/3/19 07:23 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.031	0.54	0.15	2.7
Vinyl Chloride	0.015	Not Detected	0.039	Not Detected
1,1-Dichloroethene	0.015	Not Detected	0.061	Not Detected
1,1-Dichloroethane	0.031	0.17	0.12	0.70
cis-1,2-Dichloroethene	0.031	0.076	0.12	0.30
Chloroform	0.031	0.097	0.15	0.47
1,1,1-Trichloroethane	0.031	4.4	0.17	24
Carbon Tetrachloride	0.031	0.078	0.19	0.49
Trichloroethene	0.031	4.0	0.16	22
Toluene	0.031	Not Detected	0.12	Not Detected
Tetrachloroethene	0.031	0.26	0.21	1.8
Ethyl Benzene	0.031	Not Detected	0.13	Not Detected
m,p-Xylene	0.061	Not Detected	0.26	Not Detected
o-Xylene	0.031	Not Detected	0.13	Not Detected

Q = Exceeds Quality Control limits.

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	135 Q	70-130

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Client Sample ID: SSV-1001_20190328

Lab ID#: 1904052-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040407**	**Date of Collection: 3/28/19 2:44:00 PM**	
Dil. Factor:	**1.71**	**Date of Analysis: 4/4/19 01:01 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.17	0.21	0.96	1.2
Freon 113	0.17	0.36	1.3	2.8
Acetone	0.86	3.1	2.0	7.4
2-Propanol	0.86	Not Detected	2.1	Not Detected
Carbon Disulfide	0.86	Not Detected	2.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.86	Not Detected	2.5	Not Detected
4-Methyl-2-pentanone	0.17	Not Detected	0.70	Not Detected
1,2,4-Trimethylbenzene	0.17	Not Detected	0.84	Not Detected
Propylene	1.7	Not Detected	2.9	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	114	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	121	70-130

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Client Sample ID: SSV-1001_20190328

Lab ID#: 1904052-06B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040407sim**	**Date of Collection: 3/28/19 2:44:00 PM**	
Dil. Factor:	**1.71**	**Date of Analysis: 4/4/19 01:01 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.034	0.56	0.17	2.8
Vinyl Chloride	0.017	Not Detected	0.044	Not Detected
1,1-Dichloroethene	0.017	0.49	0.068	1.9
1,1-Dichloroethane	0.034	0.15	0.14	0.63
cis-1,2-Dichloroethene	0.034	0.068	0.14	0.27
Chloroform	0.034	0.14	0.17	0.69
1,1,1-Trichloroethane	0.034	5.4	0.19	30
Carbon Tetrachloride	0.034	0.064	0.22	0.40
Trichloroethene	0.034	7.3	0.18	39
Toluene	0.034	0.044	0.13	0.17
Tetrachloroethene	0.034	0.052	0.23	0.35
Ethyl Benzene	0.034	Not Detected	0.15	Not Detected
m,p-Xylene	0.068	Not Detected	0.30	Not Detected
o-Xylene	0.034	Not Detected	0.15	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	121	70-130

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Client Sample ID: FD-02_20190328

Lab ID#: 1904052-07A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040408**	**Date of Collection:**	**3/28/19 1:03:00 PM**
Dil. Factor:	**1.55**	**Date of Analysis:**	**4/4/19 02:04 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.19	0.87	1.1
Freon 113	0.16	0.48	1.2	3.6
Acetone	0.78	20	1.8	48
2-Propanol	0.78	0.98	1.9	2.4
Carbon Disulfide	0.78	Not Detected	2.4	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.78	3.7	2.3	11
4-Methyl-2-pentanone	0.16	0.20	0.63	0.82
1,2,4-Trimethylbenzene	0.16	Not Detected	0.76	Not Detected
Propylene	1.6	Not Detected	2.7	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: FD-02_20190328

Lab ID#: 1904052-07B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040408sim**	**Date of Collection:**	**3/28/19 1:03:00 PM**
Dil. Factor:	**1.55**	**Date of Analysis:**	**4/4/19 02:04 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.031	0.54	0.15	2.6
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
1,1-Dichloroethene	0.016	2.2	0.061	8.6
1,1-Dichloroethane	0.031	0.13	0.12	0.53
cis-1,2-Dichloroethene	0.031	0.13	0.12	0.53
Chloroform	0.031	0.58	0.15	2.8
1,1,1-Trichloroethane	0.031	8.2	0.17	45
Carbon Tetrachloride	0.031	0.042	0.20	0.26
Trichloroethene	0.031	0.93	0.17	5.0
Toluene	0.031	0.17	0.12	0.63
Tetrachloroethene	0.031	0.061	0.21	0.42
Ethyl Benzene	0.031	0.046	0.13	0.20
m,p-Xylene	0.062	0.17	0.27	0.76
o-Xylene	0.031	0.065	0.13	0.28

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	107	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1904052-08A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040306a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 11:32 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.10	Not Detected	0.56	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.50	Not Detected	1.5	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
Propylene	1.0	Not Detected	1.7	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	123	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1904052-08B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040306sima**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 11:32 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.020	Not Detected	0.099	Not Detected
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
1,1-Dichloroethene	0.010	Not Detected	0.040	Not Detected
1,1-Dichloroethane	0.020	Not Detected	0.081	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Chloroform	0.020	Not Detected	0.098	Not Detected
1,1,1-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Carbon Tetrachloride	0.020	Not Detected	0.12	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Toluene	0.020	Not Detected	0.075	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
Ethyl Benzene	0.020	Not Detected	0.087	Not Detected
m,p-Xylene	0.040	Not Detected	0.17	Not Detected
o-Xylene	0.020	Not Detected	0.087	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1904052-08C

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040406c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/4/19 11:52 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.10	Not Detected	0.56	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.50	Not Detected	1.5	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
Propylene	1.0	Not Detected	1.7	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1904052-08D

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040406sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/4/19 11:52 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.020	Not Detected	0.099	Not Detected
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
1,1-Dichloroethene	0.010	Not Detected	0.040	Not Detected
1,1-Dichloroethane	0.020	Not Detected	0.081	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Chloroform	0.020	Not Detected	0.098	Not Detected
1,1,1-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Carbon Tetrachloride	0.020	Not Detected	0.12	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Toluene	0.020	Not Detected	0.075	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
Ethyl Benzene	0.020	Not Detected	0.087	Not Detected
m,p-Xylene	0.040	Not Detected	0.17	Not Detected
o-Xylene	0.020	Not Detected	0.087	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: CCV

Lab ID#: 1904052-09A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 08:22 AM**	

Compound	%Recovery
Freon 11	112
Freon 113	106
Acetone	93
2-Propanol	96
Carbon Disulfide	108
2-Butanone (Methyl Ethyl Ketone)	105
4-Methyl-2-pentanone	101
1,2,4-Trimethylbenzene	117
Propylene	91

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	109	70-130

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Client Sample ID: CCV

Lab ID#: 1904052-09B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040302sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 08:22 AM**	

Compound	%Recovery
Freon 12	96
Vinyl Chloride	92
1,1-Dichloroethene	98
1,1-Dichloroethane	101
cis-1,2-Dichloroethene	103
Chloroform	108
1,1,1-Trichloroethane	104
Carbon Tetrachloride	121
Trichloroethene	105
Toluene	107
Tetrachloroethene	107
Ethyl Benzene	112
m,p-Xylene	114
o-Xylene	113

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	93	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	106	70-130

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Client Sample ID: CCV

Lab ID#: 1904052-09C

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040402**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/4/19 08:42 AM**	

Compound	%Recovery
Freon 11	109
Freon 113	104
Acetone	92
2-Propanol	92
Carbon Disulfide	106
2-Butanone (Methyl Ethyl Ketone)	98
4-Methyl-2-pentanone	104
1,2,4-Trimethylbenzene	117
Propylene	88

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	91	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	111	70-130

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Client Sample ID: CCV

Lab ID#: 1904052-09D

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040402sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/4/19 08:42 AM**	

Compound	%Recovery
Freon 12	95
Vinyl Chloride	95
1,1-Dichloroethene	96
1,1-Dichloroethane	101
cis-1,2-Dichloroethene	101
Chloroform	107
1,1,1-Trichloroethane	104
Carbon Tetrachloride	120
Trichloroethene	106
Toluene	109
Tetrachloroethene	108
Ethyl Benzene	113
m,p-Xylene	115
o-Xylene	113

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	93	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	106	70-130

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Client Sample ID: LCS

Lab ID#: 1904052-10A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 09:10 AM**	

Compound	%Recovery	Method Limits
Freon 11	114	70-130
Freon 113	106	70-130
Acetone	94	70-130
2-Propanol	105	70-130
Carbon Disulfide	94	70-130
2-Butanone (Methyl Ethyl Ketone)	101	70-130
4-Methyl-2-pentanone	109	70-130
1,2,4-Trimethylbenzene	118	70-130
Propylene	90	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	94	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	107	70-130

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Client Sample ID: LCSD

Lab ID#: 1904052-10AA

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 09:56 AM**	

Compound	%Recovery	Method Limits
Freon 11	111	70-130
Freon 113	100	70-130
Acetone	90	70-130
2-Propanol	101	70-130
Carbon Disulfide	90	70-130
2-Butanone (Methyl Ethyl Ketone)	96	70-130
4-Methyl-2-pentanone	104	70-130
1,2,4-Trimethylbenzene	117	70-130
Propylene	85	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	92	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: LCS

Lab ID#: 1904052-10B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040303sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 09:10 AM**	

Compound	%Recovery	Method Limits
Freon 12	99	70-130
Vinyl Chloride	101	70-130
1,1-Dichloroethene	100	70-130
1,1-Dichloroethane	99	70-130
cis-1,2-Dichloroethene	112	70-130
Chloroform	107	70-130
1,1,1-Trichloroethane	104	70-130
Carbon Tetrachloride	114	70-130
Trichloroethene	118	70-130
Toluene	107	70-130
Tetrachloroethene	109	70-130
Ethyl Benzene	114	70-130
m,p-Xylene	116	70-130
o-Xylene	118	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	91	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: LCSD

Lab ID#: 1904052-10BB

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040304sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 09:56 AM**	

Compound	%Recovery	Method Limits
Freon 12	98	70-130
Vinyl Chloride	101	70-130
1,1-Dichloroethene	102	70-130
1,1-Dichloroethane	100	70-130
cis-1,2-Dichloroethene	113	70-130
Chloroform	108	70-130
1,1,1-Trichloroethane	105	70-130
Carbon Tetrachloride	114	70-130
Trichloroethene	118	70-130
Toluene	107	70-130
Tetrachloroethene	109	70-130
Ethyl Benzene	114	70-130
m,p-Xylene	115	70-130
o-Xylene	118	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	91	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	106	70-130

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Client Sample ID: LCS

Lab ID#: 1904052-10C

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040403**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/4/19 09:42 AM**	

Compound	%Recovery	Method Limits
Freon 11	114	70-130
Freon 113	103	70-130
Acetone	97	70-130
2-Propanol	101	70-130
Carbon Disulfide	93	70-130
2-Butanone (Methyl Ethyl Ketone)	99	70-130
4-Methyl-2-pentanone	109	70-130
1,2,4-Trimethylbenzene	118	70-130
Propylene	86	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: LCSD

Lab ID#: 1904052-10CC

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040404**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/4/19 10:28 AM**	

Compound	%Recovery	Method Limits
Freon 11	112	70-130
Freon 113	103	70-130
Acetone	92	70-130
2-Propanol	103	70-130
Carbon Disulfide	94	70-130
2-Butanone (Methyl Ethyl Ketone)	99	70-130
4-Methyl-2-pentanone	109	70-130
1,2,4-Trimethylbenzene	118	70-130
Propylene	82	60-140

Container Type: NA - Not Applicable

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

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Client Sample ID: LCS

Lab ID#: 1904052-10D

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040403sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/4/19 09:42 AM**	

Compound	%Recovery	Method Limits
Freon 12	99	70-130
Vinyl Chloride	101	70-130
1,1-Dichloroethene	99	70-130
1,1-Dichloroethane	99	70-130
cis-1,2-Dichloroethene	111	70-130
Chloroform	108	70-130
1,1,1-Trichloroethane	104	70-130
Carbon Tetrachloride	113	70-130
Trichloroethene	118	70-130
Toluene	108	70-130
Tetrachloroethene	110	70-130
Ethyl Benzene	114	70-130
m,p-Xylene	117	70-130
o-Xylene	117	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	94	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	106	70-130

