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REPORT OF HVAC ADJUSTMENT AND INDOOR AIR QUALITY TESTING

BUILDINGS 330C AND 338

Former IBM East Fishkill Facility
Hopewell Junction, New York

Prepared for IBM Corporate Environmental Affairs
File No. 2999.06
February 2016

8976 Wellington Road
Manassas, VA 20109

February 12, 2016

Alex G. Czuhanich
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau E, 12th Floor
625 Broadway
Albany, New York 12233-7017

Re: Report of HVAC Adjustment and Indoor Air Quality Testing – B330C/B338
Former IBM East Fishkill Facility
Hopewell Junction, New York
EPA ID No. NYD00707901

Dear Mr. Czuhanich:

The enclosed report presents the results of heating, ventilating, and air conditioning (HVAC) adjustment and indoor air quality (IAQ) testing that was conducted in Buildings 330C and 338 of the Former IBM East Fishkill Facility in Hopewell Junction, New York, which is currently owned by Global Foundries (GF). IAQ testing was conducted in accordance with IBM's Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan dated June 15, 2009.

If you wish to discuss this document or have questions, please contact me (703) 257-2583.

Sincerely yours,

Dean W. Chartrand

Dean W. Chartrand
Program Manager
Corporate Environmental Affairs

Encl: Report of HVAC Adjustment and Indoor Air Quality Testing

Cc:	Brad Green	Sanborn Head	(via email/cover letter only)
	Gary Marone	Global Foundries	(via email/cover letter only)
	Jayne Ulrich	Global Foundries	(via email/cover letter only)
	Scarlett McLaughlin	NYSDOH	(via email and hard copy)

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Dear Mr. Chartrand:

The enclosed report presents the results of heating, ventilating, and air conditioning (HVAC) adjustment and indoor air quality (IAQ) testing that was conducted in Buildings 330C and 338 at the former IBM East Fishkill facility. Please contact us if you have any questions.

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

David Shea

David Shea, P.E.
President
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Concord, NH 03301

JHS/DS: ds

Encl. Report of HVAC Adjustment and Indoor Air Quality Testing – B330C and B338

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SANBORN HEAD ENGINEERING
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REPORT OF HVAC ADJUSTMENT AND INDOOR AIR QUALITY TESTING BUILDINGS 330C AND 338

Former IBM East Fishkill Facility
Hopewell Junction, New York

Prepared for
IBM Corporation

IBM
Poughkeepsie, New York

Prepared by
Sanborn, Head Engineering, P.C.

File 2999.06
February 2016

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1.0 INTRODUCTION

This report summarizes the results of indoor air quality (IAQ) testing that was conducted in Building 338 (B338) and Building 330C (B330C) in August and November 2015, respectively, at the former IBM East Fishkill Facility (the site), currently owned by Global Foundries (GF). The work described herein was conducted by Sanborn, Head Engineering, P.C. (SHPC), on behalf of IBM, in general accordance with IBM's Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan dated June 15, 2009 (RFI Work Plan), which was approved by the New York State Department of Environmental Conservation and Department of Health (the Agencies).

IBM sold its former East Fishkill facility to GF in July 2015, and IBM maintains responsibility for execution of the RFI Work Plan. IBM is working cooperatively with GF to maintain the heating, ventilating, and air conditioning (HVAC) operating conditions in routinely occupied portions of the buildings that were the focus of the RFI Work Plan. In August 2015, GF requested to change HVAC operating conditions in B338 and B330C due to decreased occupancy in those buildings. IAQ screening and sampling was subsequently conducted in B338 and B330C to assess certain volatile organic compound (VOC) concentrations under the HVAC system operating conditions requested by GF.

The services conducted and this report are subject to the standard limitations for this type of work, as described in Appendix A.

2.0 BACKGROUND INFORMATION

This section provides a summary of prior IAQ testing and remedial measures in the buildings, as well as a summary of the original and current HVAC conditions.

2.1 Previous Sampling and Remedial Measures

B338 and B330C were both designated for confirmatory sampling in the RFI Work Plan. At the time, both buildings were routinely occupied. Confirmatory indoor air samples consisted of 8-hour time-weighted-average Summa® canister samples collected from both buildings in August 2009, the results of which were provided to the Agencies in a November 2009 report[1]. In B338, tetrachloroethene (PCE) and trichloroethene (TCE), the primary VOCs of interest, were not detected above laboratory reporting limits in the confirmatory samples. In B330C, PCE and TCE were detected in samples from several areas.

Based on the B330C confirmatory sampling results, remedial measures were implemented in October 2009 to reduce VOC concentrations in certain areas. These measures included sealing certain utility penetrations in the RMP ball mill area, and adjusting HVAC settings in the RMP ball mill area, the sintering furnace room #2 (sintering room), and the reliability engineering testing lab (reliability lab). These measures reduced the concentrations of VOCs in the RMP ball mill room and the sintering room as described in the November 2009

[1] IBM and Sanborn, Head Engineering, P.C., *Confirmatory Sampling Results, Buildings 330C and 338, VOC Source Assessment, IBM East Fishkill Facility, Hopewell Junction, NY*, November 2009.

report; however, additional measures were planned to further reduce VOC concentrations in the sintering room and in the reliability lab.

Supplemental remedial measures completed in the reliability lab included modifications to three floor-mounted air cooling/recirculation units in 2010, and sealing of peeling floor tiles in 2013. Supplemental measures in the sintering room completed in 2011 and 2012 included the closure/sealing of an industrial pit, several trenches, and expansion joints, as well as additional HVAC modifications. These measures further reduced VOC concentrations in the sintering room and reliability lab, and the results are described in a July 2014 report[2] submitted to the Agencies. Figure 6 of the July 2014 report, which summarizes the historical PCE and TCE results for B330C confirmatory samples, is included in Appendix B.

2.2 Current Occupancy and HVAC Status

Equipment within B338 has been decommissioned and the building is currently vacant. Based on this change in use, GF requested to change the HVAC operating conditions within that building. The original HVAC settings (i.e., before the August 2015 testing was conducted) and the adjusted HVAC settings (i.e., changes made based on the August 2015 testing) for B338 are provided in Table 1. Zones in which HVAC settings were adjusted are represented by shaded rows. The original HVAC settings are also referred to as baseline settings in Table 1 and in this report. The B338 HVAC zones are shown on Figure 1.

Decommissioning work and equipment removal has been completed within B330C; however, certain areas of the building remain routinely occupied. To account for the decreased occupancy of the building, GF requested to either decrease the outside air (OA) flow or turn off air handling units (AHUs) in certain HVAC zones. In one zone (AC-93), GF requested to increase the OA flow. The original HVAC settings (i.e., before the November 2015 testing was conducted) and the adjusted HVAC settings (i.e., changes proposed based on the November 2015 testing) for B330C are provided in Table 2. Zones in which HVAC settings were adjusted are represented by shaded rows. The locations of the HVAC zones and a depiction of their operating status are provided on Figure 2.

3.0 B338 HVAC ADJUSTMENTS AND INDOOR AIR QUALITY TESTING

The following sections provide a summary of the HVAC modifications, IAQ screening, and results in B338.

3.1 Scope of B338 Assessment

The purpose of collecting IAQ screening data in B338 was to assess potential changes in PCE and TCE concentrations as a result of GF's requested HVAC modifications. Confirmatory Summa® canister samples were not collected as part of the B338 assessment because the building is currently unoccupied.

[2] IBM and Sanborn, Head Engineering, P.C., *Report of Supplemental Remedial Measures, Building 330C VOC Source Assessment, IBM East Fishkill Facility, Hopewell Junction, NY*, July 2014.

IAQ screening was conducted in B338 from August 10 through 14, 2015 using a HAPSITE® portable gas chromatograph/mass spectrometer (GC/MS). The portable GC/MS was calibrated to analyze for PCE and TCE to a reporting limit of approximately 0.68 and 0.54 micrograms per cubic meter (µg/m^3), respectively.

IAQ screening was conducted under two conditions: 1) with AHUs running under their original (baseline) operating conditions, and 2) with AHUs running under the adjusted operating conditions requested by GF. The AHU settings for the original (baseline) conditions and adjusted operating conditions are summarized in Table 1.

3.2 B338 Results

PCE and TCE screening results are provided in Table 3 and are depicted on Figure 1. In Table 3, "BL" indicates a round of baseline (i.e., original conditions) screening, while "Adj" indicates that the screening was conducted when the AHUs were set at the adjusted conditions requested by GF. Four rounds of screening were conducted while the HVAC settings were adjusted; however, only the maximum concentrations of PCE and TCE are shown on Table 3 and Figure 1 for simplicity.

Under the original HVAC settings, PCE was detected at locations in HVAC zones AC-1, AC-2, and AC-3, but was not detected in AC-4. In general, PCE concentrations increased toward the northwest in the direction of B330C to a maximum concentration of 1.8 µg/m^3 in zone AC-2. TCE was not detected above the reporting limit under baseline conditions.

During testing of the adjusted operating conditions in the two areas where GF has turned off all AHUs (AC-1 and AC-2), PCE and TCE concentrations increased to maximum concentrations of 29 and 0.88 µg/m^3, respectively. PCE and TCE concentrations increased to maximum concentrations of 35 and 1.6 µg/m^3, respectively, in the loading dock area that connects to B330C north of AC-1 and AC-2. The B330C areas adjacent to B338 are currently unoccupied. A slight increase in PCE concentrations, to a maximum concentration of 1.2 µg/m^3, was also observed under the adjusted settings in the AC-4 area, where GF decreased the number of AHUs running from two units to one unit.

In summary, under GF's adjusted HVAC operating conditions for an unoccupied building scenario, the screening results indicate increases in PCE and TCE in most areas of the building, with the least effects in the area served by AC-4, and the greatest effects in the AC-1 and AC-2 areas, as well as the loading dock area and connecting corridor to B330C. GF made the changes to the B338 HVAC settings upon completion of the testing.

4.0 B330C HVAC ADJUSTMENTS AND INDOOR AIR QUALITY TESTING

The following sections provide a summary of the HVAC modifications, IAQ screening, and results in B330C.

4.1 Scope of B330C Assessment

IAQ screening was conducted in B330C from November 9 through 18, 2015 using the portable GC/MS. Several HVAC adjustments were made by GF and its contractor, US Test,

prior to the initial IAQ screening round on November 9, 2015. The modifications were made in advance of the screening to allow conditions to stabilize by the time testing began.

4.1.1 Summary of B330C HVAC Adjustments

The HVAC adjustments included infrastructure modifications that affected HVAC zones AC-6, AC-7, AC-9, AC-26, and AC-91. A summary of the infrastructure changes is as follows:

- AC-6 and AC-9: GF added ducting from AC-6 to supply the laser lab that was formerly part of AC-9.
- AC-7: GF blanked off the AC-7 supply air ducting to an unoccupied area now called AC-7(B). The only area served by the active AC-7 AHU is the NEXX lab which is in AC-7(A).
- AC-26 and AC-91: GF added supply air ducting from AC-91 to a portion of AC-26, which now comprises the occupied, southern portion of AC-91.

The infrastructure modifications were completed by GF and US Test approximately 1 week prior to the initial IAQ screening in that building.

GF and US Test changed the HVAC settings to GF's requested conditions approximately 1 week prior to the initial IAQ screening in the "yellow" areas on Figure 2, and approximately 3 days prior to initial IAQ screening in the "red" HVAC zones.

Three HVAC zones have OA economizers which automatically adjust the OA damper position based on changing weather conditions (e.g., temperature and humidity). For the purposes of testing under conservative conditions, the OA dampers were set to their minimum positions and switched to manual mode so that they would not automatically adjust to let in more OA.

4.1.2 Summary of B330C IAQ Screening and Sampling

IAQ screening was conducted in B330C from November 9 through 18, 2015 under the adjusted HVAC settings using the portable GC/MS. The adjusted HVAC settings are shown on Table 2 and depicted on Figure 2.

Following screening, confirmatory sampling was conducted in occupied areas of B330C on November 17 and 18, 2015 in conformance with the procedures described in the RFI Work Plan. Indoor air samples were collected as 8-hour time-weighted-average samples into SUMMA® canisters collected under the adjusted HVAC conditions shown in Table 2. The samples were submitted to Eurofins/Air Toxics of Folsom, California for analysis of 22 project-specific analytes using USEPA Method TO-15, which was modified as specified in the RFI Work Plan to achieve lower reporting limits via selective ion monitoring (SIM) for TCE, vinyl chloride, and carbon tetrachloride.

Indoor air samples were typically collected at a height of between 3.5 and 4 feet above the floor level within occupied areas of the building. A field duplicate sample, ambient outdoor air sample, and nitrogen blank were also collected for quality assurance/quality control

(QA/QC) purposes. A photographic log of sampling locations is provided as Appendix C, and a summary of field sampling information is provided in Table 4.

4.2 B330C Results

This discussion of results represents conditions within B330C that reflect the adjusted AHU settings indicated on Table 2 and Figure 2. These are the AHU settings that IBM understands GF will maintain until there are occupancy or other changes that warrant consideration of new adjustments.

4.2.1 B330C Portable GC/MS Screening Results

PCE and TCE screening results are provided in Table 5 and depicted on Figure 3. TCE was detected at only 5 of the 48 indoor air screening locations at concentrations ranging from 0.60 to 3.2 µg/m^3. TCE was not detected above the reporting limit of the portable GC/MS in occupied portions of the building. TCE was detected in the unoccupied southern portion of the building in and around the sintering room, and in the unoccupied former truck docking and former tank room on the eastern side of the building.

PCE was detected at levels at or below 30 µg/m^3 in 45 of the 48 screening locations in B330C. The three screening locations with elevated PCE concentrations are in unoccupied areas, where concentrations were 66, 120, and 600 µg/m^3 in the former baseline area, the former tank room, and the former truck bay, respectively. PCE concentrations were generally lowest in the north and northeast areas of the building, and increased in the south, west, and east portions of the building.

4.2.2 B330C Confirmatory Sample Results

Confirmatory indoor air samples were collected in occupied areas of the building under GF's adjusted HVAC conditions documented on Figure 2 and in Table 2. Indoor air confirmatory sampling results are provided in Table 6, and the PCE and TCE results are depicted on Figure 4.

PCE was not detected at 3 of the 14 locations, while the remaining sample locations exhibited PCE ranging from 1.1 to 15 µg/m^3. The general pattern of PCE detections was similar to that of the screening results; concentrations were the lowest (non-detect) in the northeastern portion of the building, and increased to the south, west, and east. The highest concentrations of PCE were detected in the reliability lab and in the eastern portion of AC-6 (NEXX Tool Lab). TCE was not detected at 10 of 14 sample locations. The remaining sample locations exhibited TCE at or below levels of 0.32 µg/m^3. TCE was only detected in samples collected from the south and west portions of the building and at low concentrations.

A comparison of the November 2015 PCE and TCE results to the most recent historical confirmatory samples is provided on Figure 4. At each location, the November 2015 PCE and TCE concentrations were consistent with or lower than they were in the last historical sample. Refer to the figure in Appendix B for a complete list of historical PCE and TCE results in B330C.

Low levels of seven analytes were detected in indoor air, including: acetone (5.3 to 170 µg/m^3); benzene (0.52 to 0.68 µg/m^3); carbon tetrachloride (0.37 to 0.43 µg/m^3); 1,1,2-trichloro-1,2,2-trifluoroethane (CFC113; [1.2 to 1.8 µg/m^3]); methylene chloride (1.8 to 6.7 µg/m^3); toluene (0.63 to 1.6 µg/m^3); and trichlorofluoromethane (CFC11; [1.7 to 4.2 µg/m^3]). With the exception of the maximum concentration of acetone (170 µg/m^3) and CFC113, these compounds were also detected at similar concentrations in the ambient outside air sample, indicating that the concentrations detected at interior locations are likely attributable to the presence of these analytes in ambient outdoor air.

The elevated acetone concentration of 170 µg/m^3 was reported at IA0401, which is located in an eMagin laboratory. Based on correspondence with GF personnel, acetone is currently being used in the laboratory operations, which likely contributes to the higher indoor air concentration.

The analytical laboratory report for the indoor air samples is provided in Appendix D.

5.0 QUALITY ASSURANCE/QUALITY CONTROL

The analytical data for the B330C confirmatory samples were provided to New Environmental Horizons, Inc. (NEH) of Arlington, MA and Skillman, NJ who conducted an In-Depth data usability review. The data validation report is provided in Appendix E. The review found that all results were considered usable for project objectives/decisions, with the following qualifications:

- Accuracy was compromised for the analysis of target compound 1,2,4-trichlorobenzene since the initial and/or continuing calibrations did not meet method acceptance criteria. All results for this compound were estimated (UJ) with indeterminate bias due to calibration issues. This does not introduce significant uncertainty into the data since 1,2,4-trichlorobenzene has not been a vapor intrusion-related contaminant of concern in this or other buildings at the site.

- Acetone in sample IA0401 was reported at a level above the instrument calibration range and flagged "E" by the laboratory because it was not analyzed at a higher dilution. Acetone in IA0401 was estimated (J) with indeterminate bias due to uncertainty in quantitation above the instrument calibration range. As indicated previously, acetone is used in the laboratory in which the elevated result was detected.

- The nitrogen blank, or equipment blank, is associated with all samples collected in Building 330C. This blank reported a detected value for acetone. A comparison between the blank result and the samples led to estimation of 10 results with possible high bias (EB H).

- Precision was acceptable for all VOCs in the Field Duplicate pair of IA0455 and IA0455 Dup except for acetone. The results for acetone in samples IA0455 and IA0455 Dup were estimated (J) with indeterminate bias. This is an indication of acceptable precision and representativeness of the samples for the project-specific VOCs, except acetone.

- All reporting limits were at a level below the project-required RL (as shown in Table B.1 of the QAPP) except for CFC12, which had RLs exceeding the expected RL due to an instrument calibration issue. This does not introduce significant uncertainty into the data since CFC12 has not been a vapor intrusion-related contaminant of concern in this or other buildings at the site.

6.0 CONCLUSIONS AND NEXT STEPS

The B338 indoor air screening results indicate increases in PCE and TCE in most areas of the building under GF's requested operating conditions for the HVAC systems; however, IBM understands that GF's current plans for this building do not include routine occupancy. IBM will continue to work cooperatively with GF to evaluate GF's planned changes to occupancy or HVAC conditions in B338 so that IBM can assess whether additional IAQ testing is warranted at that time.

In B330C, we understand GF intends to adjust the HVAC settings to the adjusted settings listed in Table 2 upon receipt of this report. IBM understands GF will maintain the HVAC operating conditions until there are occupancy or other changes that warrant consideration of new adjustments and IAQ testing.

Consistent with the requirements in the RFI Work Plan, IBM understands that GF will communicate the results of the 8-hr, time weighted average SUMMA® samples in B330C to building occupants within 45 days of IBM's receipt of validated data.

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TABLES

Table 1
Original and Adjusted AHU Settings
Building 338
Former IBM East Fishkill Facility
Hopewell Junction, New York

Air Handling Unit (AHU) ID	Original (Baseline) Settings (Note 1)				Adjusted Settings (Note 2)			
	Occupancy	Operating Schedule	Outside Air (OA) Damper Position	OA Flow Rate (cfm)	Occupancy	Operating Schedule	OA Damper Position	OA Flow Rate (cfm)
AC-1	Unoccupied	24/7	50% open	4,092	Unoccupied	Off	Off	Off
AC-2	Unoccupied	24/7	20% open	3,689	Unoccupied	Off	Off	Off
AC-3A	Unoccupied	24/7	10% open	3,755	Unoccupied	24/7	10% open	3,755
AC-3B	Unoccupied	Off	Off	Off	Unoccupied	Off	Off	Off
AC-3C	Unoccupied	Off	Off	Off	Unoccupied	Off	Off	Off
AC-4A	Unoccupied	Off	Off	Off	Unoccupied	Off	Off	Off
AC-4B	Unoccupied	Off	Off	Off	Unoccupied	Off	Off	Off
AC-4C	Unoccupied	24/7	10% open	4,212	Unoccupied	24/7	10% open	4,212
AC-4D	Unoccupied	24/7	10% open	5,219	Unoccupied	Off	Off	Off
AC-4E	Unoccupied	Off	Off	Off	Unoccupied	Off	Off	Off

Notes:
1. Original OA damper positions and flow rates are based on measurements conducted by US Test in April and June 2015. With the exception of AC-2, measurements were included in a US Test Report dated 4/9/2015 and provided to Sanborn, Head Engineering, PC (SHPC) via email on 4/25/2015. The measurementsfor AC-2 were included in a spreadsheet dated 7/17/2015 that was provided to SHPC via email on 7/28/2015.
2. Adjusted OA damper positions and flow rates are based on information provided to IBM by Global Foundries.
3. The AC-3A through 3D, and AC-4A through AC-4D designations represent multiple air handling units serving the same area.
4. Shaded rows indicate HVAC zones that were adjusted.
5. cfm = cubic feet per minute

Table 2
Original and Adjusted AVU Settings
Building B330C
Former IBM East Fishkill Facility
Hopewell Junction, NY

AC Unit	Services	Original HVAC Settings Prior to Nov 2015 Adjustments (Notes 2 and 3)						Alternative HVAC Settings Based on Nov 2015 Testing (Note 4)						
		Operating Schedule	Outside Air (OA) Flow Rate	Return Air (RA) Flow Rate	Total Supply Air Flow Rate	OA Economizer	OA Damper Position	Current Occupancy	Operating Schedule	OA Flow Rate	RA Flow Rate	Total Supply Air Flow Rate	OA Economizer	OA Damper Position
AC-1	Offices/Corridors	M-F 6am-7pm	27,104	4,576	31,680	No	80% open	11	M-F 6am-7pm	28,340	6,078	34,418	No	80% open
AC-4	South Shop/labs	24/7	18,725	20,275	39,000	Yes	40% open (min)	2	24/7	4,409	34,102	38,511	Yes	10% open (min)
AC-5	Handled by AC-6	Off						0	Off					
AC-6	Corridors/laser lab/NEXX Tool Lab	24/7	16,250	0	16,250	No	50% open	Occ	24/7	16,250	0	16,250	No	50% open
AC-7(A)	NEXX Tool Lab	24/7	18,430	19,491	37,921	No	20% open	Occ	24/7	17,290	14,384	31,674	No	35% open
AB-7(B)	Unoccupied	NA (new zone) - split off from AC-7(A) during initial adjustments (Note 9)						0	Off					
AC-9	"Laser" Labs/corridors/offices	24/7	12,118	10,562	22,680	No	50% open	0	Off					
AC-10	Former truck dock	Off						0	Off					
AC-10(A)	Hydrogen tanks room	24/7	0	8,374	8,374	No	0% open	0	24/7	0	8,374	8,374	No	0% open
AC-11	Occupied Lab	24/7	1,793	42,335	44,128	No	Fed from AC-13	Occ	24/7	1,793	42,335	44,128	No	Fed from AC-13
AC-13	Emagin Clean Room	24/7	27,491	2,965	30,456	No	75% open	55	24/7	27,491	2,965	30,456	No	75% open
HVAC-15	Former tank room	24/7	0	8,900	8,900	No	0% open	0	24/7	0	8,900	8,900	No	0% open
AC-26	Unoccupied Labs/emagin	24/7	5,110	39,634	44,744	No	10% open	0	Off					
AC-40	Unoccupied Lab	Off						0	Off					
AC-41	Occupied Lab	24/7	1,152	12,720	13,872	No	10% open	1	24/7	1,152	12,720	13,872	No	10% open
AC-42/ RCU-111	Breakroom/lab	24/7	36,960	0	36,960	No	100% open	2	24/7	26,048	0	26,048	No	100% open
AC-50	Baseline	Off						0	Off					
AC-51	Unoccupied Lab	24/7	2,752	0	2,752	No	100% open	0	Off					
AC-54	Unoccupied labs/storage	Off						0	Off					
AC-55	Unoccupied labs/storage	Off						0	Off					
AC-56	Demo'd space	24/7	850	21,070	21,920	No	10% open	0	Off					
AC-57	Demo'd space	Off						0	Off					
AC-58	Reliability Lab	24/7	14,038	7,170	21,208	No	100% open	7	24/7	18,720	9,176	27,896	No	100% open
AC-90	Unoccupied Labs/emagin	24/7	16,285	4,739	21,024	Yes	20% open (min) 50% open (meas)	5	24/7	3,026	28,294	31,320	Yes	5% open (min)
AC-91	Unoccupied Labs/emagin	24/7	21,578	0	21,578	Yes	20% open (min) 100% open (meas)	5	24/7	3,560	14,746	18,306	Yes	20% open (min)
AC-93	Unoccupied labs/small emagin office	24/7	1,115	8,997	10,112	No	100% open	5	24/7	2,389	5,665	8,054	No	100% open
AC-99	Demo'd space	24/7	4,734	0	4,734	No	100% open	0	Off					
AC-100	Demo'd space	24/7	4,032	0	4,032	No	100% open	0	Off					
AC-101	Unoccupied Lab	Off						0	Off					
AC-102	Unoccupied Lab	24/7	11,560	15,550	27,110	No	25% open	0	Off					
AC-103	Unoccupied Lab	24/7	168	2,290	2,458	No	0% open	0	Off					
AC-104	Unoccupied Lab	Off						0	Off					

Notes
1. The information in this table was provided to IBM and Sanborn, Head Engineering, PC (SHPC) by Global Foundries (GF). Flow rates are based on reports prepared by GF's contractor, US Test.
2. With the exception of AC-11, original HVAC flow rates are based on an Excel file titled, "AC Shutdown - Master ListR1.xls" that GF sent to IBM and SHPC on Augsut 14, 2015.
3. Original HVAC flow rates for AC-11 were provided in a US Test report dated 9/25/15.
4. The flow rates and OA damper positions for the alternative HVAC settings are based on a US Test Report dated 11/18/2015.
5. Operating schedules, economizer information, and certain OA damper positions were provided verbally or via email to SHPC by GF.
6. Flow rates are provided in cubic feet per minute (cfm).
7. "Occ" = occupied; specific number of occupants not provided by GF.
8. Shaded rows indicate the HVAC zones that were adjusted.
9. AC-7 was split into two new zones (AC-7(A) and AC-7(B)) prior to November 2015 testing. AC-7(B) was blanked off so that no supply air feeds that area.
10. The original OA damper position for AC-7A was provided in a US Test report dated 7/16/2015.
11. A portion of AC-9 (laser lab) was reconfigured to become part of AC-6 prior to November 2015 testing.