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Client Sample ID: LCSD

Lab ID#: 1904052-10DD

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**20040404sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/4/19 10:28 AM**	

Compound	%Recovery	Method Limits
Freon 12	98	70-130
Vinyl Chloride	101	70-130
1,1-Dichloroethene	100	70-130
1,1-Dichloroethane	100	70-130
cis-1,2-Dichloroethene	112	70-130
Chloroform	108	70-130
1,1,1-Trichloroethane	104	70-130
Carbon Tetrachloride	113	70-130
Trichloroethene	117	70-130
Toluene	107	70-130
Tetrachloroethene	109	70-130
Ethyl Benzene	114	70-130
m,p-Xylene	116	70-130
o-Xylene	117	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	94	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	105	70-130

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4/8/2019
Mr. Joe Corsello
Sanborn, Head & Associates
20 Foundry Street

Concord NH 03301

Project Name: Neptune Road
Project #: 3304.02
Workorder #: 1904053

Dear Mr. Joe Corsello

The following report includes the data for the above referenced project for sample(s) received on 4/1/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified 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: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

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WORK ORDER #: 1904053

Work Order Summary

CLIENT:	Mr. Joe Corsello Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301	**BILL TO:**	Accounts Payable Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301
PHONE:	603-229-1900	**P.O. #**	
FAX:	603-229-1919	**PROJECT #**	3304.02 Neptune Road
DATE RECEIVED:	04/01/2019	**CONTACT:**	Ausha Scott
DATE COMPLETED:	04/06/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	FB-01_20190328	Modified TO-15	11.4 "Hg	5.1 psi
01B	FB-01_20190328	Modified TO-15	11.4 "Hg	5.1 psi
02A	Lab Blank	Modified TO-15	NA	NA
02B	Lab Blank	Modified TO-15	NA	NA
03A	CCV	Modified TO-15	NA	NA
03B	CCV	Modified TO-15	NA	NA
04A	LCS	Modified TO-15	NA	NA
04AA	LCSD	Modified TO-15	NA	NA
04B	LCS	Modified TO-15	NA	NA
04BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 04/08/19

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. 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) 985-1020

LABORATORY NARRATIVE
Modified TO-15 Full Scan/SIM
Sanborn, Head & Associates
Workorder# 1904053

One 6 Liter Summa Canister (SIM Certified) sample was received on April 01, 2019. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the Full Scan and SIM acquisition modes. The method involves concentrating up to 1.0 liters 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.

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

Requirement	***TO-15***	***ATL Modifications***
ICAL %RSD acceptance criteria	</=30% RSD with 2 compounds allowed out to < 40% RSD	For Full Scan: 30% RSD with 4 compounds allowed out to < 40% RSD For SIM: Project specific; default criteria is </=30% RSD with 10% of compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	For Full Scan: </= 30% Difference with four allowed out up to </=40%.; flag and narrate outliers For SIM: Project specific; default criteria is </= 30% Difference with 10% of compounds allowed out up to </=40%.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

Due to omission of the sampling date from the ID format on the sample tag, the information on the Chain of Custody (COC) for sample FB-01_20190328 was used to process and report the sample.

Analytical Notes

The results for each sample in this report were acquired from two separate data files originating from the same analytical run. The two data files have the same base file name and are differentiated with a "sim" extension on the SIM data file.

Definition of Data Qualifying Flags

Nine 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.

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

N - The identification is based on presumptive evidence.

CN - See case narrative explanation

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
MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

Client Sample ID: FB-01_20190328

Lab ID#: 1904053-01A

No Detections Were Found.

Client Sample ID: FB-01_20190328

Lab ID#: 1904053-01B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	0.044	0.049	0.16	0.18
o-Xylene	0.044	0.043 J	0.19	0.19 J

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Client Sample ID: FB-01_20190328

Lab ID#: 1904053-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040316**	**Date of Collection:**	**3/28/19 2:55:00 PM**
Dil. Factor:	**2.18**	**Date of Analysis:**	**4/3/19 07:39 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.22	Not Detected	1.2	Not Detected
Freon 113	0.22	Not Detected	1.7	Not Detected
Acetone	1.1	Not Detected	2.6	Not Detected
2-Propanol	1.1	Not Detected	2.7	Not Detected
Carbon Disulfide	1.1	Not Detected	3.4	Not Detected
2-Butanone (Methyl Ethyl Ketone)	1.1	Not Detected	3.2	Not Detected
4-Methyl-2-pentanone	0.22	Not Detected	0.89	Not Detected
1,2,4-Trimethylbenzene	0.22	Not Detected	1.1	Not Detected
Propylene	2.2	Not Detected	3.8	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: FB-01_20190328

Lab ID#: 1904053-01B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040316sim**	**Date of Collection:**	**3/28/19 2:55:00 PM**
Dil. Factor:	**2.18**	**Date of Analysis:**	**4/3/19 07:39 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.044	Not Detected	0.22	Not Detected
Vinyl Chloride	0.022	Not Detected	0.056	Not Detected
1,1-Dichloroethene	0.022	Not Detected	0.086	Not Detected
1,1-Dichloroethane	0.044	Not Detected	0.18	Not Detected
cis-1,2-Dichloroethene	0.044	Not Detected	0.17	Not Detected
Chloroform	0.044	Not Detected	0.21	Not Detected
1,1,1-Trichloroethane	0.044	Not Detected	0.24	Not Detected
Carbon Tetrachloride	0.044	Not Detected	0.27	Not Detected
Trichloroethene	0.044	Not Detected	0.23	Not Detected
Toluene	0.044	0.049	0.16	0.18
Tetrachloroethene	0.044	Not Detected	0.30	Not Detected
Ethyl Benzene	0.044	Not Detected	0.19	Not Detected
m,p-Xylene	0.087	Not Detected	0.38	Not Detected
o-Xylene	0.044	0.043 J	0.19	0.19 J

J = Estimated value.

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1904053-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040306a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 11:40 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.10	Not Detected	0.56	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.50	Not Detected	1.5	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
Propylene	1.0	Not Detected	1.7	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	91	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1904053-02B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040306sima**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 11:40 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.020	Not Detected	0.099	Not Detected
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
1,1-Dichloroethene	0.010	Not Detected	0.040	Not Detected
1,1-Dichloroethane	0.020	Not Detected	0.081	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Chloroform	0.020	Not Detected	0.098	Not Detected
1,1,1-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Carbon Tetrachloride	0.020	Not Detected	0.12	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Toluene	0.020	Not Detected	0.075	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
Ethyl Benzene	0.020	Not Detected	0.087	Not Detected
m,p-Xylene	0.040	Not Detected	0.17	Not Detected
o-Xylene	0.020	Not Detected	0.087	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: CCV

Lab ID#: 1904053-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 08:27 AM**	

Compound	%Recovery
Freon 11	98
Freon 113	93
Acetone	109
2-Propanol	89
Carbon Disulfide	111
2-Butanone (Methyl Ethyl Ketone)	102
4-Methyl-2-pentanone	113
1,2,4-Trimethylbenzene	97
Propylene	120

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: CCV

Lab ID#: 1904053-03B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040302sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 08:27 AM**	

Compound	%Recovery
Freon 12	93
Vinyl Chloride	99
1,1-Dichloroethene	93
1,1-Dichloroethane	107
cis-1,2-Dichloroethene	95
Chloroform	99
1,1,1-Trichloroethane	93
Carbon Tetrachloride	106
Trichloroethene	93
Toluene	95
Tetrachloroethene	97
Ethyl Benzene	96
m,p-Xylene	90
o-Xylene	89

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: LCS

Lab ID#: 1904053-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 09:19 AM**	

Compound	%Recovery	Method Limits
Freon 11	99	70-130
Freon 113	90	70-130
Acetone	118	70-130
2-Propanol	91	70-130
Carbon Disulfide	96	70-130
2-Butanone (Methyl Ethyl Ketone)	96	70-130
4-Methyl-2-pentanone	109	70-130
1,2,4-Trimethylbenzene	98	70-130
Propylene	115	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: LCSD

Lab ID#: 1904053-04AA

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 10:06 AM**	

Compound	%Recovery	Method Limits
Freon 11	99	70-130
Freon 113	90	70-130
Acetone	117	70-130
2-Propanol	92	70-130
Carbon Disulfide	97	70-130
2-Butanone (Methyl Ethyl Ketone)	95	70-130
4-Methyl-2-pentanone	112	70-130
1,2,4-Trimethylbenzene	97	70-130
Propylene	116	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: LCS

Lab ID#: 1904053-04B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040303sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 09:19 AM**	

Compound	%Recovery	Method Limits
Freon 12	95	70-130
Vinyl Chloride	101	70-130
1,1-Dichloroethene	92	70-130
1,1-Dichloroethane	105	70-130
cis-1,2-Dichloroethene	102	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	91	70-130
Carbon Tetrachloride	84	70-130
Trichloroethene	92	70-130
Toluene	94	70-130
Tetrachloroethene	98	70-130
Ethyl Benzene	96	70-130
m,p-Xylene	90	70-130
o-Xylene	92	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: LCSD

Lab ID#: 1904053-04BB

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v040304sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/3/19 10:06 AM**	

Compound	%Recovery	Method Limits
Freon 12	95	70-130
Vinyl Chloride	101	70-130
1,1-Dichloroethene	92	70-130
1,1-Dichloroethane	106	70-130
cis-1,2-Dichloroethene	102	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	91	70-130
Carbon Tetrachloride	84	70-130
Trichloroethene	92	70-130
Toluene	93	70-130
Tetrachloroethene	97	70-130
Ethyl Benzene	95	70-130
m,p-Xylene	88	70-130
o-Xylene	90	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	93	70-130

ATTACHMENT 5

DATA USABILITY SUMMARY REPORTS

Data Usability Summary Report (DUSR)

NYSDEC ASP Category B

Client:	Sanborn, Head & Associates, Inc., Concord, New Hampshire (SHA)
Site:	Former IBM Facility, Neptune Road, Poughkeepsie, New York
Laboratory:	Eurofins Air Toxics, Inc. (EATL), Folsom, California
SDG / Work Order:	1904051 & 1904053
Date(s) of Collection:	March 28, 2019
Number and type Samples & analyses:	7 Indoor Air, 1 Ambient Air, and 1 Field Blank sample for twenty-three project-specific VOCs by Method TO-15 Hi/Lo
Senior Data Reviewers:	Dr. Nancy C. Rothman, New Environmental Horizons, Inc. Susan D. Chapnick, New Environmental Horizons, Inc.
Date Completed:	April 25, 2019

This Data Usability Summary Report (DUSR) is based on guidance developed by the New York State Department of Conservation (NYSDEC), June 1999, for technical review of analytical data in lieu of a full third-party data validation. The objective of the DUSR is to determine whether or not the data as presented meet NYSDEC ASP 2005 or EPA method QC acceptance criteria.

2 Farmers Circle, Arlington, Massachusetts 02474 781-643-4294 schapnick@neh-inc.com
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I. Required DUSR Questions

1. ***Is the data package complete as defined under the requirements for the most current NYSDEC ASP Category B or USEPA CLP deliverables?***

   Yes.

2. ***Have all holding times been met?***

   Yes.

3. ***Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?***

   Yes, in general except some QC exceptions resulted in qualification of data as noted in the Data Validation Checklists (DV Checklists).

4. ***Have all of the data been generated using established and agreed upon analytical protocols?***

   Yes. Analytical data were generated using established EPA Methods (see analytical references in Section II below). Deviations from EPA and NYSDEC ASP 2005 QC protocols are discussed in the DV Checklists of this DUSR.

5. ***Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?***

   Yes. The raw data were checked to verify that detected results met retention time and mass spectral criteria, where applicable, for qualitative identification. A spot check was performed to verify quantitative accuracy for reporting of all results (see the DV Checklists).

6. ***Have the correct data qualifiers been used and are they consistent with the most current NYSDEC ASP?***

   Yes. The laboratory used the correct data qualifiers in reporting of results. The data were unchanged as a consequence of this review.