Table 3
Summary of Portable GC/MS Indoor Air Screening Results
Building 338
Former IBM East Fishkill Facility
Hopewell Junction, New York

Location	Sample Round	Date	HVAC Zone	µg/m³	
				PCE	TCE
IA0501	BL1	08/10/15	AC-1	0.87	<0.54
IA0501	Adj	08/13/15	AC-1	14	0.73
IA0503	BL1	08/10/15	AC-4	<0.68	<0.54
IA0503	Adj	08/13/15	AC-4	1.2	<0.54
IA0504	BL	08/10/15	AC-4	<0.68	<0.54
IA0504	Adj	08/13/15	AC-4	1.2	<0.54
IA5001	BL	08/10/15	AC-2	1.8	<0.54
IA5001	Adj	08/13/15	AC-2	29	0.88
IA5002	BL	08/10/15	See Note 3	1	<0.54
IA5002	Adj	08/13/15	See Note 3	35	1.5
IA5003	BL	08/10/15	AC-3	1.1	<0.54
IA5003	Adj	08/13/15	AC-3	8.2	<0.54
IA5004	BL	08/10/15	AC-3	<0.68	<0.54
IA5004	Adj	08/13/15	AC-3	2.8	<0.54
IA5005	BL	08/10/15	AC-3	0.73	<0.54
IA5006	BL	08/10/15	AC-4	<0.68	<0.54
IA5007	BL	08/10/15	AC-4	<0.68	<0.54
IA5007	Adj	08/13/15	AC-4	1.2	<0.54
IA5008	BL	08/10/15	AC-4	<0.68	<0.54
IA5009	BL	08/10/15	AC-4	<0.68	<0.54
IA5010	BL	08/10/15	AC-3	<0.68	<0.54
IA5010	Adj	08/13/15	AC-3	2.3	<0.54
IA5011	BL	08/10/15	AC-3	<0.68	<0.54
IA5012	BL	08/10/15	AC-3	<0.68	<0.54
IA5013	Adj	08/13/15	See Note 3	30	1.6

Notes:

1. This table summarizes data recorded during field screening of grab indoor air screening samples using a HAPSITE Smart ® portable gas chromatograph/mass spectrometer (GC/MS), manufactured by Inficon. The instrument was calibrated to manufacturer prepared standards ranging from 0.1 part per billion on a volumetric basis (ppbv) to 50 ppbv, for tetrachloroethene (PCE) and trichloroethene (TCE). The field samples were collected by Sanborn, Head Engineering, PC (SHPC) personnel directly into the portable GC/MS sampling probe from the location and on the dates noted in the table. The samples were screened using the portable GC/MS in selective ion monitoring (SIM) mode. Results were converted to micrograms per cubic meter (µg/m^3) by SHPC assuming standard temperature (25 °C) and pressure (1 atmosphere) for the conversion. Results were rounded to two significant figures.

2. < - The analyte was not detected above the indicated reporting limit.
"BL" = Baseline (original HVAC conditions) sample result
"Adj" = Adjusted HVAC operating conditions sample result

3. IA5002 and IA5013 were collected from the B338 loading dock area, which is outside of the HVAC zones.

Table 4
Summary of Confirmatory Indoor Air Sample Information
Building 330C
Former IBM East Fishkill Facility
Hopewell Junction, NY

Sample Location	Building Floor	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	Chemicals Observed Near Sample Location
Collection Date: November 18, 2015											
AA-1	Roof	Ambient Air	34723	1	7:27	-30	15:27	-5	40	Under AC 58 Intake	None observed
Blank	Roof	Nitrogen	33894	1	7:27	-30	15:29	-9	40	Under AC 58 Intake	None observed
IA0400	Ground	Indoor Air	33771	3.5	8:39	-30	16:39	-5.8	75	Break room	None observed
IA0401	Ground	Indoor Air	64247	6	8:42	-30	16:42	-6	70.8	Top of shelf near door.	None observed
IA0402	Ground	Indoor Air	30836	3	10:41	-30	18:40	-6	72		None observed
IA0404	Ground	Indoor Air	342	3.5	8:47	-29	16:47	-6	72		None observed
IA0405	Ground	Indoor Air	9948	3.5	11:26	-30	19:31	-5	74	eMagin Clean Room	None observed
IA0417	Ground	Indoor Air	34759	4	10:08	-30	18:11	-8	73		None observed
IA0436	Ground	Indoor Air	05365	3.5	8:58	-29	16:58	-6	72	Hallway in lab	None observed
IA0458	Ground	Indoor Air	31430	4	9:40	-29	17:40	-5.5	73	Work bench on back wall	None observed
IA0467	Ground	Indoor Air	34006	3.5	10:30	-28	18:26	-4	73	Maintenance office. Next to column c-24	None observed
IA0468	Ground	Indoor Air	64234	3.5	10:19	-30	18:19	-5.5	72		None observed
IA0469	Ground	Indoor Air	33590	4	9:11	-30	17:11	-7	72	Microscope room	None observed
IA0470	Ground	Indoor Air	2331	4	9:27	-30	17:23	-5	70		None observed
IA0472	Ground	Indoor Air	5654	3.5	10:50	-30	18:46	-5	74	eMagin maintenance room	None observed
Collection Date: November 19, 2015											
IA0455	Ground	Indoor Air	5732	3.5	7:31	-30	15:29	-6	71	Break Room	None observed
IA0455 Dup	Ground	Indoor Air	0449	3.5	7:31	-30	15:28	-6	70	Break Room	None observed

Notes:

1. Samples were collected by Sanborn, Head Engineering, PC on November 18 and 19, 2015.

2. Samples were collected into 6-liter, stainless steel, pre-evacuated SUMMA® canisters using 8-hour metering regulators. Canisters and regulators were laboratory-certified clean (100% certification). The samples were submitted to Eurofins/Air Toxics of Folsom, California for analysis of 22 project-specific analytes using modified USEPA Method TO-15 and Method TO-15 in selective ion monitoring (SIM) mode.

Table 5
Summary of Portable GC/MS Indoor Air Screening Results
Building 330C
Former IBM East Fishkill Facility
Hopewell Junction, New York

Location	Date and Time	HVAC Zone	µg/m³	
			PCE	TCE
IA0400	11/17/15	AC-1	17	<0.54
IA0401	11/17/15	AC-90	2.7	<0.54
IA0402	11/17/15	AC-41	2.1	<0.54
IA0404	11/17/15	AC-58	8.4	<0.54
IA0405	11/17/15	AC-13	3	<0.54
IA0406	11/17/15	AC-93	2.1	<0.54
IA0408	11/17/15	AC-6	18	<0.54
IA0410	11/17/15	AC-42	5.7	<0.54
IA0411	11/17/15	AC-9	14	<0.54
IA0412	11/17/15	AC-42	5.7	<0.54
IA0413	11/17/15	AC-6	25	<0.54
IA0416	11/17/15	AC-99/AC-100	16	3.2
IA0417	11/17/15	AC-93	5.1	<0.54
IA0426	11/17/15	AC-54	18	<0.54
IA0436	11/17/15	AC-58	23	<0.54
IA0438	11/17/15	AC-56/AC-57	28	1.7
IA0439	11/17/15	AC-7A	9.6	<0.54
IA0443	11/17/15	AC-13	1.5	<0.54
IA0444	11/17/15	AC-7B	3.4	<0.54
IA0445	11/17/15	See Note 3	6.8	<0.54
IA0446	11/17/15	AC-102	1.7	<0.54
IA0447	11/17/15	AC-42	7.6	<0.54
IA0448	11/17/15	AC-6	25	<0.54
IA0449	11/17/15	AC-50	66	<0.54
IA0450	11/17/15	AC-1	7.8	<0.54
IA0451	11/17/15	AC-90	2.6	<0.54
IA0453	11/17/15	AC-4	2.3	<0.54
IA0455	11/17/15	AC-42	5.1	<0.54
IA0456	11/17/15	See Note 3	22	<0.54
IA0457	11/17/15	AC-91	2.8	<0.54
IA0458	11/17/15	AC-91	7.0	<0.54
IA0459	11/17/15	See Note 3	2.6	<0.54
IA0460	11/17/15	AC-101	2.3	<0.54
IA0461	11/17/15	HVAC-15	120	0.6
IA0462	11/17/15	AC-10A	4.5	<0.54
IA0464	11/17/15	AC-58	24	<0.54
IA0465	11/17/15	AC-26	17	<0.54
IA0466	11/17/15	AC-91	3	<0.54
IA0467	11/17/15	AC-4	2.5	<0.54
IA0468	11/17/15	AC-42	4.8	<0.54
IA0469	11/17/15	AC-6	22	<0.54
IA0470	11/17/15	AC-7A	7.7	<0.54
IA0471	11/17/15	AC-6	15	<0.54
IA0472	11/17/15	AC-11	1.5	<0.54
IA0476	11/17/15	AC-58	20	<0.54
IA0477	11/17/15	AC-10	600	1.5
IA0478	11/17/15	AC-51	12	<0.54
IA5014	11/17/15	See Note 3	30	2.6

Notes:

1. This table summarizes data recorded during field screening of grab indoor air screening samples using a HAPSITE Smart ® portable gas chromatograph/mass spectrometer (GC/MS), manufactured by Inficon. The instrument was calibrated to manufacturer prepared standards ranging from 0.1 part per billion on a volumetric basis (ppbv) to 50 ppbv, for tetrachloroethene (PCE) and trichloroethene (TCE). The field samples were collected by Sanborn, Head Engineering, PC (SHPC) personnel directly into the portable GC/MS sampling probe from the location and on the dates noted in the table. The samples were screened using the portable GC/MS in selective ion monitoring (SIM) mode. Results were converted to micrograms per cubic meter (µg/m^3) by SHPC assuming standard temperature (25 °C) and pressure (1 atmosphere) for the conversion. Results were rounded to two significant figures.

2. < - The analyte was not detected above the indicated reporting limit.

3. Screening location not within an HVAC zone.

Table 6
Summary of 8-Hour Confirmatory Sampling Results
Building 330C
Former IBM East Fishkill Facility
Hopewell Junction, NY

	Field Sample Name	AA-1			Field Blank			IA0400			IA0401			IA0402			IA0404			IA0405			IA0417		
	Collection Date	11/18/2015			11/18/2015			11/18/2015			11/18/2015			11/18/2015			11/18/2015			11/18/2015			11/18/2015		
	Units	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Acetone	µg/m^3	4.4	EB	H	2.6			8.5	EB H		170	J	I	11	EB	H	7.9	EB	H	8.6	EB	H	6.2	EB	H
Benzene	µg/m^3	0.52			0.6	U		0.55			0.53			0.51	U		0.49	U		0.5	U		0.54	U	
Carbon tetrachloride	µg/m^3	0.37			0.24	U		0.39			0.38			0.43			0.42			0.37			0.4		
Chlorobenzene (Monochlorobenzene)	µg/m^3	0.69	U		0.86	U		0.73	U		0.73	U		0.74	U		0.71	U		0.73	U		0.77	U	
Dichlorobenzene (1,2-)	µg/m^3	0.9	U		1.1	U		0.96	U		0.95	U		0.97	U		0.92	U		0.95	U		1	U	
Dichlorobenzene (1,3-)	µg/m^3	0.9	U		1.1	U		0.96	U		0.95	U		0.97	U		0.92	U		0.95	U		1	U	
Dichlorobenzene (1,4-)	µg/m^3	0.9	U		1.1	U		0.96	U		0.95	U		0.97	U		0.92	U		0.95	U		1	U	
Dichlorodifluoromethane (CFC12)	µg/m^3	3.7	U		4.6	U		3.9	U		3.9	U		4	U		3.8	U		3.9	U		4.2	U	
Dichloroethene (1,1-)	µg/m^3	0.59	U		0.74	U		0.63	U		0.63	U		0.64	U		0.61	U		0.63	U		0.67	U	
Dichloroethene (cis-1,2-)	µg/m^3	0.59	U		0.74	U		0.63	U		0.63	U		0.64	U		0.61	U		0.63	U		0.67	U	
Ethane, 1,1,2-trichloro-1,2,2-trifluoro- (CFC113)	µg/m^3	1.1	U		1.4	U		1.2	U		1.2	U		1.2	U		1.2			1.2	U		1.3	U	
Ethylbenzene	µg/m^3	0.65	U		0.82	U		0.69	U		0.69	U		0.7	U		0.67	U		0.69	U		0.73	U	
Methylene Chloride (Dichloromethane)	µg/m^3	5.6			1.3	U		1.8			1.1	U		1.1	U		1.1	U		1.1	U		1.2	U	
Tetrachloroethene (PCE)	µg/m^3	1	U		1.3	U		5.6			1.9			1.1	U		6.7			1.1			3.3		
Toluene	µg/m^3	0.66			0.71	U		0.92			0.72			0.61	U		1.6			0.6	U		0.63	U	
Trichlorobenzene (1,2,4-)	µg/m^3	5.6	UJ	I	7	UJ	I	5.9	UJ	I	5.9	UJ	I	6	UJ	I	5.7	UJ	I	5.9	UJ	I	6.2	UJ	I
Trichloroethane (1,1,1-)	µg/m^3	0.82	U		1	U		0.87	U		0.86	U		0.88	U		0.84	U		0.86	U		0.92	U	
Trichloroethene (TCE)	µg/m^3	0.16	U		0.2	U		0.17	U		0.17	U		0.17	U		0.19			0.17	U		0.18	U	
Trichlorofluoromethane	µg/m^3	1.3			1	U		1.8			2			3.2			1.8			2			2.7		
Vinyl chloride	µg/m^3	0.038	U		0.048	U		0.041	U		0.04	U		0.041	U		0.039	U		0.04	U		0.043	U	
Xylene (o-)	µg/m^3	0.65	U		0.82	U		0.69	U		0.69	U		0.7	U		0.67	U		0.69	U		0.73	U	
Xylene-m,p (Sum of Isomers)	µg/m^3	0.65	U		0.82	U		0.69	U		0.69	U		0.7	U		0.67	U		0.69	U		0.73	U	

Notes:

1. Samples were collected by Sanborn, Head Engineering, PC (SHPC) on the dates indicated over an 8-hour sampling interval. The samples were analyzed by Eurofins Air Toxics, Inc. (EATI) of Folsom, California for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in the full scan and selective ion monitoring (SIM) modes.