7. ***Have any quality control (QC) exceedances been specifically noted in the DUSR and have the corresponding QC summary sheets from the data package been attached to the DUSR?***

   Yes. QC exceedances are specified in the DV Checklists. QC summary sheets from the data package have not been attached; however, all QC exceedances that required data qualification are summarized in Table 2 of the DUSR and flagged in the validated electronic data deliverable (EDD).

II. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, identification of quality control (QC) samples, if applicable, and the analytical parameters reviewed in this In-Depth data usability review are listed in Table 1. Any deviations noted for sample collection or receipt (*e.g.*, temperature or preservation issues) are included in Section III, below.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Lab Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
IA-1016_20190328	1904051-01	03/28/2019	Indoor Air	VOCs	Field Sample
IA-1017_20190328	1904051-02	03/28/2019	Indoor Air	VOCs	Field Sample
IA-1015_20190328	1904051-03	03/28/2019	Indoor Air	VOCs	Field Sample
IA-1013_20190328	1904051-04	03/28/2019	Indoor Air	VOCs	Field Sample
IA-1005_20190328	1904051-05	03/28/2019	Indoor Air	VOCs	Field Sample
IA-1002_20190328	1904051-06	03/28/2019	Indoor Air	VOCs	Field Sample
FD-01_20190328	1904051-07	03/28/2019	Indoor Air	VOCs	Field Duplicate of IA-1017_20190328
AA-01_20190328	1904051-08	03/28/2019	Ambient Air	VOCs	Field Sample
FB-01_20190328	1904053-01	03/28/2019	Air	VOCs	Equipment Blank

Analytical method reference:

VOC: TO-15 Hi/Lo – Method TO-15 with simultaneous Full Scan and Selected Ion Monitoring (SIM) analysis for twenty-three project-specific VOCs

III. Data Deficiencies, Analytical Protocol Deviations, and Quality Control Problems

The following QC elements, as applicable to the analytical methods, were reviewed during this validation:

- Data package completeness and reporting protocols
- Sample receipt, holding times, and canister condition
- Calibration criteria (instrument tuning, initial and continuing calibration verifications)
- Method and field blank results
- Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) Recoveries and Precision
- Internal Standard (IS) and Surrogate Recoveries
- Sample/Laboratory Duplicate (LD) or sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including reporting limits and units)
- Other method-specific QC if applicable and reported
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

During this review of VOCs three results were estimated (J) due to QC issues. Table 2 summarizes the actions taken during this review. NEH generated validated data spreadsheets based on the electronic project database files received from SHA for these Work Orders. All results were considered acceptable compared to QAPP and method criteria and usable for project decisions with the understanding of the potential uncertainty (bias) in the qualified results.

As required by the DUSR, the DV Checklist attached to this DUSR documents the QC reviewed and the issues that required action or affected the data certainty in terms of the project data quality objectives (DQO) of accuracy, precision, representativeness, comparability, and sensitivity. The DQO of completeness can be evaluated by the project manager after all data are generated.

The laboratory reported results for 23 project-specific VOCs from a single analysis with two mass spectrometer (MS) detectors, each operated in a different detection mode: one operated in the full scan electron impact mode and the other operated in the Selected Ion Monitoring (SIM) mode. This analysis, called TO-15 Hi/Lo by ATL, allowed the sensitivity requirements of the project, unless otherwise discussed in this report, to be met for all of the compounds. The Data Review Checklist indicates the compounds reported from each of the two modes of MS operation. The full scan analysis was reported with an "A" suffix and the SIM analysis with a "B" suffix appended to the laboratory sample ID.

Field duplicate (FD) precision was acceptable in the FD pair IA-1017_20190328 and FD-01_20190328 for all target VOCs except for toluene. The results for toluene in these two samples were estimated (J) with indeterminate bias due to FD imprecision as shown in Table 2 indicating acceptable precision and representativeness of the samples to the site location for all the project-specific VOCs except for toluene.

All non-detects were reported at levels below the May 2017 NYSDOH Soil Vapor/Indoor Air values indicating sensitivity was acceptable for these data.

All other quality control information associated with accuracy, precision, and sensitivity for the VOCs reported met method and QAPP criteria for the samples in these Work Orders with the exceptions included in Table 2.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
IA-1017_20190328 FD-01_20190328	Toluene	J	I	FD imprecision
FB-01_20190328	o-Xylene	J	I	Result < RL

Qualifiers: U = Analyte is non-detect at or above the sample-specific reporting limit (RL); UJ = Non-detect is estimated at the RL; J = Result is estimated with indeterminate bias; J+ = Result is estimated with possible high bias; J- = Result is estimated with possible low bias;; EB = Analyte was also present in a Field Equipment Blank; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Abbreviations used in Table 2:
FD = Field Duplicate
RL = Reporting Limit

Date Sampled: 3/28/19

No. Samples 6 IA + 1FD + 1AA

Method of Analysis: TO-15 Full scan & SIM

Data Element Acceptable	Canister Receipt	HT	GC/MS Tunes + Calibrations	Internal Stds + Surrogates	LCS	Lab Dup (LCS and LD)	Field Duplicates	RL & Quant.
Yes	√	√	√	√	√	√		√
No							Estimate (J) 2 results	

Other Issues : None

A combined Full Scan and SIM Analysis was performed for each sample for 23 Project-specific VOCs listed in Table B.1 of the Work Plan, as shown on the second to last page of this checklist. The full scan analysis was reported with an "A" suffix and the SIM analysis with a "B" suffix appended to the laboratory sample ID.

Data usability review was performed on Quality Control forms associated with this data package, which involved evaluation of the following (where applicable): agreement of analyses conducted with COC requests; Holding times and sample preservation; Laboratory blanks/equipment blanks/ field blanks results compared to field sample results; Field duplicate results; Quantitation limits and sample results; Surrogate and Internal Standard recoveries; LCS/LCSD results; Laboratory duplicate results; instrument tuning and calibration information; sample chromatograms; and laboratory qualifiers applied to the dataset. The project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. This review is consistent with the requirements set forth in NYSDEC Technical Guidance for Site Investigation and Remediation, DER-10, Appendix 2B (May 2010).

Data Package Completeness: All required forms (results, summary QC, COC), as needed to validate the data in accordance with NYSDEC ASP and the Work Plan were present in the data package. The laboratory provided the equivalent of the Category B deliverable.

Sample receipt: The 8 6-L canisters were received intact and in good condition on 4/1/19. The laboratory noted that the sample tags did not contain the full samples ID (date of collection omitted) so lab used the COC ID (e.g., IA-106_20190328) for reporting of sample results.

Date: ***4/19/19***

Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Associated Blanks: Method Blank: v040306a / v040306sima
FB = FB-01_20190328 (reported in Work Order 1904045)

Blank ID	Contaminant / Level (µg/m^3)	Action Level DF= 2.18	Sample and reported result (µg/m3)		Corrected Database Result
v040306a	None		No Blank Action Required		
v040306sima	None		No Blank Action Required		
FB-01_20190328	Toluene 0.18	0.14	IA-1016_20190328	1	No Action
		0.14	IA-1017_20190328	1.7	No Action
		0.14	IA-1015_20190328	0.92	No Action
		0.12	IA-1013_20190328	1.7	No Action
		0.13	IA-1005_20190328	1.2	No Action
		0.13	IA-1002_20190328	1.1	No Action
		0.14	FD-01_20190328	4.2	No Action
		0.12	AA-01_20190328	0.71	No Action
FB-01_20190328	o-Xylene 0.19 J	0.14	IA-1016_20190328	0.24	No Action
		0.15	IA-1017_20190328	0.25	No Action
		0.15	IA-1015_20190328	0.25	No Action
		0.13	IA-1013_20190328	0.2	No Action
		0.14	IA-1005_20190328	0.22	No Action
		0.13	IA-1002_20190328	0.18	No Action
		0.14	FD-01_20190328	0.22	No Action
		0.12	AA-01_20190328	0.15	No Action

Additional Notes:

Certification: Canisters were Certified pre-cleaned on 3/19/19 & 3/20/19 prior to shipment to the field indicating all 23 target VOCs were non-detect prior to use.

Sample Integrity: Samples were collected for between 6 to 8 hours on 3/28/19. The field receipt vacuums (26 - 30 ”Hg), field final vacuums (3.5 - 6.5 "Hg) and lab receipt vacuum (2.6 - 6.5"Hg) were acceptable. The canisters were over-pressurized to 4.6 to 5.2 psi prior to analysis. No Action required.

Holding Time (HT): Samples were analyzed on 4/3/19; therefore HT was met. No Action required.

Date: ***4/19/19***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Additional Notes:

BFB Tunes: Instrument MSD-V 2 tunes (ICAL + 1 CCV). Another tune on 2/22/19 was performed prior to analysis of several ICAL standards; however, the 2/22/19 ICAL contained compounds not required for this project (i.e., non-target compounds). Method TO-15 tune criteria used and tunes were acquired properly (average of 3 scans across BFB peak with background subtraction). All criteria in all tunes were met and all samples were analyzed within 12 hours of tune; therefore, No Action Required.

ICALs : Instrument V Full Scan and SIM performed on 2/18/19. Additional standards were analyzed 2/22/19 but these were for compounds that are not targets for this project. Full Scan = 6- to 9-level calibration from 0.05, 0.1, 0.5, or 1 to 20 or 40 ppbV for all 23 Target compounds plus several non-target compounds. SIM = 9- to 10-level calibration from 0.01 or 0.02 to 20 ppbV for all 14 Targets requiring SIM (see Table on second to last page of this DV Checklist). All %RSD were acceptable and all RLs were supported by the ICAL (i.e., the lowest ICAL standard was at a level at or below the RL reported as verified by evaluating the Method Blank with DF=1). No Action required - valid ICAL.

CCALs: v040302/v040302sim - % Recovery 70-130% for all 23 Target compounds - No Action required.

Surrogates & Internal Standards **:** Surrogates (1,2-Dichloroethane-d4, Toluene-d8, and 4-Bromofluorobenzene) had %Recovery within criteria and all 3 IS' (Chlorobenzene-d5, 1,4-Difluorobenzene, and Bromochloromethane) had areas and RTs within criteria for both full scan and SIM in all analyses; therefore, No Action Required.

LCS/LCSD : v040303/v040304 & v040303sim/v040304sim - %Recovery acceptable for all 23 Targets in both LCS and LCSD and LCS/LCSD RPDs all OK; therefore, acceptable accuracy and precision demonstrated for analysis of the 23 VOCs by Full Scan & SIM analysis. No Action required

LD: not performed for this sample since LCS/LCSD performed allowing precision evaluation.

Compound Reporting: the lab reported results for 23 Target VOCs, as requested in Table B.1 of the Work Plan. 9 compounds were reported from the Full Scan analysis and 14 from the SIM analysis as shown on the second to last page of this DV Checklist.

Qualifier Action: There were no results reported < RL and qualified "J" by the lab. All other data were either detected (not qualified) or non-detect with the "U" qualifier. No qualifier action required.

Sensitivity: All non-detects were below the NYSDOH Values; therefore, senstivity was acceptable for all these analyses.

Narrative: The narrative did not raise any issues that would affect data quality.

The sample chromatogram, and quantitation report was reviewed and data appeared to have been reported correctly. Although Tentatively Identified Compound (TIC) analysis was not requested, there were some extra peaks in some samples not identified in the analyses.