2. Results are presented in micrograms per cubic meter (µg/m^3).

3. An In-Depth data usability review (DUR) was performed on the data by New Environmental Horizons, Inc. (NEH) . 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. Refer to the DUR report for further details.
"U" indicates the analyte is non-detect at or above the indicated sample specific practical quantification limit (PQL).
"J" indicates the result is an estimated value.
"UJ" indicates the non-detect is estimated at the indicated PQL.
"EB" indicates analyte was also present in the associated field blank.
"H" indicates a high bias.
"I" indicates an indeterminate bias.

4. The "AA" designation indicates that the sample consists of ambient air collected from outside the building. The ambient air and field blank samples were collected from beneath the outside air intake to air handling unit AC-58, which serves the reliability lab.

5. Results were rounded to two significant figures.

Table 6
Summary of 8-Hour Confirmatory Sampling Results
Building 330C
Former IBM East Fishkill Facility
Hopewell Junction, NY

	Field Sample Name	IA0436			IA0455			IA0455 Dup			IA0458			IA0467			IA0468			IA0469			IA0470			IA0472		
	Collection Date	11/18/2015			11/19/2015			11/19/2015			11/18/2015			11/18/2015			11/18/2015			11/18/2015			11/18/2015			11/18/2015		
	Units	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Acetone	µg/m^3	7.8	EB	H	5.3	EB	H	16	J	I	37			9.2	EB	H	29			9.7	EB	H	12			14		
Benzene	µg/m^3	0.6			0.5	U		0.51	U		0.68			0.5	U		0.52			0.58			0.55			0.5	U	
Carbon tetrachloride	µg/m^3	0.4			0.38			0.43			0.43			0.43			0.42			0.39			0.43			0.43		
Chlorobenzene (Monochlorobenzene)	µg/m^3	0.74	U		0.73	U		0.74	U		0.73	U		0.72	U		0.72	U		0.77	U		0.71	U		0.72	U	
Dichlorobenzene (1,2-)	µg/m^3	0.97	U		0.95	U		0.97	U		0.95	U		0.94	U		0.94	U		1	U		0.93	U		0.94	U	
Dichlorobenzene (1,3-)	µg/m^3	0.97	U		0.95	U		0.97	U		0.95	U		0.94	U		0.94	U		1	U		0.93	U		0.94	U	
Dichlorobenzene (1,4-)	µg/m^3	0.97	U		0.95	U		0.97	U		0.95	U		0.94	U		0.94	U		1	U		0.93	U		0.94	U	
Dichlorodifluoromethane (CFC12)	µg/m^3	4	U		3.9	U		4	U		3.9	U		3.9	U		3.8	U		4.1	U		3.8	U		3.9	U	
Dichloroethene (1,1-)	µg/m^3	0.64	U		0.63	U		0.64	U		0.63	U		0.62	U		0.62	U		0.66	U		0.61	U		0.62	U	
Dichloroethene (cis-1,2-)	µg/m^3	0.64	U		0.63	U		0.64	U		0.63	U		0.62	U		0.62	U		0.66	U		0.61	U		0.62	U	
Ethane, 1,1,2-trichloro-1,2,2-trifluoro- (CFC113)	µg/m^3	1.8			1.2	U		1.2	U		1.2	U		1.2	U		1.2	U		1.4			1.2	U		1.2	U	
Ethylbenzene	µg/m^3	0.7	U		0.69	U		0.7	U		0.69	U		0.68	U		0.68	U		0.72	U		0.67	U		0.68	U	
Methylene Chloride (Dichloromethane)	µg/m^3	1.1	U		1.1	U		1.1	U		6.7			1.1	U		1.1	U		2.4			1.1	U		1.1	U	
Tetrachloroethene (PCE)	µg/m^3	15			3.6			3			3.8			1.1	U		2.3			14			3.6			1.1	U	
Toluene	µg/m^3	0.71			0.6	U		0.61	U		0.7			1.4			0.59	U		0.67			0.63			0.59	U	
Trichlorobenzene (1,2,4-)	µg/m^3	6	UJ	I	5.9	UJ	I	6	UJ	I	5.9	UJ	I	5.8	UJ	I	5.8	UJ	I	6.2	UJ	I	5.8	UJ	I	5.8	UJ	I
Trichloroethane (1,1,1-)	µg/m^3	0.88	U		0.86	U		0.88	U		0.86	U		0.86	U		0.85	U		0.91	U		0.84	U		0.86	U	
Trichloroethene (TCE)	µg/m^3	0.21			0.17	U		0.17	U		0.32			0.17	U		0.17	U		0.28			0.18			0.17	U	
Trichlorofluoromethane	µg/m^3	2.2			4.2			4			2.2			1.7			3.9			3.2			3.1			2.3		
Vinyl chloride	µg/m^3	0.041	U		0.04	U		0.041	U		0.04	U		0.04	U		0.04	U		0.043	U		0.04	U		0.04	U	
Xylene (o-)	µg/m^3	0.7	U		0.69	U		0.7	U		0.69	U		0.68	U		0.68	U		0.72	U		0.67	U		0.68	U	
Xylene-m,p (Sum of Isomers)	µg/m^3	0.7	U		0.69	U		0.7	U		0.69	U		0.68	U		0.68	U		0.72	U		0.67	U		0.68	U	

FIGURES

N

W E

S

B330C

B338

AC-1

AC-2

AC-3A, 3B, & 3C

AC-4A, 4B, 4C, & 4D

IA5013
NS
30 / 1.6

IA0501
0.87 / <0.54
14 / 0.73

IA5002
1.0 / <0.54
35 / 1.5

IA5004
<0.68 / <0.54
2.8 / <0.54

IA5001
1.8 / <0.54
29 / 0.88

IA5005
0.73 / <0.54
NS

IA5012
<0.68 / <0.54
NS

IA5003
1.1 / <0.54
8.2 / <0.54

IA5011
<0.68 / <0.54
NS

IA0504
<0.68 / <0.54
1.2 / <0.54

IA5008
<0.68 / <0.54
NS

IA5010
<0.68 / <0.54
2.3 / <0.54

IA5006
<0.68 / <0.54
NS

IA0503
<0.68 / <0.54
1.2 / <0.54

IA5007
<0.68 / <0.54
1.2 / <0.54

IA5009
<0.68 / <0.54
NS

Figure 1

Summary of Portable GC/MS Results - Original and Adjusted HVAC Operating Conditions

Building 338

Former IBM East Fishkill Facility

Hopewell Junction, New York

Drawn By:	C. LaVack
Designed By:	J. Sanborn
Reviewed By:	B. Green / D. Shea
Project No:	2999.06
Date:	February 2016

Figure Narrative

This figure shows tetrachloroethene (PCE) and trichloroethene (TCE) results for indoor air screening using a portable gas chromatograph / mass spectrometer (GC/MS) that was conducted under the original (baseline) and adjusted heating, ventilation, and air conditioning system (HVAC) operating conditions in August 2015. Refer to Table 1 of this report for further detail on the HVAC operating conditions. Results are shown in micrograms per cubic meter (µg/m3).

Legend

IA0501	Indoor air location
IA0504 <0.68 / <0.54 1.2 / <0.54	Control Point Name PCE/TCE Screening Results for Initial Baseline Round (HVAC operating under original conditions) PCE/TCE Screening Results for Adjusted HVAC Settings
NS	Not Screened
AC-2	HVAC Zone

20 10 0 20 40 Feet

SANBORN HEAD ENGINEERING

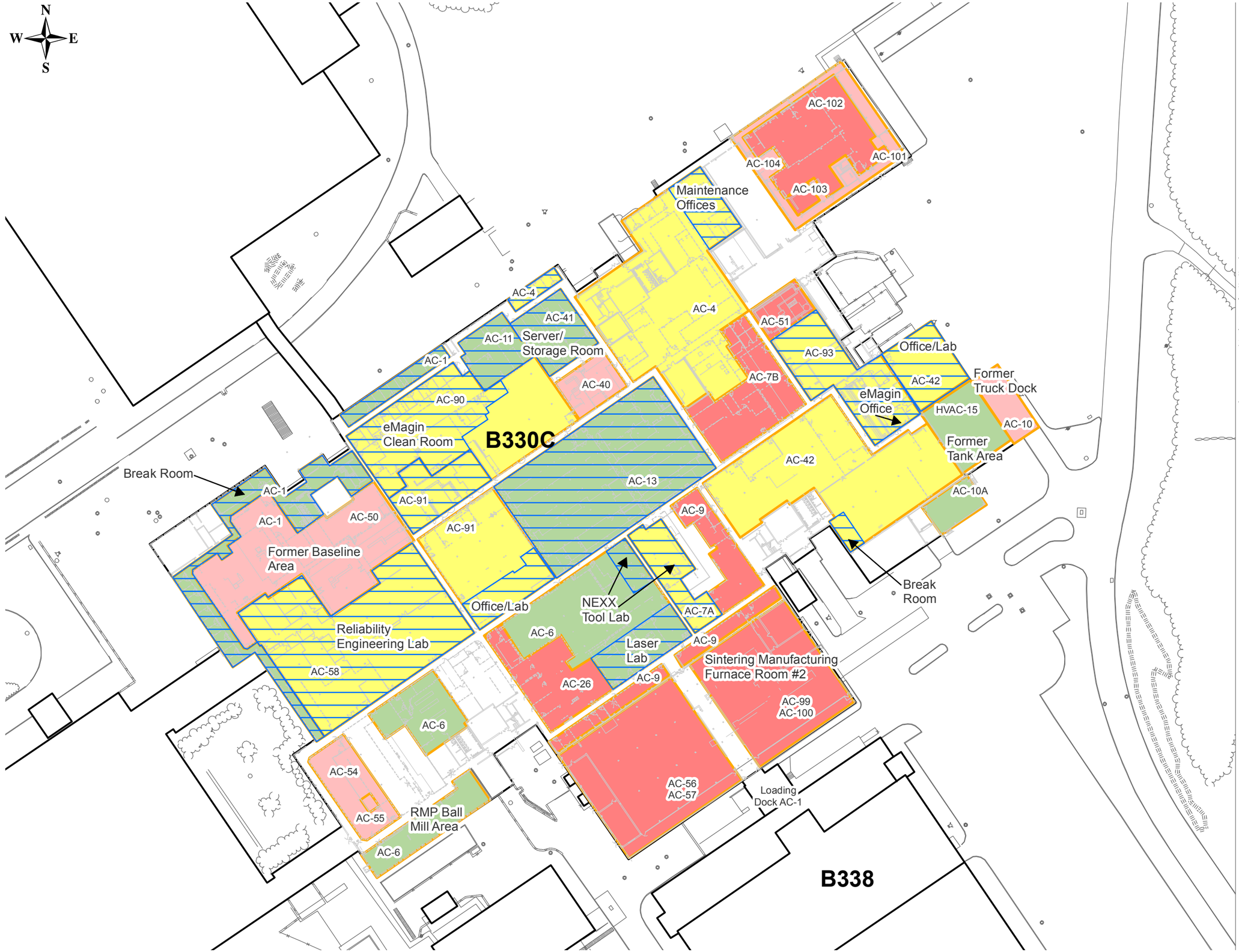

Figure 2

B330C HVAC Status

Former IBM East Fishkill Facility

Hopewell Junction, New York

Drawn By:	C. LaVack
Designed By:	J. Sanborn
Reviewed By:	B. Green / D. Shea
Project No:	2999.06
Date:	February 2016

Figure Narrative

This figure shows the HVAC zones and operating status in November 2015 at the time of indoor air screening and sampling reported in the text. Additional information is provided in the legend.

In the legend, the term "original settings" refers to the HVAC settings in-place prior to the November 2015 HVAC adjustment and indoor air testing.

Legend

- AC-10 — HVAC Zone and Associated Air Handling Unit ID
- HVAC off prior to November 2015 testing. No changes from original settings.
- HVAC off as requested by GF.
- HVAC on. Outside air flow rate changed from original settings.
- HVAC on. No changes from original settings.
- Occupied area

Unshaded areas represent represent routinely unocccupied areas without direct HVAC service

40 20 0 40 80 Feet

SANBORN HEAD ENGINEERING

N
W E
S

B330C

B338

AC-102
AC-104
AC-101
AC-103
AC-4
AC-41
AC-51
AC-93
AC-42
AC-10
AC-1
AC-40
AC-7B
AC-90
AC-13
HVAC-15
AC-91
AC-9
AC-50
AC-7A
AC-6
AC-58
AC-26
AC-99
AC-100
AC-56
AC-57
AC-55
Loading Dock AC-1

IA0400 17 / <0.54
IA0401 2.7 / <0.54
IA0402 2.1 / <0.54
IA0404 8.4 / <0.54
IA0405 3 / <0.54
IA0406 2.1 / <0.54
IA0408 18 / <0.54
IA0410 5.7 / <0.54
IA0411 14 / <0.54
IA0412 5.7 / <0.54
IA0413 25 / <0.54
IA0416 16 / 3.2
IA0417 5.1 / <0.54
IA0426 18 / <0.54
IA0436 23 / <0.54
IA0438 28 / 1.7
IA0439 9.6 / <0.54
IA0443 1.5 / <0.54
IA0444 3.4 / <0.54
IA0445 6.8 / <0.54
IA0446 1.7 / <0.54
IA0447 7.6 / <0.54
IA0448 25 / <0.54
IA0449 66 / <0.54
IA0450 7.8 / <0.54
IA0451 2.6 / <0.54
IA0453 2.3 / <0.54
IA0455 5.1 / <0.54
IA0456 22 / <0.54
IA0457 2.8 / <0.54
IA0458 7 / <0.54
IA0459 2.6 / <0.54
IA0460 2.3 / <0.54
IA0461 120 / 0.6
IA0462 4.5 / <0.54
IA0464 24 / <0.54
IA0465 17 / <0.54
IA0466 3 / <0.54
IA0467 2.5 / <0.54
IA0468 4.8 / <0.54
IA0469 22 / <0.54
IA0470 7.7 / <0.54
IA0471 15 / <0.54
IA0472 1.5 / <0.54
IA0476 20 / <0.54
IA0477 600 / 1.5
IA0478 12 / <0.54
IA5014 30 / 2.6

Figure 3

Summary of Portable GC/MS Results - Adjusted HVAC Operating Conditions

Building 330C

Former IBM East Fishkill Facility

Hopewell Junction, New York

Drawn By:	C. LaVack
Designed By:	J. Sanborn
Reviewed By:	B. Green / D. Shea
Project No:	2999.06
Date:	February 2016

Figure Narrative

This figure shows tetrachloroethene (PCE) and trichloroethene (TCE) results for indoor air screening using a portable gas chromatograph/mass spectrometer (GC/MS) that was conducted under adjusted heating, ventilation, and air conditioning (HVAC) operating conditions. Results are shown in micrograms per cubic meter (ug/m3). Refer to Table 2 of this report for further details on the HVAC operating conditions in B330C.

Legend

- Indoor Air Location
- HVAC Zone
- HVAC Zones Off During Testing
- IA0468 4.8 / <0.54 — Control Point Name, PCE result / TCE Result (µg/m^3) (November 17th, 2015)
- Occupied area

40 20 0 40 80 Feet

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Figure 4

Summary of 8-Hour Confirmatory Sampling Results (PCE and TCE)

Building 330C

Former IBM East Fishkill Facility

Hopewell Junction, New York

Drawn By:	C. LaVack
Designed By:	J. Sanborn
Reviewed By:	B. Green / D. Shea
Project No:	2999.06
Date:	February 2016

Figure Narrative

This figure shows tetrachloroethene (PCE) and trichloroethene (TCE) results for indoor air sampling of occupied portions of B330C on November 18 and 19, 2015. The results of the last historical sampling event are also shown for comparison at each location where a November 2015 sample was collected. "NS" indicates that the location has not been sampled previously. The samples were collected as 8-hour time-weighted-average samples using 6-L SUMMA canisters. Results are shown in micrograms per cubic meter (ug/m3). Refer to Table 2 of this report for further details on the HVAC operating conditions in B330C.

Legend

- Indoor Air Location
- Ambient Air Location
- HVAC Zone
- IA0405 / 2.5 / 0.74 / 1.1 / <0.17 — Control Point Name; PCE/TCE (Historical Confirmatory Sample Date Varies); PCE/TCE (Nov 18/19, 2015 Confirmatory Sample)
- NS — Not Screened
- Occupied area

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APPENDIX A

LIMITATIONS

APPENDIX A
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. Where such analyses have been conducted by an outside laboratory, unless otherwise stated in the report, SHPC has relied upon the data provided, and has not conducted an independent evaluation of the reliability of these data. It must be noted that additional compounds not searched for during the current study may be present in vapor and 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 vapor and indoor air may occur due to the passage of time, seasonal water table fluctuations, recharge events, and other factors.

3. This report has been prepared for the exclusive use of the IBM Corporation for specific application to the former IBM East Fishkill facility 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.

APPENDIX B

PCE AND TCE RESULTS IN B330C
HISTORICAL CONFIRMATORY SAMPLES

Last Edited By: ewright

Path: S:\RANDATA\2900s\2999.00\Arcfiles\Figures\Final\B330C_Additional Figures\VOC_SA_Rpt_Fig6.mxd

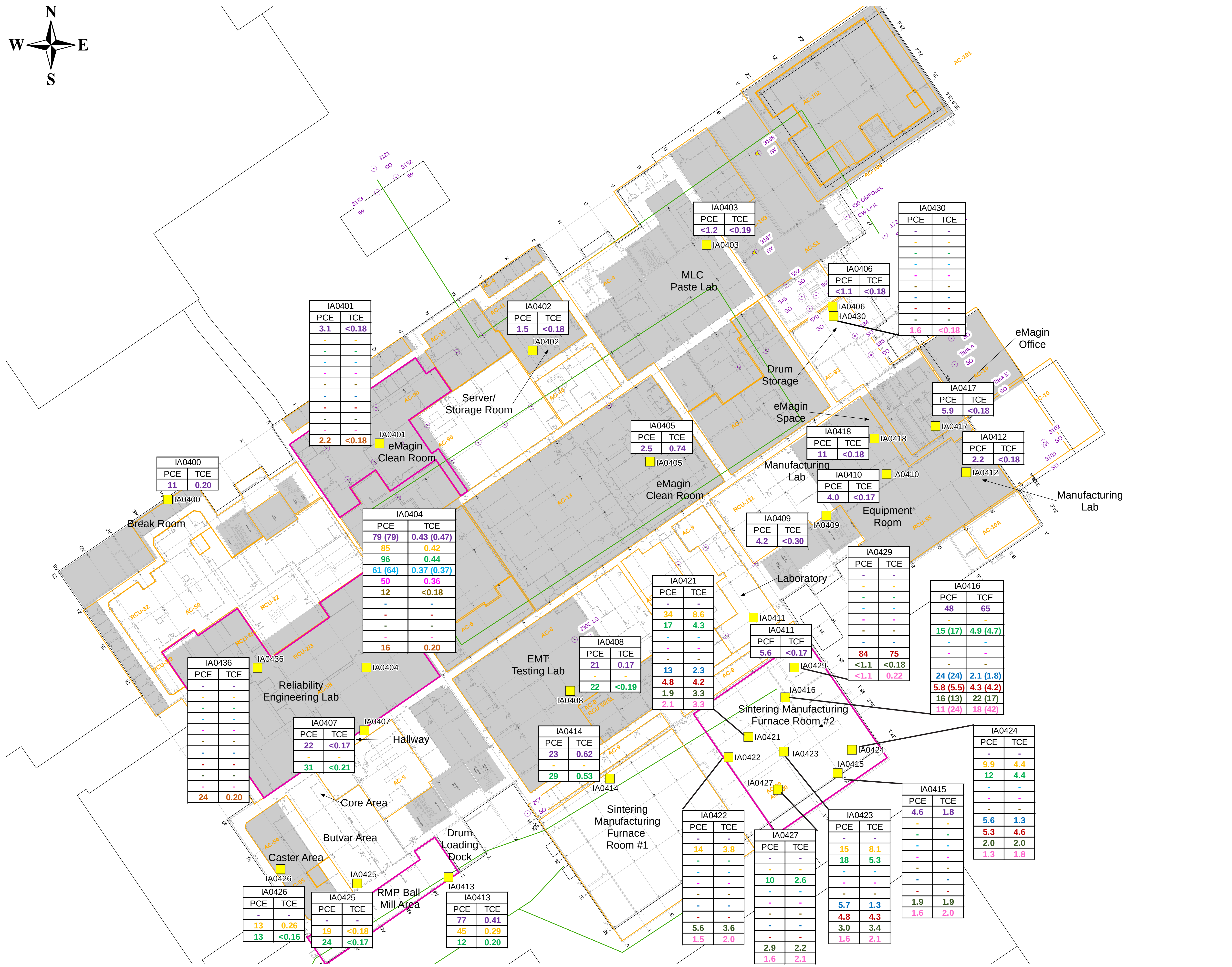
Figure 6

Summary of Indoor Air Results for PCE and TCE

Report of Supplemental Remedial Measures
Building 330C VOC Source Assessment

IBM East Fishkill Facility
Hopewell Junction, New York

Drawn By: E. Wright
Designed By: L. Atwell
Reviewed By: B. Green
Project No: 2999.00
Date: July 2014



IA0400 PCE	IA0400 TCE
11	0.20

IA0401 PCE	IA0401 TCE
3.1	<0.18
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
2.2	<0.18

IA0402 PCE	IA0402 TCE
1.5	<0.18

IA0403 PCE	IA0403 TCE
<1.2	<0.19

IA0404 PCE	IA0404 TCE
79 (79)	0.43 (0.47)
85	0.42
96	0.44
61 (64)	0.37 (0.37)
50	0.36
12	<0.18
-	-
-	-
-	-
-	-
16	0.20

IA0405 PCE	IA0405 TCE
2.5	0.74

IA0406 PCE	IA0406 TCE
<1.1	<0.18

IA0430 PCE	IA0430 TCE
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
1.6	<0.18

IA0417 PCE	IA0417 TCE
5.9	<0.18

IA0418 PCE	IA0418 TCE
11	<0.18

IA0412 PCE	IA0412 TCE
2.2	<0.18

IA0410 PCE	IA0410 TCE
4.0	<0.17

IA0409 PCE	IA0409 TCE
4.2	<0.30

IA0436 PCE	IA0436 TCE
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
24	0.20

IA0407 PCE	IA0407 TCE
22	<0.17
-	-
31	<0.21

IA0408 PCE	IA0408 TCE
21	0.17
-	-
22	<0.19

IA0421 PCE	IA0421 TCE
-	-
34	8.6
17	4.3
-	-
-	-
-	-
13	2.3
4.8	4.2
1.9	3.3
2.1	3.3

IA0411 PCE	IA0411 TCE
5.6	<0.17

IA0429 PCE	IA0429 TCE
-	-
-	-
-	-
-	-
-	-
-	-
-	-
84	75
<1.1	<0.18
<1.1	0.22

IA0416 PCE	IA0416 TCE
48	65
-	-
15 (17)	4.9 (4.7)
-	-
-	-
-	-
24 (24)	2.1 (1.8)
5.8 (5.5)	4.3 (4.2)
16 (13)	22 (17)
11 (24)	18 (42)

IA0414 PCE	IA0414 TCE
23	0.62
-	-
29	0.53

IA0424 PCE	IA0424 TCE
-	-
9.9	4.4
12	4.4
-	-
-	-
-	-
5.6	1.3
5.3	4.6
2.0	2.0
1.3	1.8

IA0415 PCE	IA0415 TCE
4.6	1.8
-	-
-	-
-	-
-	-
-	-
-	-
-	-
1.9	1.9
1.6	2.0

IA0422 PCE	IA0422 TCE
-	-
14	3.8
-	-
-	-
-	-
-	-
-	-
-	-
5.6	3.6
1.5	2.0

IA0427 PCE	IA0427 TCE
-	-
-	-
10	2.6
-	-
-	-
-	-
-	-
-	-
2.9	2.2
1.6	2.1

IA0423 PCE	IA0423 TCE
-	-
15	8.1
18	5.3
-	-
-	-
-	-
5.7	1.3
4.8	4.3
3.0	3.4
1.6	2.1

IA0413 PCE	IA0413 TCE
77	0.41
45	0.29
12	0.20

IA0425 PCE	IA0425 TCE
-	-
19	<0.18
24	<0.17

IA0426 PCE	IA0426 TCE
-	-
13	0.26
13	<0.16

Figure Narrative

This figure shows the results of indoor air sampling performed in Building 330C. All samples were collected by vacuum into 6L Summa canisters with 8-hour flow controllers. Results are shown in units of micrograms per cubic meter (µg/m3). Refer to Table 1 for the complete analytical results for each sample.