Date: ***4/19/19***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Calculation Verification Checks:

Initial Calibration : Verification MSD-V Full Scan ICAL on 2/18/19 for Isopropanol (called 2-Propanol in the data) with IS Bromochloromethane

	Level 1	Level 2	Level 3	Level 4	Level 5
Std Conc.	0.5	1	5	10	15
Cpd Resp	34200	67930	404199	597095	1117657
IS Conc.	5	5	5	5	5
IS Resp	118533	117183	133203	131623	137704
RRF	2.8853	2.8985	3.0345	2.2682	2.7055

	Level 6	Level 7	Avg. RRF	%RSD	
Std Conc.	20	40			
Cpd Resp	1260556	3515071			
IS Conc.	5	5			
IS Resp	141312	150124			
RRF	2.2301	2.9268	2.7070	12.10%	√

ICAL verified, no action required

CCV : Verification MSD-V 4/3/19 for 10 ppbV Standard of Freon 12: Response for Compound = 910818; IS (Bromochloromethane) 125459 = 476082 @5 ppbV; RRF from SIM ICAL = 3.88235

$$\text{Concentration} = \frac{910818 \times 5}{125459 \times 3.88235} = 9.35 \text{ ppb}$$ √

$$\%\text{Recovery} = \frac{100 \times 9.35}{10} = 93\%$$

QL & Result Verification: AA-01_20190328; Freon 12

Normal 250 mL analyzed (same as for Method Blank) but since canister was over-pressurize, effective DF = 1.45; MWt = 120.92

Sample Response = 29385; IS Response = 112979 @ 5; RRF ICAL = 3.88235

$$\text{Conc.} = \frac{29385 \times 5 \times 1.45}{112979 \times 3.88235} = 0.49 \text{ ppbV}$$

$\mu g/m^3$ = (ppbv x Mwt x DF) / 24.45 = (0.049 x 120.92 x 1)/24.45 = 2.4 $\mu g/m^3$ √

Date: ***4/19/19***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

FD : IA-1017_20190328 /FD-01_20190328. A comparison of results for the 23 target compounds is shown below

Field Duplicate Evaluation_ Sample IDs: Sample = IA-1017_20190328 FD = FD-01_20190328

Analyte Name	DF= 1.69* RL (µg/m^3)	Sample µg/m^3	Q	Sample Result Level	FD µg/m^3	Q	FD Result Level	RPD	Action **
Freon 11	0.95	1.2		< 5x RL	1.2		< 5x RL	0.0%	None
Freon 113	1.3	1.3	U	RL	1.3	U	RL	NA	None
Acetone	2	14		> 5x RL	14		> 5x RL	0.0%	None
2-Propanol	2.1	6.3		< 5x RL	6.2		< 5x RL	1.6%	None
Carbon Disulfide	2.6	2.6	U	RL	2.6	U	RL	NA	None
2-Butanone (Methyl Ethyl Ketone)	2.5	2.5	U	RL	2.4	U	RL	NA	None
4-Methyl-2-pentanone	0.69	0.69	U	RL	0.68	U	RL	NA	None
1,2,4-Trimethylbenzene	0.83	1.2		< 5x RL	0.82	U	RL	NA	None
Propylene	2.9	2.9	U	RL	2.8	U	RL	NA	None
Freon 12	0.17	2.3		> 5x RL	2.4		> 5x RL	4.3%	None
Vinyl Chloride	0.043	0.043	U	RL	0.042	U	RL	NA	None
1,1-Dichloroethene	0.067	0.067	U	RL	0.066	U	RL	NA	None
1,1-Dichloroethane	0.14	0.14	U	RL	0.13	U	RL	NA	None
cis-1,2-Dichloroethene	0.13	0.13	U	RL	0.13	U	RL	NA	None
Chloroform	0.16	0.16	U	RL	0.16	U	RL	NA	None
1,1,1-Trichloroethane	0.18	0.18	U	RL	0.18	U	RL	NA	None
Carbon Tetrachloride	0.21	0.48		< 5x RL	0.46		< 5x RL	4.3%	None
Trichloroethene	0.18	0.3		< 5x RL	0.18	U	RL	NA	None
Toluene	0.13	1.7		> 5x RL	4.2		> 5x RL	84.7%	**J Both**
Tetrachloroethene	0.23	0.23	U	RL	0.27		< 5x RL	NA	None
Ethyl Benzene	0.15	0.19		< 5x RL	0.16		< 5x RL	17.1%	None
m,p-Xylene	0.29	0.54		< 5x RL	0.56		< 5x RL	3.6%	None
o-Xylene	0.15	0.25		< 5x RL	0.22		< 5x RL	12.8%	None

* FD DF was 1.66 so RLs for FD are RLs shown x 1.66/1.69

**Action only taken if RPD > 20% and one or both samples report values > 5 x RL; Q = Validator Qualifier

FD precision was acceptable for all project-specific VOCs in the FD pair IA-1017_20190328 /FD-01_20190328 except for Toluene which had RPD > 20% for values > 5x RL. These results are an indication of acceptable precision and representativeness of the samples to the site location for all compounds except Toluene. Note: although Blank Action was not required, the Field Blank reported Toluene at a level above the RL suggesting possible cross contamination of the samples for this compound.

****ACTION: Toluene estimated (J) in samples IA-1017_20190328 and FD-01_20190328 with indeterminate bias due to FD imprecision.***

Date: ***4/19/19***

Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Compound List and Project-required Reporting Limits (RL): Table B.1 of Work Plan (updated March 2019)

Analyte	CAS No.		TO-15/TO-15 SIM (6 L canister)	Full Scan TO-15 Soil Vapor (6 L canister)		NYS DOH Values (µg/m³)		
			Typical Final RL (µg/m³) *	Typical Final RL (µg/m³) *	Expected Analysis	Indoor Air		Subslab Vapor
1,1,1-Trichloroethane	71-55-6		0.1771	4.3	SIM	3		100
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	76-13-1		1.2397	6.1	Full			
1,1-Dichloroethane (1,1-DCA)	75-34-3		0.13041	3.2	SIM			
1,1-Dichloroethylene (1,1-DCE)	75-35-4		0.0644	3.2	SIM	0.2		6
1,2,4-Trimethylbenzene	95-63-6		0.7889	3.8	Full			
2-Butanone (Methyl Ethyl Ketone [MEK])	78-93-3		2.415	9.5	Full			
4-Methyl-2-Pentanone (2-Pentanone; Methyl Isobutyl Ketone [MIBK])	108-10-1		0.6601	3.2	Full			
Acetone	67-64-1		1.932	19	Full			
Carbon disulfide	75-15-0		2.576	10	Full			
Carbon tetrachloride	56-23-5		0.2093	5	SIM	0.2		6
Chloroform	67-66-3		0.15778	3.8	SIM			
cis-1,2-Dichloroethylene (cis-1,2-DCE)	156-59-2		0.12719	3.2	SIM	0.2		6
Dichlorodifluoromethane (DCDFM; Freon 12)	75-71-8		0.15939	4	SIM			
Ethylbenzene	100-41-4		0.14007	3.5	SIM			
Isopropanol	67-63-0		1.932	7.9	Full			
Propylene	115-07-1		2.737	5.5	Full			
Tetrachloroethylene (PCE)	127-18-4		0.2254	5.5	SIM	3		100
Toluene	108-88-3		0.12075	3	SIM			
Trichloroethylene (TCE)	79-01-6		0.1771	4.3	SIM	0.2		6
Trichlorofluoromethane (TCFM; Freon 11)	75-69-4		0.9016	4.5	Full			
Vinyl chloride (VC)	75-01-4		0.04186	2.1	SIM	0.2		6
m/p-Xylene	108-38-3 106-42-3		0.2737	3.5	SIM			
o-Xylene	95-47-6		0.14007	3.5	SIM			

* Typical Final RL assumed a 1.61 Dilution Factor for sample (6L canister collected to a final vacuum of 5 "Hg and over-pressurized to 5 psi prior to analysis).

Date: ***4/19/19***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Actions continued (see references below):

Canister Integrity:	If certification forms indicate issues, J/U or UJ results in samples; if Flow controller RPD > 20% for pre- and post-flow calibrations, J detect/UJ non-detects
Canister Vacuum (Vac):	Initial Field Vac < 25" Hg, J/UJ all results; Lab Receipt Vac > 15" Hg, J/UJ results; Lab Receipt Vac > ± 5" Hg of Final Field Vac, J/UJ results
Hold Time (HT):	HT > 30 days, J detects/ UJ non-detects
Blank Actions:	Sample-specific Blank Action Level = Blank Level x (Sample DF/Blank DF)
	Method Blank (MB): ***If MB < RL*** : and sample < RL, negate (U) result in sample RL; if sample is > RL but < 2 x RL (or 4 x RL for acetone, 2-butanone, and methylene chloride), negate (U) result at level found in sample. ***If MB > RL*** : and sample < RL, negate (U) result in sample RL; if sample is > RL but < Sample-Specific Blank Action Level, negate (U) the sample at the Sample-Specific Blank Action Level.
	Equipment Blank (EB): Result<Blank Action, EB result at level reported in sample
BFB Tune:	SW-846 method 8260B or TO-15 tune criteria not met, professional judgment on R of all data; samples analyzed > 12-hours after tune; professional judgment on J/UJ or R of results
LCS and CCV:	Percent Recovery (%Rec) <10%, J detects, R non-detects; 10% < %Rec <70%; J/UJ all associated data; %Rec >130%, J detects - no action for non-detects
Initial Calibration (ICAL):	%RSD > 30%, J/UJ associated results
Internal Standard (IS):	RT > ±0.33 min of IS RT in daily CCV, J/UJ associated results;
	Area < 25% Area in CCV, J detects, R non-detects (or professional judgment); 25%< Area < 60% of CCV Area, J/UJ associated results; Area > 140% of CCV Area, J detects, no action for non-detects
Surrogates:	%Rec <10%, J detects, R non-detects; 10% < %Rec <70%; J/UJ all associated data; %Rec >130%, J detects - no action for non-detects
Laboratory Duplicates:	LCS/LCSD RPD or Sample/LD RPD > 20% for detects > 5x RL, J associated data; professional judgment for results < 5 x RL
Field Duplicates:	RPD > 20% for detects > 5x RL, J associated data; professional judgment for results < 5 x RL
RLs + Quant:	Compound reported outside calibration range (< RL or at ppbV level > sample-specific highest ICAL standard for compound), J data. Note if RL > expected RL from Table B.1 of Work Plan (see above) and if non-detects exceed NYSDOH May 2017 Updated Soil Vapor/Indoor Air Matrices levels
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; and R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	*Remedial Design/Remedial Action Work Plan; Former IBM Building 982 – Neptune Road, Poughkeepsie, New York, including Appendix B, QAQC Plan, prepared by Sanborn, Head & Associates, September 3, 2013 (Work Plan) with updated Table B.1 March 2019* ; *NYSDEC Analytical Services Protocol,* June 2005 *with NYSDEC Modifications to the EPA Region 9 TO-15 QA/QC Criteria,* February 2008*; USEPA Region II SOP HW-31, Validating Air Samples, Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15,* Rev. 6, June 2014; *Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS),* Publication EPA/625/R-96/010b, January 1999; and NYSDOH May 2017 Update to Soil Vapor/Indoor Air Decision Matrices.

Date: ***4/19/19***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Date Sampled: 3/28/19

No. Samples 1 FB

Method of Analysis: TO-15 Full scan & SIM

Data Element Acceptable	Canister Receipt	HT	GC/MS Tunes + Calibrations	Internal Stds + Surrogates	LCS	Lab Dup (LCS and LD)	Field Duplicates	RL & Quant.
Yes	√	√	√	√	√	√	NA	
No								Accept 1 "J" value

Other Issues : None

A combined Full Scan and SIM Analysis was performed for each sample for 23 Project-specific VOCs listed in Table B.1 of the Work Plan, as shown on the second to last page of this checklist. The full scan analysis was reported with an "A" suffix and the SIM analysis with a "B" suffix appended to the laboratory sample ID.

Data usability review was performed on Quality Control forms associated with this data package, which involved evaluation of the following (where applicable): agreement of analyses conducted with COC requests; Holding times and sample preservation; Laboratory blanks/equipment blanks/ field blanks results compared to field sample results; Field duplicate results; Quantitation limits and sample results; Surrogate and Internal Standard recoveries; LCS/LCSD results; Laboratory duplicate results; instrument tuning and calibration information; sample chromatograms; and laboratory qualifiers applied to the dataset. The project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. This review is consistent with the requirements set forth in NYSDEC Technical Guidance for Site Investigation and Remediation, DER-10, Appendix 2B (May 2010).

Data Package Completeness: All required forms (results, summary QC, COC), as needed to validate the data in accordance with NYSDEC ASP and the Work Plan were present in the data package. The laboratory provided the equivalent of the Category B deliverable.

Sample receipt: The 1 6-L canisters was received intact and in good condition on 4/1/19. The laboratory noted that the sample tag did not contain the full samples ID (date of collection omitted) so lab used the COC ID (FB-01_20190328) for association with the sample data.

Date: ***4/19/19***

Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Associated Blanks: Method Blank: v040306a / v040306sima
FB = NA

Blank ID	Contaminant / Level (µg/m^3)		Action Level DF=		Sample and reported result (µg/m3)	Corrected Database Result
v040306a	None				No Blank Action Required	
v040306sima	None				No Blank Action Required	

Additional Notes:

Certification: Canister was Certified pre-cleaned on 3/20/19 prior to shipment to the field indicating all 23 target VOCs were non-detect prior to use.