Legend

IA0411 — Indoor air sampling location and designation

3226 SO — Solid Waste Management Unit

HVAC zone

Area of additional assessment and remedial measures (see text for details)

Above / below ground former solvent drain line

Currently occupied area

Tetrachloroethene (PCE) and trichloroethene (TCE) results for samples collected on the dates indicated below (color represents date)

	IA0423	
Sample Date	PCE	TCE
8/26/2009	-	-
10/13/2009	15	8.1
10/28/2009	18	5.3
12/17/2009	-	-
7/29/2010	-	-
10/6/2010	-	-
2/9/2011	5.7	1.3
5/12/2011	4.8	4.3
1/26/2012	3.0	3.4
10/11/2012	1.6	2.1
7/9/2013	-	-

Sample Name
Analyte

< Indicates less than reporting limit

- Indicates not sampled on that date

( ) Indicates duplicate sample result

35 17.5 0 35 70 Feet

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APPENDIX C

PHOTOGRAPH LOG (B330C)

B330C 8-Hour Confirmatory Sampling Photograph Log

Photo 1: Samples AA-1 and Nitrogen Blank on roof of 330C at the intake for AC-58

Photo 2: Sample IA0400, located in a break room

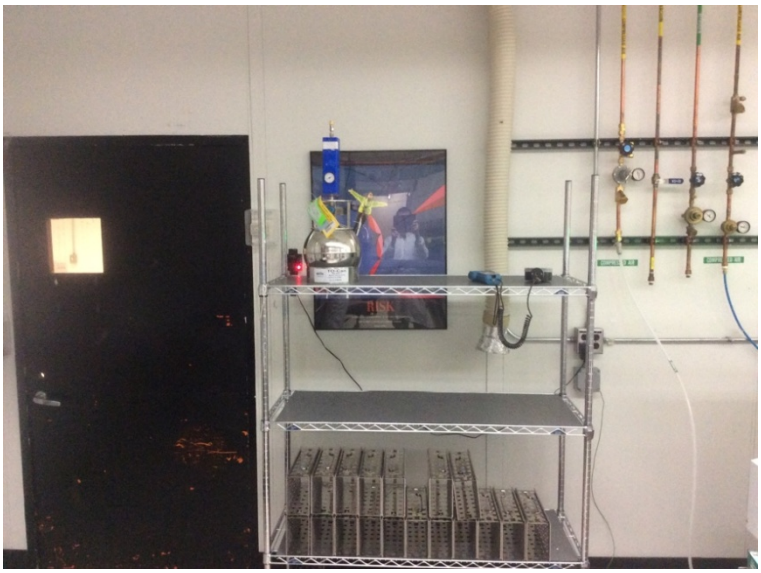

Photo 3: Sample IA0401, located in an eMagin laboratory

Photo 4: Sample IA0402, located in a server room

Photo 5: Sample IA0404, located in Reliability Lab

Photo 6: Sample IA0405, located in eMagin clean room

Photo 7: Sample IA0417, located in eMagin office

Photo 8: Sample IA0436, located in hallway of Reliability Lab

Photo 9: Sample IA0455 & IA0455 Dup, located in break room

Photo 10: Sample IA0458, located in office on work bench

Photo 11: Sample IA0467, located in maintenance office

Photo 12: Sample IA0468, located in office

Photo 13: Sample IA0469, located in NEXX tool lab

Photo 14: Sample IA0470, located in NEXX tool lab

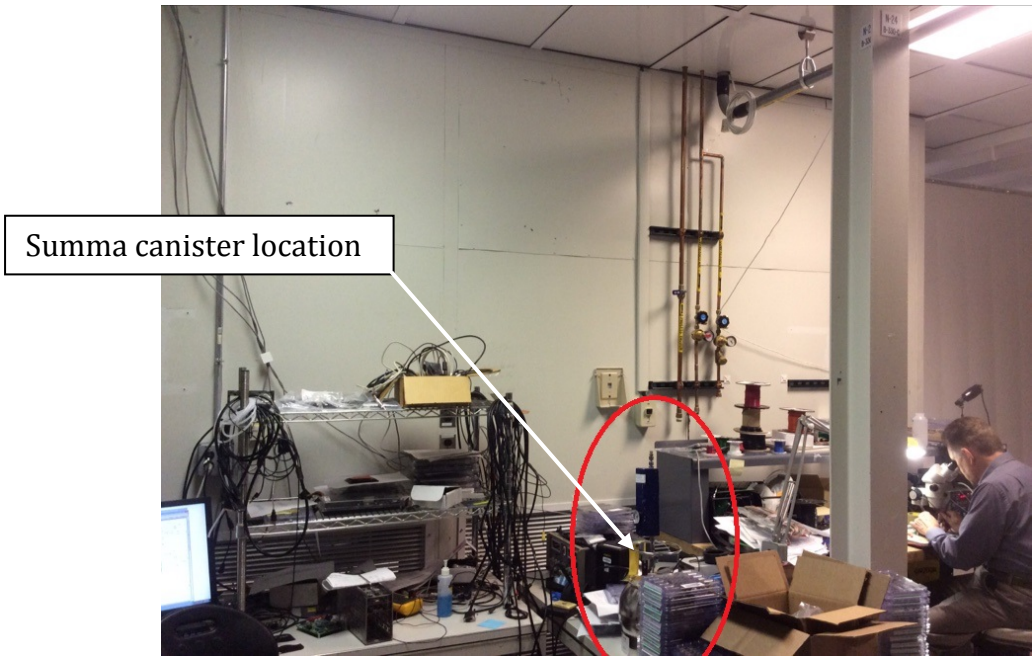

Photo 15: Sample IA0472, located in eMagin maintenance room

APPENDIX D

ANALYTICAL LABORATORY REPORT (B330C)

(On CD)

eurofins | Air Toxics

12/8/2015
Ms. Erica Bosse
Sanborn, Head & Associates
24 Wade Road

Latham NY

Project Name: EFK
Project #: 2999.06
Workorder #: 1511413

Dear Ms. Erica Bosse

The following report includes the data for the above referenced project for sample(s) received on 11/23/2015 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 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 #: 1511413

Work Order Summary

CLIENT:	Ms. Erica Bosse Sanborn, Head & Associates 24 Wade Road Latham, NY	**BILL TO:**	Accounts Payable Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301
PHONE:	518-207-0769	**P.O. #**	
FAX:		**PROJECT #**	2999.06 EFK
DATE RECEIVED:	11/23/2015	**CONTACT:**	Ausha Scott
DATE COMPLETED:	12/08/2015		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	IA0458	Modified TO-15	4.3 "Hg	5.2 psi
01B	IA0458	Modified TO-15	4.3 "Hg	5.2 psi
02A	IA0467	Modified TO-15	4.7 "Hg	4.8 psi
02B	IA0467	Modified TO-15	4.7 "Hg	4.8 psi
03A	IA0468	Modified TO-15	4.3 "Hg	4.9 psi
03B	IA0468	Modified TO-15	4.3 "Hg	4.9 psi
04A	IA0469	Modified TO-15	5.3 "Hg	5.5 psi
04B	IA0469	Modified TO-15	5.3 "Hg	5.5 psi
05A	IA0470	Modified TO-15	4.1 "Hg	5 psi
05B	IA0470	Modified TO-15	4.1 "Hg	5 psi
06A	IA0472	Modified TO-15	4.7 "Hg	4.8 psi
06B	IA0472	Modified TO-15	4.7 "Hg	4.8 psi
07A	IA0455	Modified TO-15	4.5 "Hg	5.1 psi
07B	IA0455	Modified TO-15	4.5 "Hg	5.1 psi
08A	IA0455 Dup	Modified TO-15	5.3 "Hg	4.8 psi
08B	IA0455 Dup	Modified TO-15	5.3 "Hg	4.8 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 #: 1511413

Work Order Summary

CLIENT:	Ms. Erica Bosse Sanborn, Head & Associates 24 Wade Road Latham, NY	**BILL TO:**	Accounts Payable Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301
PHONE:	518-207-0769	**P.O. #**	
FAX:		**PROJECT #**	2999.06 EFK
DATE RECEIVED:	11/23/2015	**CONTACT:**	Ausha Scott
DATE COMPLETED:	12/08/2015		

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

CERTIFIED BY:  DATE: 12/08/15

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704343-14-7, UT NELAP CA009332014-5, VA NELAP - 460197, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2014, Expiration date: 10/17/2015.
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 - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15 Full Scan/SIM
Sanborn, Head & Associates
Workorder# 1511413

Eight 6 Liter Summa Canister (SIM Certified) samples were received on November 23, 2015. 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

There were no receiving discrepancies.

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.

Due to the linear calibration range of the instrument, the reporting limit for Freon 12 was raised from

0.10 ppbv to 0.50 ppbv.

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

Definition of Data Qualifying Flags

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: IA0458

Lab ID#: 1511413-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.40	0.89	2.2
Acetone	0.79	15	1.9	37
Methylene Chloride	0.32	1.9	1.1	6.7
Benzene	0.16	0.21	0.50	0.68
Toluene	0.16	0.18	0.60	0.70
Tetrachloroethene	0.16	0.56	1.1	3.8

Client Sample ID: IA0458

Lab ID#: 1511413-01B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.032	0.068	0.20	0.43
Trichloroethene	0.032	0.060	0.17	0.32

Client Sample ID: IA0467

Lab ID#: 1511413-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.30	0.88	1.7
Acetone	0.78	3.8	1.9	9.2
Toluene	0.16	0.36	0.59	1.4

Client Sample ID: IA0467

Lab ID#: 1511413-02B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.031	0.068	0.20	0.43

Client Sample ID: IA0468

Lab ID#: 1511413-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)

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

Client Sample ID: IA0468

Lab ID#: 1511413-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.69	0.88	3.9
Acetone	0.78	12	1.8	29
Benzene	0.16	0.16	0.50	0.52
Tetrachloroethene	0.16	0.34	1.0	2.3

Client Sample ID: IA0468

Lab ID#: 1511413-03B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.031	0.066	0.20	0.42

Client Sample ID: IA0469

Lab ID#: 1511413-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.17	0.57	0.94	3.2
Freon 113	0.17	0.18	1.3	1.4
Acetone	0.84	4.1	2.0	9.7
Methylene Chloride	0.33	0.70	1.2	2.4
Benzene	0.17	0.18	0.53	0.58
Toluene	0.17	0.18	0.63	0.67
Tetrachloroethene	0.17	2.0	1.1	14

Client Sample ID: IA0469

Lab ID#: 1511413-04B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.033	0.062	0.21	0.39
Trichloroethene	0.033	0.051	0.18	0.28

Client Sample ID: IA0470

Lab ID#: 1511413-05A

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

Client Sample ID: IA0470

Lab ID#: 1511413-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.55	0.87	3.1
Acetone	0.78	5.0	1.8	12
Benzene	0.16	0.17	0.50	0.55
Toluene	0.16	0.17	0.58	0.63
Tetrachloroethene	0.16	0.52	1.0	3.6

Client Sample ID: IA0470

Lab ID#: 1511413-05B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.031	0.068	0.20	0.43
Trichloroethene	0.031	0.033	0.17	0.18

Client Sample ID: IA0472

Lab ID#: 1511413-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.40	0.88	2.3
Acetone	0.78	5.9	1.9	14

Client Sample ID: IA0472

Lab ID#: 1511413-06B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.031	0.068	0.20	0.43

Client Sample ID: IA0455

Lab ID#: 1511413-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.74	0.89	4.2
Acetone	0.79	2.2	1.9	5.3

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

Client Sample ID: IA0455

Lab ID#: 1511413-07A

Tetrachloroethene	0.16	0.53	1.1	3.6

Client Sample ID: IA0455

Lab ID#: 1511413-07B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.032	0.061	0.20	0.38

Client Sample ID: IA0455 Dup

Lab ID#: 1511413-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.71	0.90	4.0
Acetone	0.80	6.6	1.9	16
Tetrachloroethene	0.16	0.44	1.1	3.0

Client Sample ID: IA0455 Dup

Lab ID#: 1511413-08B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.032	0.068	0.20	0.43

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Client Sample ID: IA0458

Lab ID#: 1511413-01A

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

File Name:	**v120207**	**Date of Collection: 11/18/15 5:40:00 PM**	
Dil. Factor:	**1.58**	**Date of Analysis: 12/2/15 12:07 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.79	Not Detected	3.9	Not Detected
Freon 11	0.16	0.40	0.89	2.2
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.63	Not Detected
Acetone	0.79	15	1.9	37
Methylene Chloride	0.32	1.9	1.1	6.7
cis-1,2-Dichloroethene	0.16	Not Detected	0.63	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.86	Not Detected
Benzene	0.16	0.21	0.50	0.68
Toluene	0.16	0.18	0.60	0.70
Tetrachloroethene	0.16	0.56	1.1	3.8
Chlorobenzene	0.16	Not Detected	0.73	Not Detected
Ethyl Benzene	0.16	Not Detected	0.69	Not Detected
m,p-Xylene	0.16	Not Detected	0.69	Not Detected
o-Xylene	0.16	Not Detected	0.69	Not Detected
1,3-Dichlorobenzene	0.16	Not Detected	0.95	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.95	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.95	Not Detected
1,2,4-Trichlorobenzene	0.79	Not Detected UJ	5.9	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	86	70-130

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Client Sample ID: IA0458

Lab ID#: 1511413-01B

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

File Name:	**v120207sim**	**Date of Collection: 11/18/15 5:40:00 PM**	
Dil. Factor:	**1.58**	**Date of Analysis: 12/2/15 12:07 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
Carbon Tetrachloride	0.032	0.068	0.20	0.43
Trichloroethene	0.032	0.060	0.17	0.32

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	90	70-130

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Client Sample ID: IA0467

Lab ID#: 1511413-02A

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

File Name:	**v120208**	**Date of Collection: 11/18/15 6:26:00 PM**	
Dil. Factor:	**1.57**	**Date of Analysis: 12/2/15 12:42 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.78	Not Detected	3.9	Not Detected
Freon 11	0.16	0.30	0.88	1.7
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.62	Not Detected
Acetone	0.78	3.8	1.9	9.2
Methylene Chloride	0.31	Not Detected	1.1	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.62	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.86	Not Detected
Benzene	0.16	Not Detected	0.50	Not Detected
Toluene	0.16	0.36	0.59	1.4
Tetrachloroethene	0.16	Not Detected	1.1	Not Detected
Chlorobenzene	0.16	Not Detected	0.72	Not Detected
Ethyl Benzene	0.16	Not Detected	0.68	Not Detected
m,p-Xylene	0.16	Not Detected	0.68	Not Detected
o-Xylene	0.16	Not Detected	0.68	Not Detected
1,3-Dichlorobenzene	0.16	Not Detected	0.94	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.94	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.94	Not Detected
1,2,4-Trichlorobenzene	0.78	Not Detected UJ	5.8	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	85	70-130

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Client Sample ID: IA0467

Lab ID#: 1511413-02B

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

File Name:	**v120208sim**	**Date of Collection: 11/18/15 6:26:00 PM**	
Dil. Factor:	**1.57**	**Date of Analysis: 12/2/15 12:42 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
Carbon Tetrachloride	0.031	0.068	0.20	0.43
Trichloroethene	0.031	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: IA0468

Lab ID#: 1511413-03A

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

File Name:	**v120209**	**Date of Collection: 11/18/15 6:19:00 PM**	
Dil. Factor:	**1.56**	**Date of Analysis: 12/2/15 01:19 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.78	Not Detected	3.8	Not Detected
Freon 11	0.16	0.69	0.88	3.9
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.62	Not Detected
Acetone	0.78	12	1.8	29
Methylene Chloride	0.31	Not Detected	1.1	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.62	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.85	Not Detected
Benzene	0.16	0.16	0.50	0.52
Toluene	0.16	Not Detected	0.59	Not Detected
Tetrachloroethene	0.16	0.34	1.0	2.3
Chlorobenzene	0.16	Not Detected	0.72	Not Detected
Ethyl Benzene	0.16	Not Detected	0.68	Not Detected
m,p-Xylene	0.16	Not Detected	0.68	Not Detected
o-Xylene	0.16	Not Detected	0.68	Not Detected
1,3-Dichlorobenzene	0.16	Not Detected	0.94	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.94	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.94	Not Detected
1,2,4-Trichlorobenzene	0.78	Not Detected UJ	5.8	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

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	84	70-130

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Client Sample ID: IA0468

Lab ID#: 1511413-03B

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

File Name:	**v120209sim**	**Date of Collection: 11/18/15 6:19:00 PM**	
Dil. Factor:	**1.56**	**Date of Analysis: 12/2/15 01:19 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
Carbon Tetrachloride	0.031	0.066	0.20	0.42
Trichloroethene	0.031	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: IA0469

Lab ID#: 1511413-04A

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

File Name:	**v120210**	**Date of Collection: 11/18/15 5:11:00 PM**	
Dil. Factor:	**1.67**	**Date of Analysis: 12/2/15 01:54 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.84	Not Detected	4.1	Not Detected
Freon 11	0.17	0.57	0.94	3.2
Freon 113	0.17	0.18	1.3	1.4
1,1-Dichloroethene	0.17	Not Detected	0.66	Not Detected
Acetone	0.84	4.1	2.0	9.7
Methylene Chloride	0.33	0.70	1.2	2.4
cis-1,2-Dichloroethene	0.17	Not Detected	0.66	Not Detected
1,1,1-Trichloroethane	0.17	Not Detected	0.91	Not Detected
Benzene	0.17	0.18	0.53	0.58
Toluene	0.17	0.18	0.63	0.67
Tetrachloroethene	0.17	2.0	1.1	14
Chlorobenzene	0.17	Not Detected	0.77	Not Detected
Ethyl Benzene	0.17	Not Detected	0.72	Not Detected
m,p-Xylene	0.17	Not Detected	0.72	Not Detected
o-Xylene	0.17	Not Detected	0.72	Not Detected
1,3-Dichlorobenzene	0.17	Not Detected	1.0	Not Detected
1,4-Dichlorobenzene	0.17	Not Detected	1.0	Not Detected
1,2-Dichlorobenzene	0.17	Not Detected	1.0	Not Detected
1,2,4-Trichlorobenzene	0.84	Not Detected UJ	6.2	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	85	70-130

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Client Sample ID: IA0469

Lab ID#: 1511413-04B

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

File Name:	**v120210sim**	**Date of Collection: 11/18/15 5:11:00 PM**	
Dil. Factor:	**1.67**	**Date of Analysis: 12/2/15 01:54 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.017	Not Detected	0.043	Not Detected
Carbon Tetrachloride	0.033	0.062	0.21	0.39
Trichloroethene	0.033	0.051	0.18	0.28

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: IA0470

Lab ID#: 1511413-05A

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

File Name:	**v120211**	**Date of Collection: 11/18/15 5:23:00 PM**	
Dil. Factor:	**1.55**	**Date of Analysis: 12/2/15 02:30 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.78	Not Detected	3.8	Not Detected
Freon 11	0.16	0.55	0.87	3.1
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.61	Not Detected
Acetone	0.78	5.0	1.8	12
Methylene Chloride	0.31	Not Detected	1.1	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.61	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.84	Not Detected
Benzene	0.16	0.17	0.50	0.55
Toluene	0.16	0.17	0.58	0.63
Tetrachloroethene	0.16	0.52	1.0	3.6
Chlorobenzene	0.16	Not Detected	0.71	Not Detected
Ethyl Benzene	0.16	Not Detected	0.67	Not Detected
m,p-Xylene	0.16	Not Detected	0.67	Not Detected
o-Xylene	0.16	Not Detected	0.67	Not Detected
1,3-Dichlorobenzene	0.16	Not Detected	0.93	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.93	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.93	Not Detected
1,2,4-Trichlorobenzene	0.78	Not Detected UJ	5.8	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: IA0470

Lab ID#: 1511413-05B

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

File Name:	**v120211sim**	**Date of Collection: 11/18/15 5:23:00 PM**	
Dil. Factor:	**1.55**	**Date of Analysis: 12/2/15 02:30 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
Carbon Tetrachloride	0.031	0.068	0.20	0.43
Trichloroethene	0.031	0.033	0.17	0.18

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: IA0472

Lab ID#: 1511413-06A

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

File Name:	**v120212**	**Date of Collection: 11/18/15 6:46:00 PM**	
Dil. Factor:	**1.57**	**Date of Analysis: 12/2/15 03:06 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.78	Not Detected	3.9	Not Detected
Freon 11	0.16	0.40	0.88	2.3
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.62	Not Detected
Acetone	0.78	5.9	1.9	14
Methylene Chloride	0.31	Not Detected	1.1	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.62	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.86	Not Detected
Benzene	0.16	Not Detected	0.50	Not Detected
Toluene	0.16	Not Detected	0.59	Not Detected
Tetrachloroethene	0.16	Not Detected	1.1	Not Detected
Chlorobenzene	0.16	Not Detected	0.72	Not Detected
Ethyl Benzene	0.16	Not Detected	0.68	Not Detected
m,p-Xylene	0.16	Not Detected	0.68	Not Detected
o-Xylene	0.16	Not Detected	0.68	Not Detected
1,3-Dichlorobenzene	0.16	Not Detected	0.94	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.94	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.94	Not Detected
1,2,4-Trichlorobenzene	0.78	Not Detected UJ	5.8	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	86	70-130

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Client Sample ID: IA0472

Lab ID#: 1511413-06B

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

File Name:	**v120212sim**	**Date of Collection: 11/18/15 6:46:00 PM**	
Dil. Factor:	**1.57**	**Date of Analysis: 12/2/15 03:06 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
Carbon Tetrachloride	0.031	0.068	0.20	0.43
Trichloroethene	0.031	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: IA0455

Lab ID#: 1511413-07A

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

File Name:	**v120213**	**Date of Collection: 11/19/15 3:29:00 PM**	
Dil. Factor:	**1.58**	**Date of Analysis: 12/2/15 03:41 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.79	Not Detected	3.9	Not Detected
Freon 11	0.16	0.74	0.89	4.2
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.63	Not Detected
Acetone	0.79	2.2	1.9	5.3
Methylene Chloride	0.32	Not Detected	1.1	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.63	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.86	Not Detected
Benzene	0.16	Not Detected	0.50	Not Detected
Toluene	0.16	Not Detected	0.60	Not Detected
Tetrachloroethene	0.16	0.53	1.1	3.6
Chlorobenzene	0.16	Not Detected	0.73	Not Detected
Ethyl Benzene	0.16	Not Detected	0.69	Not Detected
m,p-Xylene	0.16	Not Detected	0.69	Not Detected
o-Xylene	0.16	Not Detected	0.69	Not Detected
1,3-Dichlorobenzene	0.16	Not Detected	0.95	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.95	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.95	Not Detected
1,2,4-Trichlorobenzene	0.79	Not Detected UJ	5.9	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	88	70-130

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Client Sample ID: IA0455

Lab ID#: 1511413-07B

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

File Name:	**v120213sim**	**Date of Collection: 11/19/15 3:29:00 PM**	
Dil. Factor:	**1.58**	**Date of Analysis: 12/2/15 03:41 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
Carbon Tetrachloride	0.032	0.061	0.20	0.38
Trichloroethene	0.032	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	103	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: IA0455 Dup

Lab ID#: 1511413-08A

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

File Name:	**v120214**	**Date of Collection:**	**11/19/15 3:28:00 PM**
Dil. Factor:	**1.61**	**Date of Analysis:**	**12/2/15 04:17 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.80	Not Detected	4.0	Not Detected
Freon 11	0.16	0.71	0.90	4.0
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.64	Not Detected
Acetone	0.80	6.6	1.9	16
Methylene Chloride	0.32	Not Detected	1.1	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.64	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.88	Not Detected
Benzene	0.16	Not Detected	0.51	Not Detected
Toluene	0.16	Not Detected	0.61	Not Detected
Tetrachloroethene	0.16	0.44	1.1	3.0
Chlorobenzene	0.16	Not Detected	0.74	Not Detected
Ethyl Benzene	0.16	Not Detected	0.70	Not Detected
m,p-Xylene	0.16	Not Detected	0.70	Not Detected
o-Xylene	0.16	Not Detected	0.70	Not Detected
1,3-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected
1,2,4-Trichlorobenzene	0.80	Not Detected UJ	6.0	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: IA0455 Dup

Lab ID#: 1511413-08B

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

File Name:	**v120214sim**	**Date of Collection:**	**11/19/15 3:28:00 PM**
Dil. Factor:	**1.61**	**Date of Analysis:**	**12/2/15 04:17 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.041	Not Detected
Carbon Tetrachloride	0.032	0.068	0.20	0.43
Trichloroethene	0.032	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1511413-09A

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

File Name:	**v120206**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/2/15 11:32 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 11	0.10	Not Detected	0.56	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
1,1-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
Methylene Chloride	0.20	Not Detected	0.69	Not Detected
cis-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
1,1,1-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Benzene	0.10	Not Detected	0.32	Not Detected
Toluene	0.10	Not Detected	0.38	Not Detected
Tetrachloroethene	0.10	Not Detected	0.68	Not Detected
Chlorobenzene	0.10	Not Detected	0.46	Not Detected
Ethyl Benzene	0.10	Not Detected	0.43	Not Detected
m,p-Xylene	0.10	Not Detected	0.43	Not Detected
o-Xylene	0.10	Not Detected	0.43	Not Detected
1,3-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,4-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2,4-Trichlorobenzene	0.50	Not Detected UJ	3.7	Not Detected UJ

UJ = Analyte associated with low bias in the CCV and/or LCS.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	88	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1511413-09B

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

File Name:	**v120206sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/2/15 11:32 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
Carbon Tetrachloride	0.020	Not Detected	0.12	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	91	70-130

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Client Sample ID: CCV

Lab ID#: 1511413-10A

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

File Name:	**v120202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/2/15 08:21 AM**	

Compound	%Recovery
Freon 12	97
Freon 11	92
Freon 113	92
1,1-Dichloroethene	90
Acetone	92
Methylene Chloride	93
cis-1,2-Dichloroethene	93
1,1,1-Trichloroethane	90
Benzene	101
Toluene	95
Tetrachloroethene	86
Chlorobenzene	91
Ethyl Benzene	87
m,p-Xylene	87
o-Xylene	86
1,3-Dichlorobenzene	74
1,4-Dichlorobenzene	76
1,2-Dichlorobenzene	74
1,2,4-Trichlorobenzene	65 Q

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	91	70-130

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Client Sample ID: CCV

Lab ID#: 1511413-10B

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

File Name:	**v120202sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/2/15 08:21 AM**	

Compound	%Recovery
Vinyl Chloride	98
Carbon Tetrachloride	93
Trichloroethene	86

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: LCS

Lab ID#: 1511413-11A

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

File Name:	**v120203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/2/15 09:08 AM**	

Compound	%Recovery	Method Limits
Freon 12	104	70-130
Freon 11	93	70-130
Freon 113	87	70-130
1,1-Dichloroethene	85	70-130
Acetone	94	70-130
Methylene Chloride	92	70-130
cis-1,2-Dichloroethene	101	70-130
1,1,1-Trichloroethane	89	70-130
Benzene	93	70-130
Toluene	87	70-130
Tetrachloroethene	84	70-130
Chlorobenzene	91	70-130
Ethyl Benzene	81	70-130
m,p-Xylene	82	70-130
o-Xylene	85	70-130
1,3-Dichlorobenzene	77	70-130
1,4-Dichlorobenzene	73	70-130
1,2-Dichlorobenzene	73	70-130
1,2,4-Trichlorobenzene	82	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	96	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	90	70-130