Sample Integrity: FB was collected for about 8 hours on 3/28/19. The field receipt vacuum (28.5 ”Hg), field final vacuum (13.0 "Hg) and lab receipt vacuum (11.4"Hg) were acceptable. The canister was over-pressurized to 5.1 psi prior to analysis. No Action required.

Holding Time (HT): Sample was analyzed on 4/3/19; therefore HT was met. No Action required.

BFB Tunes: Instrument MSD-V 2 tunes (ICAL + 1 CCV). Another tune on 2/22/19 was performed prior to analysis of several ICAL standards; however, the 2/22/19 ICAL contained compounds not required for this project (i.e., non-target compounds). Method TO-15 tune criteria used and tunes were acquired properly (average of 3 scans across BFB peak with background subtraction). All criteria in all tunes were met and all samples were analyzed within 12 hours of tune; therefore, No Action Required.

ICALs : Instrument V Full Scan and SIM performed on 2/18/19. Additional standards were analyzed 2/22/19 but these were for compounds that are not targets for this project. Full Scan = 6- to 9-level calibration from 0.05, 0.1, 0.5, or 1 to 20 or 40 ppbV for all 23 Target compounds plus several non-target compounds. SIM = 9- to 10-level calibration from 0.01 or 0.02 to 20 ppbV for all 14 Targets requiring SIM (see Table on second to last page of this DV Checklist). All %RSD were acceptable and all RLs were supported by the ICAL (i.e., the lowest ICAL standard was at a level at or below the RL reported as verified by evaluating the Method Blank with DF=1). No Action required - valid ICAL.

Additional Notes:

CCALs: v040302/v040302sim - % Recovery 70-130% for all 23 Target compounds - No Action required.

Surrogates & Internal Standards **:** Surrogates (1,2-Dichloroethane-d4, Toluene-d8, and 4-Bromofluorobenzene) had %Recovery within criteria and all 3 IS' (Chlorobenzene-d5, 1,4-Difluorobenzene, and Bromochloromethane) had areas and RTs within criteria for both full scan and SIM in all analyses; therefore, No Action Required.

LCS/LCSD : v040303/v040304 & v040303sim/v040304sim - %Recovery acceptable for all 23 Targets in both LCS and LCSD and LCS/LCSD RPDs all OK; therefore, acceptable accuracy and precision demonstrated for analysis of the 23 VOCs by Full Scan & SIM analysis. No Action required

LD: not performed for this sample since LCS/LCSD performed allowing precision evaluation.

FD: not applicable for a Field Blank.

Compound Reporting: the lab reported results for 23 Target VOCs, as requested in Table B.1 of the Work Plan. 9 compounds were reported from the Full Scan analysis and 14 from the SIM analysis as shown on the second to last page of this DV Checklist.

Qualifier Action: There was one result reported < RL and qualified "J" by the lab. This "J" value was accepted as an estimated (J) result with indeterminate bias due to uncertainty of quantitation below the calibration range. Other than with one "J", all other data were wither detected (no qualifier) or non-detect qualified "U". NOTE: value reported for o-Xylene in ppbV was < RL but equaled the RL when converted to µg/m^3 units.
****ACTION: Accept 1 "J" lab result as an estimated (J) value due to reporting < RL***

Sensitivity: All non-detects were below the NYSDOH Values except for carbon tetrachloride and trichloroethene, which were slightly above the 0.2 µg/m^3 level (ranged for 0.23 to 0.27 µg/m^3) due to higher than expected receipt vacuum. Since this is a Field Blank, sensitivity was considered acceptable.

Narrative: The narrative did not raise any issues that would affect data quality.

The sample chromatogram, and quantitation report was reviewed and data appeared to have been reported correctly. Although Tentatively Identified Compound (TIC) analysis was not requested, there were no extra peaks not identified in the FB sample.

Date: ***4/19/19***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Calculation Verification Checks:

Initial Calibration : Verification MSD-V Full Scan ICAL on 2/18/19 for Freon 11 with IS Bromochloromethane

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Std Conc.	0.05	0.1	0.5	1	5	10	15
Cpd Resp	4002	10405	42475	87082	562456	1003245	1526778
IS Conc.	5	5	5	5	5	5	5
IS Resp	120499	131410	118533	117183	133203	131623	137704
RRF	3.3212	3.9590	3.5834	3.7156	4.2225	3.8111	3.6958

	Level 8	Level 9	Avg. RRF	%RSD
Std Conc.	20	40		
Cpd Resp	2073141	4151362		
IS Conc.	5	5		
IS Resp	141312	150124		
RRF	3.6677	3.4566	3.7148	7.17%

√

ICAL verified, no action required

CCV : Verification MSD-V 4/3/19 for 10 ppbV Standard of Toluene: Response for Compound = 1370578; IS (1,4-Difluorobenzene) Response = 476082 @5 ppbV; RRF from SIM ICAL = 1.51563

$$\text{Concentration} = \frac{1370578 \times 5}{476082 \times 1.51563} = 9.50 \text{ ppb}$$ √

$$\%\text{Recovery} = \frac{100 \times 9.50}{10} = 95\%$$

QL & Result Verification: FB-01_20190328; Toluene

Normal 250 mL analyzed (same as for Method Blank) but since canister was over-pressurize, effective DF = 2.18; MWt = 92.13

Sample Response = 2542; IS Response = 375980 @ 5; RRF ICAL = 1.51563

$$\text{Conc.} = \frac{2542 \times 5 \times 2.18}{375980 \times 1.51563} = 0.049 \text{ ppbV}$$

$\mu g/m^3$ = (ppbv x Mwt x DF) / 24.45 = (0.049 x 92.13 x 1)/24.45 = 0.18 $\mu g/m^3$ √

Date: ***4/19/19***

Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Compound List and Project-required Reporting Limits (RL): Table B.1 of Work Plan (updated March 2019)

Analyte	CAS No.		TO-15/TO-15 SIM (6 L canister)	Full Scan TO-15 Soil Vapor (6 L canister)		NYS DOH Values (µg/m³)		
			Typical Final RL (µg/m³) *	Typical Final RL (µg/m³) *	Expected Analysis	Indoor Air		Subslab Vapor
1,1,1-Trichloroethane	71-55-6		0.1771	4.3	SIM	3		100
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	76-13-1		1.2397	6.1	Full			
1,1-Dichloroethane (1,1-DCA)	75-34-3		0.13041	3.2	SIM			
1,1-Dichloroethylene (1,1-DCE)	75-35-4		0.0644	3.2	SIM	0.2		6
1,2,4-Trimethylbenzene	95-63-6		0.7889	3.8	Full			
2-Butanone (Methyl Ethyl Ketone [MEK])	78-93-3		2.415	9.5	Full			
4-Methyl-2-Pentanone (2-Pentanone; Methyl Isobutyl Ketone [MIBK])	108-10-1		0.6601	3.2	Full			
Acetone	67-64-1		1.932	19	Full			
Carbon disulfide	75-15-0		2.576	10	Full			
Carbon tetrachloride	56-23-5		0.2093	5	SIM	0.2		6
Chloroform	67-66-3		0.15778	3.8	SIM			
cis-1,2-Dichloroethylene (cis-1,2-DCE)	156-59-2		0.12719	3.2	SIM	0.2		6
Dichlorodifluoromethane (DCDFM; Freon 12)	75-71-8		0.15939	4	SIM			
Ethylbenzene	100-41-4		0.14007	3.5	SIM			
Isopropanol	67-63-0		1.932	7.9	Full			
Propylene	115-07-1		2.737	5.5	Full			
Tetrachloroethylene (PCE)	127-18-4		0.2254	5.5	SIM	3		100
Toluene	108-88-3		0.12075	3	SIM			
Trichloroethylene (TCE)	79-01-6		0.1771	4.3	SIM	0.2		6
Trichlorofluoromethane (TCFM; Freon 11)	75-69-4		0.9016	4.5	Full			
Vinyl chloride (VC)	75-01-4		0.04186	2.1	SIM	0.2		6
m/p-Xylene	108-38-3 106-42-3		0.2737	3.5	SIM			
o-Xylene	95-47-6		0.14007	3.5	SIM			

* Typical Final RL assumed a 1.61 Dilution Factor for sample (6L canister collected to a final vacuum of 5 "Hg and over-pressurized to 5 psi prior to analysis).

Date: ***4/19/19***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Actions continued (see references below):

Canister Integrity:	If certification forms indicate issues, J/U or UJ results in samples; if Flow controller RPD > 20% for pre- and post-flow calibrations, J detect/UJ non-detects
Canister Vacuum (Vac):	Initial Field Vac < 25" Hg, J/UJ all results; Lab Receipt Vac > 15" Hg, J/UJ results; Lab Receipt Vac > ± 5" Hg of Final Field Vac, J/UJ results
Hold Time (HT):	HT > 30 days, J detects/ UJ non-detects
Blank Actions:	Sample-specific Blank Action Level = Blank Level x (Sample DF/Blank DF)
	Method Blank (MB): ***If MB < RL*** : and sample < RL, negate (U) result in sample RL; if sample is > RL but < 2 x RL (or 4 x RL for acetone, 2-butanone, and methylene chloride), negate (U) result at level found in sample. ***If MB > RL*** : and sample < RL, negate (U) result in sample RL; if sample is > RL but < Sample-Specific Blank Action Level, negate (U) the sample at the Sample-Specific Blank Action Level.
	Equipment Blank (EB): Result<Blank Action, EB result at level reported in sample
BFB Tune:	SW-846 method 8260B or TO-15 tune criteria not met, professional judgment on R of all data; samples analyzed > 12-hours after tune; professional judgment on J/UJ or R of results
LCS and CCV:	Percent Recovery (%Rec) <10%, J detects, R non-detects; 10% < %Rec <70%; J/UJ all associated data; %Rec >130%, J detects - no action for non-detects
Initial Calibration (ICAL):	%RSD > 30%, J/UJ associated results
Internal Standard (IS):	RT > ±0.33 min of IS RT in daily CCV, J/UJ associated results;
	Area < 25% Area in CCV, J detects, R non-detects (or professional judgment); 25%< Area < 60% of CCV Area, J/UJ associated results; Area > 140% of CCV Area, J detects, no action for non-detects
Surrogates:	%Rec <10%, J detects, R non-detects; 10% < %Rec <70%; J/UJ all associated data; %Rec >130%, J detects - no action for non-detects
Laboratory Duplicates:	LCS/LCSD RPD or Sample/LD RPD > 20% for detects > 5x RL, J associated data; professional judgment for results < 5 x RL
Field Duplicates:	RPD > 20% for detects > 5x RL, J associated data; professional judgment for results < 5 x RL
RLs + Quant:	Compound reported outside calibration range (< RL or at ppbV level > sample-specific highest ICAL standard for compound), J data. Note if RL > expected RL from Table B.1 of Work Plan (see above) and if non-detects exceed NYSDOH May 2017 Updated Soil Vapor/Indoor Air Matrices levels
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; and R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	*Remedial Design/Remedial Action Work Plan; Former IBM Building 982 – Neptune Road, Poughkeepsie, New York, including Appendix B, QAQC Plan, prepared by Sanborn, Head & Associates, September 3, 2013 (Work Plan) with updated Table B.1 March 2019* ; *NYSDEC Analytical Services Protocol,* June 2005 *with NYSDEC Modifications to the EPA Region 9 TO-15 QA/QC Criteria,* February 2008*; USEPA Region II SOP HW-31, Validating Air Samples, Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15,* Rev. 6, June 2014; *Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS),* Publication EPA/625/R-96/010b, January 1999; and NYSDOH May 2017 Update to Soil Vapor/Indoor Air Decision Matrices.

Date: ***4/19/19***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Data Usability Summary Report (DUSR)

NYSDEC ASP Category B

Client:	Sanborn, Head & Associates, Inc., Concord, New Hampshire (SHA)
Site:	Former IBM Facility, Neptune Road, Poughkeepsie, New York
Laboratory:	Eurofins Air Toxics, Inc. (EATL), Folsom, California
SDG / Work Order:	1904052 & 1904053
Date(s) of Collection:	March 28, 2019
Number and type Samples & analyses:	7 Subslab Soil Vapor and 1 Field Blank sample for twenty-three project-specific VOCs by Method TO-15 Hi/Lo
Senior Data Reviewers:	Dr. Nancy C. Rothman, New Environmental Horizons, Inc. Susan D. Chapnick, New Environmental Horizons, Inc.
Date Completed:	April 25, 2019

This Data Usability Summary Report (DUSR) is based on guidance developed by the New York State Department of Conservation (NYSDEC), June 1999, for technical review of analytical data in lieu of a full third-party data validation. The objective of the DUSR is to determine whether or not the data as presented meet NYSDEC ASP 2005 or EPA method QC acceptance criteria.

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I. Required DUSR Questions

1. ***Is the data package complete as defined under the requirements for the most current NYSDEC ASP Category B or USEPA CLP deliverables?***

   Yes.

2. ***Have all holding times been met?***

   Yes.

3. ***Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?***

   Yes, in general except some QC exceptions resulted in qualification of data as noted in the Data Validation Checklists (DV Checklists).

4. ***Have all of the data been generated using established and agreed upon analytical protocols?***

   Yes. Analytical data were generated using established EPA Methods (see analytical references in Section II below). Deviations from EPA and NYSDEC ASP 2005 QC protocols are discussed in the DV Checklists of this DUSR.

5. ***Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?***

   Yes. The raw data were checked to verify that detected results met retention time and mass spectral criteria, where applicable, for qualitative identification. A spot check was performed to verify quantitative accuracy for reporting of all results (see the DV Checklists).

6. ***Have the correct data qualifiers been used and are they consistent with the most current NYSDEC ASP?***

   Yes. The laboratory used the correct data qualifiers in reporting of results. The data were unchanged as a consequence of this review.

7. ***Have any quality control (QC) exceedances been specifically noted in the DUSR and have the corresponding QC summary sheets from the data package been attached to the DUSR?***

   Yes. QC exceedances are specified in the DV Checklists. QC summary sheets from the data package have not been attached; however, all QC exceedances that required data qualification are summarized in Table 2 of the DUSR and flagged in the validated electronic data deliverable (EDD).

II. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, identification of quality control (QC) samples, if applicable, and the analytical parameters reviewed in this In-Depth data usability review are listed in Table 1. Any deviations noted for sample collection or receipt (*e.g.*, temperature or preservation issues) are included in Section III, below.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Lab Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SSV-1033_20190328	1904052-01	03/28/2019	Subslab Soil Vapor	VOCs	Field Sample
SSV-1017_20190328	1904052-02	03/28/2019	Subslab Soil Vapor	VOCs	Field Sample
SSV-1016_20190328	1904052-03	03/28/2019	Subslab Soil Vapor	VOCs	Field Sample
SSV-1009_20190328	1904052-04	03/28/2019	Subslab Soil Vapor	VOCs	Field Sample
SSV-1002_20190328	1904052-05	03/28/2019	Subslab Soil Vapor	VOCs	Field Sample
SSV-1001_20190328	1904052-06	03/28/2019	Subslab Soil Vapor	VOCs	Field Sample
FD-02_20190328	1904052-07	03/28/2019	Subslab Soil Vapor	VOCs	Field Duplicate of SSV-1017_20190328
FB-01_20190328	1904053-01	03/28/2019	Air	VOCs	Equipment Blank

Analytical method reference:

VOC: TO-15 Hi/Lo – Method TO-15 with simultaneous Full Scan and Selected Ion Monitoring (SIM) analysis for twenty-three project-specific VOCs

III. Data Deficiencies, Analytical Protocol Deviations, and Quality Control Problems

The following QC elements, as applicable to the analytical methods, were reviewed during this validation:

- Data package completeness and reporting protocols
- Sample receipt, holding times, and canister condition
- Calibration criteria (instrument tuning, initial and continuing calibration verifications)
- Method and field blank results
- Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) Recoveries and Precision
- Internal Standard (IS) and Surrogate Recoveries
- Sample/Laboratory Duplicate (LD) or sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including reporting limits and units)
- Other method-specific QC if applicable and reported
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

During this review of VOCs several results were estimated (J, J+, or UJ) due to QC issues. Table 2 summarizes the actions taken during this review. NEH generated validated data spreadsheets based on the electronic project database files received from SHA for these Work Orders. All results were considered acceptable compared to QAPP and method criteria and usable for project decisions with the understanding of the potential uncertainty (bias) in the qualified results.

As required by the DUSR, the DV Checklist attached to this DUSR documents the QC reviewed and the issues that required action or affected the data certainty in terms of the project data quality objectives (DQO) of accuracy, precision, representativeness, comparability, and sensitivity. The DQO of completeness can be evaluated by the project manager after all data are generated.

The laboratory reported results for 23 project-specific VOCs from a single analysis with two mass spectrometer (MS) detectors, each operated in a different detection mode: one operated in the full scan electron impact mode and the other operated in the Selected Ion Monitoring (SIM) mode. This analysis, called TO-15 Hi/Lo by ATL, allowed the sensitivity requirements of the project, unless otherwise discussed in this report, to be met for all of the compounds. The Data Review Checklist indicates the compounds reported from each of the two modes of MS operation. The full scan analysis was reported with an "A" suffix and the SIM analysis with a "B" suffix appended to the laboratory sample ID.

Field duplicate (FD) precision was acceptable in the FD pair SSV-1017_20190328 and FD-02_20190328 for all target VOCs except for acetone, 2-butanone, and toluene. These three compound results in these two samples were estimated (J) with indeterminate bias due to FD imprecision as shown in Table 2 indicating acceptable precision and representativeness of the samples to the site location for all the project-specific VOCs except for acetone, 2-butanone, and toluene.

All non-detects were reported at levels below the May 2017 NYSDOH Soil Vapor/Indoor Air values indicating sensitivity was acceptable for these data.

All other quality control information associated with accuracy, precision, and sensitivity for the VOCs reported met method and QAPP criteria for the samples in these Work Orders with the exceptions included in Table 2.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SSV-1017_20190328	All VOCs	J or UJ	I	Field final and Receipt vacuums disagree
SSV-1017_20190328 FD-02_20190328	Acetone 2-Butanone Toluene	J or UJ	I	FD imprecision
SSV-1002_20190328	Freon 11 Freon 113 Acetone Freon 12 1,1-Dichloroethane cis-1,2-Dichloroethene Chloroform 1,1,1-Trichloroethane Carbon Tetrachloride Trichloroethene Tetrachloroethene	J+	H	High Surrogate recovery
FB-01_20190328	o-Xylene	J	I	Result < RL

Qualifiers: U = Analyte is non-detect at or above the sample-specific reporting limit (RL); UJ = Non-detect is estimated at the RL; J = Result is estimated with indeterminate bias; J+ = Result is estimated with possible high bias; J- = Result is estimated with possible low bias;; EB = Analyte was also present in a Field Equipment Blank; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Abbreviations used in Table 2:
FD = Field Duplicate
RL = Reporting Limit

Date Sampled: 3/28/19

No. Samples 6 SSV + 1FD

Method of Analysis: TO-15 Full scan & SIM

Data Element Acceptable	Canister Receipt	HT	GC/MS Tunes + Calibrations	Internal Stds + Surrogates	LCS	Lab Dup (LCS and LD)	Field Duplicates	RL & Quant.
Yes		√	√		√	√		√
No	Estimate (J or UJ) all results in 1 sample			Estimate (J+) 11 results			Estimate (J) 6 results	

Other Issues : None

A combined Full Scan and SIM Analysis was performed for each sample for 23 Project-specific VOCs listed in Table B.1 of the Work Plan, as shown on the second to last page of this checklist. The full scan analysis was reported with an "A" suffix and the SIM analysis with a "B" suffix appended to the laboratory sample ID.

Data usability review was performed on Quality Control forms associated with this data package, which involved evaluation of the following (where applicable): agreement of analyses conducted with COC requests; Holding times and sample preservation; Laboratory blanks/equipment blanks/ field blanks results compared to field sample results; Field duplicate results; Quantitation limits and sample results; Surrogate and Internal Standard recoveries; LCS/LCSD results; Laboratory duplicate results; instrument tuning and calibration information; sample chromatograms; and laboratory qualifiers applied to the dataset. The project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. This review is consistent with the requirements set forth in NYSDEC Technical Guidance for Site Investigation and Remediation, DER-10, Appendix 2B (May 2010).

Data Package Completeness: All required forms (results, summary QC, COC), as needed to validate the data in accordance with NYSDEC ASP and the Work Plan were present in the data package. The laboratory provided the equivalent of the Category B deliverable. The original COC omitted 2 samples that were received at the lab which was corrected by a revised COC received on 4/3/19.

Sample receipt: The 7 6-L canisters were received intact and in good condition on 4/1/19. The laboratory noted that the sample tags did not contain the full samples ID (date of collection omitted) so lab used the COC ID (e.g., SSV-1033_20190328) for reporting of sample results.

Date: ***4/23/19***

Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Associated Blanks: Method Blank: 20040306a/20040306sima & 20040406c/20040406sim
FB = FB-01_20190328 (reported in Work Order 1904045)

Blank ID	Contaminant / Level (µg/m^3)		Action Level DF= 2.18		Sample and reported result (µg/m3)		Corrected Database Result
20040306a	None				No Blank Action Required		
20040306sima	None				No Blank Action Required		
20040406c	None				No Blank Action Required		
20040406sim	None				No Blank Action Required		
FB-01_20190328	Toluene 0.18		0.13		SSV-1017_20190328	1	No Action
			0.13		SSV-1016_20190328	1.7	No Action
			0.13		SSV-1009_20190328	0.92	No Action
			0.14		SSV-1001_20190328	1.7	No Action
			0.13		FD-02_20190328	1.2	No Action
FB-01_20190328	o-Xylene 0.19 J		0.14		SSV-1017_20190328	0.24	No Action
			0.14		FD-02_20190328	0.25	No Action

Additional Notes:

Certification: Canisters were Certified pre-cleaned on 3/19/19 & 3/20/19 prior to shipment to the field indicating all 23 target VOCs were non-detect prior to use.

Sample Integrity: Samples were collected for between 7 to 8 hours on 3/28/19. The field receipt vacuums (27 - 30 ”Hg), field final vacuums (3.0 - 10.0 "Hg) and lab receipt vacuum (3.9 - 6.3"Hg) were acceptable except for sample SSV-1017_20190328 reported a field final vacuum (10.0 "Hg) and lab receipt vacuum (4.5 "Hg), which differed by > 5 "Hg. The narrative indicated the laboratory checked the canister valve and found it to not be leaking suggesting that some field issue (e.g., incorrect vacuum reading or valve not closed at time of field reading, etc.) occurred for this one sample. The canisters were over-pressurized to 4.9 to 5.1 psi prior to analysis.
****ACTION: All results for sample SSV-1017_20190328 estimated (J or UJ) with indeterminate bias due to disagreement between the field final and lab receipt vacuums***

Holding Time (HT): Samples were analyzed on 4/3/19 & 4/4/19; therefore HT was met. No Action required.

Date: ***4/23/19***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Additional Notes:

BFB Tunes: Instrument MSD-20 3 tunes (ICAL + 2 CCV). Method TO-15 tune criteria used and tunes were acquired properly (average of 3 scans across BFB peak with background subtraction). All criteria in all tunes were met and all samples were analyzed within 12 hours of tune; therefore, No Action Required.

ICALs : Instrument 20 Full Scan and SIM performed on 3/14/19. Full Scan = 6- to 9-level calibration from 0.05, 0.1, 0.5, or 1 to 40 ppbV for all 23 Target compounds plus several non-target compounds. SIM = 9- to 10-level calibration from 0.01 or 0.02 to 20 ppbV for all 14 Targets requiring SIM (see Table on second to last page of this DV Checklist). All %RSD were acceptable and all RLs were supported by the ICAL (i.e., the lowest ICAL standard was at a level at or below the RL reported as verified by evaluating the Method Blanks with DF=1). No Action required - valid ICAL.

CCALs: 20040302/20040302sim & 20040402/20040402sim - % Recovery 70-130% for all 23 Target compounds - No Action required.

Surrogates & Internal Standards **:** Surrogates (1,2-Dichloroethane-d4, Toluene-d8, and 4-Bromofluorobenzene) had %Recovery within criteria and all 3 IS' (Chlorobenzene-d5, 1,4-Difluorobenzene, and Bromochloromethane) had areas and RTs within criteria for both full scan and SIM in all analyses except 4-BFB %Rec high in SSV-1002_20190328 by full scan and SIM. High recovery only affects detected results.
****ACTION: Freon 11, Freon 113, acetone, Freon 12, 1,1-dichloroethane, cis-1,2-dichloroethene, chloroform, 1,1,1-trichloroethane, carbon tetrachloride, trichloroethene, and tetrachloroethene estimated (J+) with possible high bias due to high Surrogate recovery.***

LCS/LCSD : 20040303/ 20040304, 20040303sim/20040304sim, 20040403/ 20040404, & 20040403sim/20040404sim - %Recovery acceptable for all 23 Targets in all LCS and LCSD and LCS/LCSD RPDs all OK; therefore, acceptable accuracy and precision demonstrated for analysis of the 23 VOCs by Full Scan & SIM analysis. No Action required

LD: not performed for this sample since LCS/LCSD performed allowing precision evaluation.

Compound Reporting: the lab reported results for 23 Target VOCs, as requested in Table B.1 of the Work Plan. 9 compounds were reported from the Full Scan analysis and 14 from the SIM analysis as shown on the second to last page of this DV Checklist.

Qualifier Action: There were no results reported < RL and qualified "J" by the lab. All other data were either detected (not qualified) or non-detect with the "U" qualifier. No qualifier action required.

Sensitivity: All non-detects were below the NYSDOH Values shown on the Table B.1 (second to last page of this DV Checklist) indicating sensitivity was acceptable for the analysis of these samples.

Narrative: The narrative did not raise any issues in addition to those already discussed (receipt vacuum issue and high surrogate recovery) that would affect data quality.

The sample chromatogram, and quantitation report was reviewed and data appeared to have been reported correctly. Although Tentatively Identified Compound (TIC) analysis was not requested, there were some extra peaks in some samples not identified in the analyses.

Date: ***4/23/19***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Calculation Verification Checks:

Initial Calibration : Verification MSD-20 SIM ICAL on 3/14/19 for 1,1,1-Trichloroethane with IS Bromochloromethane

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Std Conc.	0.02	0.05	0.1	0.5	1	5	10
Cpd Resp	1739	4289	9599	43872	87856	519367	1001682
IS Conc.	5	5	5	5	5	5	5
IS Resp	153851	146418	158619	155728	152686	164442	168034
RRF	2.8258	2.9293	3.0258	2.8172	2.8770	3.1584	2.9806

	Level 8	Level 9	Avg. RRF	%RSD
Std Conc.	15	20		
Cpd Resp	1503091	2004353		
IS Conc.	5	5		
IS Resp	171901	173915		
RRF	2.9146	2.8812	2.9344	3.67%

√

ICAL verified, no action required

CCV : Verification MSD-20 4/3/19 for 10 ppbV Standard of Acetone: Response for Compound = 131306; IS (Bromochloromethane) 125459 = 126876 @5 ppbV; RRF from Full Scan ICAL = 0.55693

$$\text{Concentration} = \frac{131306 \times 5}{126876 \times 0.55693} = 9.29 \text{ ppb}$$ √

$$\%\text{Recovery} = \frac{100 \times 9.29}{10} = 93\%$$

QL & Result Verification: SSV-1009_20190328; 1,1,1-Trichloroethane

Normal 250 mL analyzed (same as for Method Blank) but since canister was over-pressurize, effective DF = 1.56; MWt = 133.42

Sample Response = 519981; IS Response = 104827 @ 5; RRF ICAL = 2.9344

$$\text{Conc.} = \frac{519981 \times 5 \times 1.56}{104827 \times 2.9344} = 13 \text{ ppbV}$$

$\mu g/m^3$ = (ppbv x Mwt x DF) / 24.45 = (13 x 133.42 x 1)/24.45 = 72 $\mu g/m^3$ √

FD : SSV-1017_20190328 /FD-02_20190328. A comparison of results for the 23 target compounds is shown below

Field Duplicate Evaluation_ Sample IDs: Sample = SSV-1017_20190328 FD = FD-02_20190328

Analyte Name	DF= 1.58* RL (µg/m^3)	Sample µg/m^3	Q	Sample Result Level	FD µg/m^3	Q	FD Result Level	RPD	Action **
Freon 11	0.89	1.2	J	< 5x RL	1.1		< 5x RL	8.7%	None
Freon 113	1.2	4.8	J	< 5x RL	3.6		< 5x RL	28.6%	None **
Acetone	1.9	9	J	< 5x RL	48		> 5x RL	136.8%	**J Both**
2-Propanol	1.9	1.9	UJ	RL	2.4		< 5x RL	NA	None
Carbon Disulfide	2.5	2.5	UJ	RL	2.4	U	RL	NA	None
2-Butanone (Methyl Ethyl Ketone)	2.3	2.3	UJ	RL	11		> 5x RL	NA	**UJ / J**
4-Methyl-2-pentanone	0.65	0.65	UJ	RL	0.82		< 5x RL	NA	None
1,2,4-Trimethylbenzene	0.78	0.78	UJ	RL	0.76	U	RL	NA	None
Propylene	2.7	2.7	UJ	RL	2.7	U	RL	NA	None
Freon 12	0.16	2.7	J	> 5x RL	2.6		> 5x RL	3.8%	None
Vinyl Chloride	0.04	0.04	UJ	RL	0.04	U	RL	NA	None
1,1-Dichloroethene	0.063	9.1	J	> 5x RL	8.6		> 5x RL	5.6%	None
1,1-Dichloroethane	0.13	0.57	J	< 5x RL	0.53		< 5x RL	7.3%	None
cis-1,2-Dichloroethene	0.12	0.5	J	< 5x RL	0.53		< 5x RL	5.8%	None
Chloroform	0.15	2.9	J	> 5x RL	2.8		> 5x RL	3.5%	None
1,1,1-Trichloroethane	0.17	47	J	> 5x RL	45		> 5x RL	4.3%	None
Carbon Tetrachloride	0.2	0.25	J	< 5x RL	0.26		< 5x RL	3.9%	None
Trichloroethene	0.17	6.2	J	< 5x RL	5		< 5x RL	21.4%	None **
Toluene	0.12	0.27	J	< 5x RL	0.63		> 5x RL	80.0%	**J Both**
Tetrachloroethene	0.21	0.88	J	< 5x RL	0.42		< 5x RL	70.8%	None **
Ethyl Benzene	0.14	0.14	UJ	RL	0.2		< 5x RL	NA	None
m,p-Xylene	0.27	0.27	UJ	RL	0.76		< 5x RL	NA	None
o-Xylene	0.14	0.25	J	< 5x RL	0.28		< 5x RL	11.3%	None

* FD DF was 1.55 so RLs for FD are RLs shown x 1.55/1.58

**Action only taken if RPD > 20% and one or both samples report values > 5 x RL; Q = Validator Qualifier

FD precision was acceptable for all project-specific VOCs in the FD pair SSV-1017_20190328 /FD-02_20190328 except for Acetone, 2-Butanone, and Toluene which had RPD > 20% for values > 5x RL for one or both of the samples. These results are an indication of acceptable precision and representativeness of the samples to the site location for all compounds except Acetone, 2-Butanone, and Toluene.

****ACTION: Acetone, 2-Butanone, and Toluene estimated (J or UJ) in samples SSV-1017_20190328 and FD-02_20190328 with indeterminate bias due to FD imprecision.***

Date: ***4/23/19***

Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Compound List and Project-required Reporting Limits (RL): Table B.1 of Work Plan (updated March 2019)

Analyte	CAS No.		TO-15/TO-15 SIM (6 L canister)	Full Scan TO-15 Soil Vapor (6 L canister)		NYS DOH Values (µg/m³)		
			Typical Final RL (µg/m³) *	Typical Final RL (µg/m³) *	Expected Analysis	Indoor Air		Subslab Vapor
1,1,1-Trichloroethane	71-55-6		0.1771	4.3	SIM	3		100
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	76-13-1		1.2397	6.1	Full			
1,1-Dichloroethane (1,1-DCA)	75-34-3		0.13041	3.2	SIM			
1,1-Dichloroethylene (1,1-DCE)	75-35-4		0.0644	3.2	SIM	0.2		6
1,2,4-Trimethylbenzene	95-63-6		0.7889	3.8	Full			
2-Butanone (Methyl Ethyl Ketone [MEK])	78-93-3		2.415	9.5	Full			
4-Methyl-2-Pentanone (2-Pentanone; Methyl Isobutyl Ketone [MIBK])	108-10-1		0.6601	3.2	Full			
Acetone	67-64-1		1.932	19	Full			
Carbon disulfide	75-15-0		2.576	10	Full			
Carbon tetrachloride	56-23-5		0.2093	5	SIM	0.2		6
Chloroform	67-66-3		0.15778	3.8	SIM			
cis-1,2-Dichloroethylene (cis-1,2-DCE)	156-59-2		0.12719	3.2	SIM	0.2		6
Dichlorodifluoromethane (DCDFM; Freon 12)	75-71-8		0.15939	4	SIM			
Ethylbenzene	100-41-4		0.14007	3.5	SIM			
Isopropanol	67-63-0		1.932	7.9	Full			
Propylene	115-07-1		2.737	5.5	Full			
Tetrachloroethylene (PCE)	127-18-4		0.2254	5.5	SIM	3		100
Toluene	108-88-3		0.12075	3	SIM			
Trichloroethylene (TCE)	79-01-6		0.1771	4.3	SIM	0.2		6
Trichlorofluoromethane (TCFM; Freon 11)	75-69-4		0.9016	4.5	Full			
Vinyl chloride (VC)	75-01-4		0.04186	2.1	SIM	0.2		6
m/p-Xylene	108-38-3 106-42-3		0.2737	3.5	SIM			
o-Xylene	95-47-6		0.14007	3.5	SIM			

* Typical Final RL assumed a 1.61 Dilution Factor for sample (6L canister collected to a final vacuum of 5 "Hg and over-pressurized to 5 psi prior to analysis).

Date: ***4/23/19***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Actions continued (see references below):

Canister Integrity:	If certification forms indicate issues, J/U or UJ results in samples; if Flow controller RPD > 20% for pre- and post-flow calibrations, J detect/UJ non-detects
Canister Vacuum (Vac):	Initial Field Vac < 25" Hg, J/UJ all results; Lab Receipt Vac > 15" Hg, J/UJ results; Lab Receipt Vac > ± 5" Hg of Final Field Vac, J/UJ results
Hold Time (HT):	HT > 30 days, J detects/ UJ non-detects
Blank Actions:	Sample-specific Blank Action Level = Blank Level x (Sample DF/Blank DF)
	Method Blank (MB): ***If MB < RL*** : and sample < RL, negate (U) result in sample RL; if sample is > RL but < 2 x RL (or 4 x RL for acetone, 2-butanone, and methylene chloride), negate (U) result at level found in sample. ***If MB > RL*** : and sample < RL, negate (U) result in sample RL; if sample is > RL but < Sample-Specific Blank Action Level, negate (U) the sample at the Sample-Specific Blank Action Level.
	Equipment Blank (EB): Result<Blank Action, EB result at level reported in sample
BFB Tune:	SW-846 method 8260B or TO-15 tune criteria not met, professional judgment on R of all data; samples analyzed > 12-hours after tune; professional judgment on J/UJ or R of results
LCS and CCV:	Percent Recovery (%Rec) <10%, J detects, R non-detects; 10% < %Rec <70%; J/UJ all associated data; %Rec >130%, J detects - no action for non-detects
Initial Calibration (ICAL):	%RSD > 30%, J/UJ associated results
Internal Standard (IS):	RT > ±0.33 min of IS RT in daily CCV, J/UJ associated results;
	Area < 25% Area in CCV, J detects, R non-detects (or professional judgment); 25%< Area < 60% of CCV Area, J/UJ associated results; Area > 140% of CCV Area, J detects, no action for non-detects
Surrogates:	%Rec <10%, J detects, R non-detects; 10% < %Rec <70%; J/UJ all associated data; %Rec >130%, J detects - no action for non-detects
Laboratory Duplicates:	LCS/LCSD RPD or Sample/LD RPD > 20% for detects > 5x RL, J associated data; professional judgment for results < 5 x RL
Field Duplicates:	RPD > 20% for detects > 5x RL, J associated data; professional judgment for results < 5 x RL
RLs + Quant:	Compound reported outside calibration range (< RL or at ppbV level > sample-specific highest ICAL standard for compound), J data. Note if RL > expected RL from Table B.1 of Work Plan (see above) and if non-detects exceed NYSDOH May 2017 Updated Soil Vapor/Indoor Air Matrices levels
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; and R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	*Remedial Design/Remedial Action Work Plan; Former IBM Building 982 – Neptune Road, Poughkeepsie, New York, including Appendix B, QAQC Plan, prepared by Sanborn, Head & Associates, September 3, 2013 (Work Plan) with updated Table B.1 March 2019* ; *NYSDEC Analytical Services Protocol,* June 2005 *with NYSDEC Modifications to the EPA Region 9 TO-15 QA/QC Criteria,* February 2008*; USEPA Region II SOP HW-31, Validating Air Samples, Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15,* Rev. 6, June 2014; *Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS),* Publication EPA/625/R-96/010b, January 1999; and NYSDOH May 2017 Update to Soil Vapor/Indoor Air Decision Matrices.

Date: ***4/23/19***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Date Sampled: 3/28/19

No. Samples 1 FB

Method of Analysis: TO-15 Full scan & SIM

Data Element Acceptable	Canister Receipt	HT	GC/MS Tunes + Calibrations	Internal Stds + Surrogates	LCS	Lab Dup (LCS and LD)	Field Duplicates	RL & Quant.
Yes	√	√	√	√	√	√	NA	
No								Accept 1 "J" value

Other Issues : None

A combined Full Scan and SIM Analysis was performed for each sample for 23 Project-specific VOCs listed in Table B.1 of the Work Plan, as shown on the second to last page of this checklist. The full scan analysis was reported with an "A" suffix and the SIM analysis with a "B" suffix appended to the laboratory sample ID.

Data usability review was performed on Quality Control forms associated with this data package, which involved evaluation of the following (where applicable): agreement of analyses conducted with COC requests; Holding times and sample preservation; Laboratory blanks/equipment blanks/ field blanks results compared to field sample results; Field duplicate results; Quantitation limits and sample results; Surrogate and Internal Standard recoveries; LCS/LCSD results; Laboratory duplicate results; instrument tuning and calibration information; sample chromatograms; and laboratory qualifiers applied to the dataset. The project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. This review is consistent with the requirements set forth in NYSDEC Technical Guidance for Site Investigation and Remediation, DER-10, Appendix 2B (May 2010).

Data Package Completeness: All required forms (results, summary QC, COC), as needed to validate the data in accordance with NYSDEC ASP and the Work Plan were present in the data package. The laboratory provided the equivalent of the Category B deliverable.

Sample receipt: The 1 6-L canisters was received intact and in good condition on 4/1/19. The laboratory noted that the sample tag did not contain the full samples ID (date of collection omitted) so lab used the COC ID (FB-01_20190328) for association with the sample data.

Date: ***4/19/19***

Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Associated Blanks: Method Blank: v040306a / v040306sima
FB = NA

Blank ID	Contaminant / Level (µg/m^3)		Action Level DF=		Sample and reported result (µg/m3)	Corrected Database Result
v040306a	None				No Blank Action Required	
v040306sima	None				No Blank Action Required	

Additional Notes:

Certification: Canister was Certified pre-cleaned on 3/20/19 prior to shipment to the field indicating all 23 target VOCs were non-detect prior to use.

Sample Integrity: FB was collected for about 8 hours on 3/28/19. The field receipt vacuum (28.5 ”Hg), field final vacuum (13.0 "Hg) and lab receipt vacuum (11.4"Hg) were acceptable. The canister was over-pressurized to 5.1 psi prior to analysis. No Action required.

Holding Time (HT): Sample was analyzed on 4/3/19; therefore HT was met. No Action required.

BFB Tunes: Instrument MSD-V 2 tunes (ICAL + 1 CCV). Another tune on 2/22/19 was performed prior to analysis of several ICAL standards; however, the 2/22/19 ICAL contained compounds not required for this project (i.e., non-target compounds). Method TO-15 tune criteria used and tunes were acquired properly (average of 3 scans across BFB peak with background subtraction). All criteria in all tunes were met and all samples were analyzed within 12 hours of tune; therefore, No Action Required.

ICALs : Instrument V Full Scan and SIM performed on 2/18/19. Additional standards were analyzed 2/22/19 but these were for compounds that are not targets for this project. Full Scan = 6- to 9-level calibration from 0.05, 0.1, 0.5, or 1 to 20 or 40 ppbV for all 23 Target compounds plus several non-target compounds. SIM = 9- to 10-level calibration from 0.01 or 0.02 to 20 ppbV for all 14 Targets requiring SIM (see Table on second to last page of this DV Checklist). All %RSD were acceptable and all RLs were supported by the ICAL (i.e., the lowest ICAL standard was at a level at or below the RL reported as verified by evaluating the Method Blank with DF=1). No Action required - valid ICAL.

Additional Notes:

CCALs: v040302/v040302sim - % Recovery 70-130% for all 23 Target compounds - No Action required.

Surrogates & Internal Standards **:** Surrogates (1,2-Dichloroethane-d4, Toluene-d8, and 4-Bromofluorobenzene) had %Recovery within criteria and all 3 IS' (Chlorobenzene-d5, 1,4-Difluorobenzene, and Bromochloromethane) had areas and RTs within criteria for both full scan and SIM in all analyses; therefore, No Action Required.

LCS/LCSD : v040303/v040304 & v040303sim/v040304sim - %Recovery acceptable for all 23 Targets in both LCS and LCSD and LCS/LCSD RPDs all OK; therefore, acceptable accuracy and precision demonstrated for analysis of the 23 VOCs by Full Scan & SIM analysis. No Action required

LD: not performed for this sample since LCS/LCSD performed allowing precision evaluation.

FD: not applicable for a Field Blank.

Compound Reporting: the lab reported results for 23 Target VOCs, as requested in Table B.1 of the Work Plan. 9 compounds were reported from the Full Scan analysis and 14 from the SIM analysis as shown on the second to last page of this DV Checklist.

Qualifier Action: There was one result reported < RL and qualified "J" by the lab. This "J" value was accepted as an estimated (J) result with indeterminate bias due to uncertainty of quantitation below the calibration range. Other than with one "J", all other data were wither detected (no qualifier) or non-detect qualified "U". NOTE: value reported for o-Xylene in ppbV was < RL but equaled the RL when converted to µg/m^3 units.
****ACTION: Accept 1 "J" lab result as an estimated (J) value due to reporting < RL***

Sensitivity: All non-detects were below the NYSDOH Values except for carbon tetrachloride and trichloroethene, which were slightly above the 0.2 µg/m^3 level (ranged for 0.23 to 0.27 µg/m^3) due to higher than expected receipt vacuum. Since this is a Field Blank, sensitivity was considered acceptable.

Narrative: The narrative did not raise any issues that would affect data quality.

The sample chromatogram, and quantitation report was reviewed and data appeared to have been reported correctly. Although Tentatively Identified Compound (TIC) analysis was not requested, there were no extra peaks not identified in the FB sample.

Date: ***4/19/19***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Calculation Verification Checks:

Initial Calibration : Verification MSD-V Full Scan ICAL on 2/18/19 for Freon 11 with IS Bromochloromethane

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Std Conc.	0.05	0.1	0.5	1	5	10	15
Cpd Resp	4002	10405	42475	87082	562456	1003245	1526778
IS Conc.	5	5	5	5	5	5	5
IS Resp	120499	131410	118533	117183	133203	131623	137704
RRF	3.3212	3.9590	3.5834	3.7156	4.2225	3.8111	3.6958

	Level 8	Level 9	Avg. RRF	%RSD
Std Conc.	20	40		
Cpd Resp	2073141	4151362		
IS Conc.	5	5		
IS Resp	141312	150124		
RRF	3.6677	3.4566	3.7148	7.17%

√

ICAL verified, no action required

CCV : Verification MSD-V 4/3/19 for 10 ppbV Standard of Toluene: Response for Compound = 1370578; IS (1,4-Difluorobenzene) Response = 476082 @5 ppbV; RRF from SIM ICAL = 1.51563

$$\text{Concentration} = \frac{1370578 \times 5}{476082 \times 1.51563} = 9.50 \text{ ppb}$$ √

$$\%\text{Recovery} = \frac{100 \times 9.50}{10} = 95\%$$

QL & Result Verification: FB-01_20190328; Toluene

Normal 250 mL analyzed (same as for Method Blank) but since canister was over-pressurize, effective DF = 2.18; MWt = 92.13

Sample Response = 2542; IS Response = 375980 @ 5; RRF ICAL = 1.51563

$$\text{Conc.} = \frac{2542 \times 5 \times 2.18}{375980 \times 1.51563} = 0.049 \text{ ppbV}$$

$\mu g/m^3$ = (ppbv x Mwt x DF) / 24.45 = (0.049 x 92.13 x 1)/24.45 = 0.18 $\mu g/m^3$ √

Date: ***4/19/19***

Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Compound List and Project-required Reporting Limits (RL): Table B.1 of Work Plan (updated March 2019)

Analyte	CAS No.		TO-15/TO-15 SIM (6 L canister)	Full Scan TO-15 Soil Vapor (6 L canister)		NYS DOH Values (µg/m³)		
			Typical Final RL (µg/m³) *	Typical Final RL (µg/m³) *	Expected Analysis	Indoor Air		Subslab Vapor
1,1,1-Trichloroethane	71-55-6		0.1771	4.3	SIM	3		100
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	76-13-1		1.2397	6.1	Full			
1,1-Dichloroethane (1,1-DCA)	75-34-3		0.13041	3.2	SIM			
1,1-Dichloroethylene (1,1-DCE)	75-35-4		0.0644	3.2	SIM	0.2		6
1,2,4-Trimethylbenzene	95-63-6		0.7889	3.8	Full			
2-Butanone (Methyl Ethyl Ketone [MEK])	78-93-3		2.415	9.5	Full			
4-Methyl-2-Pentanone (2-Pentanone; Methyl Isobutyl Ketone [MIBK])	108-10-1		0.6601	3.2	Full			
Acetone	67-64-1		1.932	19	Full			
Carbon disulfide	75-15-0		2.576	10	Full			
Carbon tetrachloride	56-23-5		0.2093	5	SIM	0.2		6
Chloroform	67-66-3		0.15778	3.8	SIM			
cis-1,2-Dichloroethylene (cis-1,2-DCE)	156-59-2		0.12719	3.2	SIM	0.2		6
Dichlorodifluoromethane (DCDFM; Freon 12)	75-71-8		0.15939	4	SIM			
Ethylbenzene	100-41-4		0.14007	3.5	SIM			
Isopropanol	67-63-0		1.932	7.9	Full			
Propylene	115-07-1		2.737	5.5	Full			
Tetrachloroethylene (PCE)	127-18-4		0.2254	5.5	SIM	3		100
Toluene	108-88-3		0.12075	3	SIM			
Trichloroethylene (TCE)	79-01-6		0.1771	4.3	SIM	0.2		6
Trichlorofluoromethane (TCFM; Freon 11)	75-69-4		0.9016	4.5	Full			
Vinyl chloride (VC)	75-01-4		0.04186	2.1	SIM	0.2		6
m/p-Xylene	108-38-3 106-42-3		0.2737	3.5	SIM			
o-Xylene	95-47-6		0.14007	3.5	SIM			

* Typical Final RL assumed a 1.61 Dilution Factor for sample (6L canister collected to a final vacuum of 5 "Hg and over-pressurized to 5 psi prior to analysis).

Date: ***4/19/19***
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	Area < 25% Area in CCV, J detects, R non-detects (or professional judgment); 25%< Area < 60% of CCV Area, J/UJ associated results; Area > 140% of CCV Area, J detects, no action for non-detects
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RLs + Quant:	Compound reported outside calibration range (< RL or at ppbV level > sample-specific highest ICAL standard for compound), J data. Note if RL > expected RL from Table B.1 of Work Plan (see above) and if non-detects exceed NYSDOH May 2017 Updated Soil Vapor/Indoor Air Matrices levels
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