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Client Sample ID: LCSD

Lab ID#: 1511413-11AA

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

File Name:	**v120204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/2/15 09:48 AM**	

Compound	%Recovery	Method Limits
Freon 12	101	70-130
Freon 11	96	70-130
Freon 113	88	70-130
1,1-Dichloroethene	92	70-130
Acetone	98	70-130
Methylene Chloride	98	70-130
cis-1,2-Dichloroethene	104	70-130
1,1,1-Trichloroethane	87	70-130
Benzene	96	70-130
Toluene	91	70-130
Tetrachloroethene	90	70-130
Chlorobenzene	93	70-130
Ethyl Benzene	81	70-130
m,p-Xylene	83	70-130
o-Xylene	87	70-130
1,3-Dichlorobenzene	77	70-130
1,4-Dichlorobenzene	77	70-130
1,2-Dichlorobenzene	73	70-130
1,2,4-Trichlorobenzene	86	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	96	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	90	70-130

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Client Sample ID: LCS

Lab ID#: 1511413-11B

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

File Name:	**v120203sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/2/15 09:08 AM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	99	70-130
Carbon Tetrachloride	64	60-140
Trichloroethene	85	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: LCSD

Lab ID#: 1511413-11BB

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

File Name:	**v120204sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/2/15 09:48 AM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	98	70-130
Carbon Tetrachloride	64	60-140
Trichloroethene	86	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	92	70-130

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12/14/2015
Ms. Erica Bosse
Sanborn, Head & Associates
24 Wade Road

Latham NY

Project Name: EFK
Project #: 2999.06
Workorder #: 1511412B

Dear Ms. Erica Bosse

The following report includes the data for the above referenced project for sample(s) received on 11/23/2015 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 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 #: 1511412B

Work Order Summary

CLIENT:	Ms. Erica Bosse Sanborn, Head & Associates 24 Wade Road Latham, NY	**BILL TO:**	Accounts Payable Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301
PHONE:	518-207-0769	**P.O. #**	
FAX:		**PROJECT #**	2999.06 EFK
DATE RECEIVED:	11/23/2015	**CONTACT:**	Ausha Scott
DATE COMPLETED:	12/12/2015		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	AA-1	Modified TO-15	3.3 "Hg	5 psi
01B	AA-1	Modified TO-15	3.3 "Hg	5 psi
02A	Blank	Modified TO-15	8.4 "Hg	5.2 psi
02B	Blank	Modified TO-15	8.4 "Hg	5.2 psi
03A	IA0400	Modified TO-15	4.7 "Hg	5 psi
03B	IA0400	Modified TO-15	4.7 "Hg	5 psi
04A	IA0401	Modified TO-15	4.5 "Hg	5.1 psi
04B	IA0401	Modified TO-15	4.5 "Hg	5.1 psi
05A	IA0402	Modified TO-15	5.1 "Hg	5 psi
05B	IA0402	Modified TO-15	5.1 "Hg	5 psi
06A	IA0404	Modified TO-15	4.1 "Hg	4.9 psi
06B	IA0404	Modified TO-15	4.1 "Hg	4.9 psi
07A	IA0405	Modified TO-15	4.5 "Hg	5.1 psi
07B	IA0405	Modified TO-15	4.5 "Hg	5.1 psi
08A	IA0417	Modified TO-15	5.9 "Hg	5.1 psi
08B	IA0417	Modified TO-15	5.9 "Hg	5.1 psi
09A	IA0436	Modified TO-15	4.9 "Hg	5.1 psi
09B	IA0436	Modified TO-15	4.9 "Hg	5.1 psi
13A	Lab Blank	Modified TO-15	NA	NA
13B	Lab Blank	Modified TO-15	NA	NA
14A	CCV	Modified TO-15	NA	NA
14B	CCV	Modified TO-15	NA	NA
15A	LCS	Modified TO-15	NA	NA

Continued on next page

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WORK ORDER #: 1511412B

Work Order Summary

CLIENT:	Ms. Erica Bosse Sanborn, Head & Associates 24 Wade Road Latham, NY	**BILL TO:**	Accounts Payable Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301
PHONE:	518-207-0769	**P.O. #**	
FAX:		**PROJECT #**	2999.06 EFK
DATE RECEIVED:	11/23/2015	**CONTACT:**	Ausha Scott
DATE COMPLETED:	12/12/2015		

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

CERTIFIED BY:  DATE: 12/12/15

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704343-14-7, UT NELAP CA009332014-5, VA NELAP - 460197, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2014, Expiration date: 10/17/2015.
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 - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15 Full Scan/SIM
Sanborn, Head & Associates
Workorder# 1511412B

Eight 6 Liter Summa Canister (SIM Certified) and one 6 Liter Summa Canister (SIM Certified Calscience) samples were received on November 23, 2015. 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

The Chain of Custody (COC) information for samples AA-1 and Blank did not match the entries on the sample tags with regard to sample identification. Therefore the information on the COC was used to process and report the samples.

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.

Due to the linear calibration range of the instrument, the reporting limit for Freon 12 was raised from 0.10 ppbv to 0.50 ppbv.

Acetone exceeded the instrument's calibration range for sample IA0401 and was flagged accordingly.

Per client request, the samples from the original report in workorder 1511412 were split into fractions A and B. As a result, samples IA4008, IA0400, and IA BA-39 are reported in workorder 1511412AR1 and samples AA-1, Blank, IA0400, IA0401, IA0402, IA0404, IA0405, IA-0417, and IA0436 are reported in workorder 1511412B.

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: AA-1

Lab ID#: 1511412B-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.15	0.23	0.84	1.3
Acetone	0.75	1.8	1.8	4.4
Methylene Chloride	0.30	1.6	1.0	5.6
Benzene	0.15	0.16	0.48	0.52
Toluene	0.15	0.18	0.56	0.66

Client Sample ID: AA-1

Lab ID#: 1511412B-01B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.030	0.059	0.19	0.37

Client Sample ID: Blank

Lab ID#: 1511412B-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	0.94	1.1	2.2	2.6

Client Sample ID: Blank

Lab ID#: 1511412B-02B

No Detections Were Found.

Client Sample ID: IA0400

Lab ID#: 1511412B-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.32	0.89	1.8
Acetone	0.80	3.6	1.9	8.5
Methylene Chloride	0.32	0.53	1.1	1.8
Benzene	0.16	0.17	0.51	0.55
Toluene	0.16	0.24	0.60	0.92
Tetrachloroethene	0.16	0.82	1.1	5.6

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

Client Sample ID: IA0400

Lab ID#: 1511412B-03B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.032	0.062	0.20	0.39

Client Sample ID: IA0401

Lab ID#: 1511412B-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.36	0.89	2.0
Acetone	0.79	73 E	1.9	170 E
Benzene	0.16	0.16	0.50	0.53
Toluene	0.16	0.19	0.60	0.72
Tetrachloroethene	0.16	0.28	1.1	1.9

Client Sample ID: IA0401

Lab ID#: 1511412B-04B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.032	0.061	0.20	0.38

Client Sample ID: IA0402

Lab ID#: 1511412B-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.56	0.90	3.2
Acetone	0.80	4.5	1.9	11

Client Sample ID: IA0402

Lab ID#: 1511412B-05B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.032	0.069	0.20	0.43

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

Client Sample ID: IA0404

Lab ID#: 1511412B-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.15	0.32	0.86	1.8
Freon 113	0.15	0.16	1.2	1.2
Acetone	0.77	3.3	1.8	7.9
Toluene	0.15	0.41	0.58	1.6
Tetrachloroethene	0.15	0.98	1.0	6.7

Client Sample ID: IA0404

Lab ID#: 1511412B-06B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.031	0.067	0.19	0.42
Trichloroethene	0.031	0.035	0.16	0.19

Client Sample ID: IA0405

Lab ID#: 1511412B-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.35	0.89	2.0
Acetone	0.79	3.6	1.9	8.6
Tetrachloroethene	0.16	0.17	1.1	1.1

Client Sample ID: IA0405

Lab ID#: 1511412B-07B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.032	0.059	0.20	0.37

Client Sample ID: IA0417

Lab ID#: 1511412B-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.17	0.49	0.94	2.7

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

Client Sample ID: IA0417

Lab ID#: 1511412B-08A

Acetone	0.84	2.6	2.0	6.2
Tetrachloroethene	0.17	0.48	1.1	3.3

Client Sample ID: IA0417

Lab ID#: 1511412B-08B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.034	0.063	0.21	0.40

Client Sample ID: IA0436

Lab ID#: 1511412B-09A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.16	0.40	0.90	2.2
Freon 113	0.16	0.23	1.2	1.8
Acetone	0.80	3.3	1.9	7.8
Benzene	0.16	0.19	0.51	0.60
Toluene	0.16	0.19	0.61	0.71
Tetrachloroethene	0.16	2.3	1.1	15

Client Sample ID: IA0436

Lab ID#: 1511412B-09B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Tetrachloride	0.032	0.064	0.20	0.40
Trichloroethene	0.032	0.039	0.17	0.21

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Client Sample ID: AA-1

Lab ID#: 1511412B-01A

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

File Name:	**v120107a**	**Date of Collection:**	**11/18/15 3:27:00 PM**
Dil. Factor:	**1.50**	**Date of Analysis:**	**12/1/15 12:04 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.75	Not Detected	3.7	Not Detected
Freon 11	0.15	0.23	0.84	1.3
Freon 113	0.15	Not Detected	1.1	Not Detected
1,1-Dichloroethene	0.15	Not Detected	0.59	Not Detected
Acetone	0.75	1.8	1.8	4.4
Methylene Chloride	0.30	1.6	1.0	5.6
cis-1,2-Dichloroethene	0.15	Not Detected	0.59	Not Detected
1,1,1-Trichloroethane	0.15	Not Detected	0.82	Not Detected
Benzene	0.15	0.16	0.48	0.52
Toluene	0.15	0.18	0.56	0.66
Tetrachloroethene	0.15	Not Detected	1.0	Not Detected
Chlorobenzene	0.15	Not Detected	0.69	Not Detected
Ethyl Benzene	0.15	Not Detected	0.65	Not Detected
m,p-Xylene	0.15	Not Detected	0.65	Not Detected
o-Xylene	0.15	Not Detected	0.65	Not Detected
1,3-Dichlorobenzene	0.15	Not Detected	0.90	Not Detected
1,4-Dichlorobenzene	0.15	Not Detected	0.90	Not Detected
1,2-Dichlorobenzene	0.15	Not Detected	0.90	Not Detected
1,2,4-Trichlorobenzene	0.75	Not Detected	5.6	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	89	70-130

eurofins | Air Toxics

Client Sample ID: AA-1

Lab ID#: 1511412B-01B

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

File Name:	**v120107sima**	**Date of Collection: 11/18/15 3:27:00 PM**	
Dil. Factor:	**1.50**	**Date of Analysis: 12/1/15 12:04 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.015	Not Detected	0.038	Not Detected
Carbon Tetrachloride	0.030	0.059	0.19	0.37
Trichloroethene	0.030	Not Detected	0.16	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	97	70-130

eurofins | Air Toxics

Client Sample ID: Blank

Lab ID#: 1511412B-02A

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

File Name:	**v120108a**	**Date of Collection:**	**11/18/15 3:29:00 PM**
Dil. Factor:	**1.88**	**Date of Analysis:**	**12/1/15 12:44 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.94	Not Detected	4.6	Not Detected
Freon 11	0.19	Not Detected	1.0	Not Detected
Freon 113	0.19	Not Detected	1.4	Not Detected
1,1-Dichloroethene	0.19	Not Detected	0.74	Not Detected
Acetone	0.94	1.1	2.2	2.6
Methylene Chloride	0.38	Not Detected	1.3	Not Detected
cis-1,2-Dichloroethene	0.19	Not Detected	0.74	Not Detected
1,1,1-Trichloroethane	0.19	Not Detected	1.0	Not Detected
Benzene	0.19	Not Detected	0.60	Not Detected
Toluene	0.19	Not Detected	0.71	Not Detected
Tetrachloroethene	0.19	Not Detected	1.3	Not Detected
Chlorobenzene	0.19	Not Detected	0.86	Not Detected
Ethyl Benzene	0.19	Not Detected	0.82	Not Detected
m,p-Xylene	0.19	Not Detected	0.82	Not Detected
o-Xylene	0.19	Not Detected	0.82	Not Detected
1,3-Dichlorobenzene	0.19	Not Detected	1.1	Not Detected
1,4-Dichlorobenzene	0.19	Not Detected	1.1	Not Detected
1,2-Dichlorobenzene	0.19	Not Detected	1.1	Not Detected
1,2,4-Trichlorobenzene	0.94	Not Detected	7.0	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	90	70-130

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Client Sample ID: Blank

Lab ID#: 1511412B-02B

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

File Name:	**v120108sima**	**Date of Collection: 11/18/15 3:29:00 PM**	
Dil. Factor:	**1.88**	**Date of Analysis: 12/1/15 12:44 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.019	Not Detected	0.048	Not Detected
Carbon Tetrachloride	0.038	Not Detected	0.24	Not Detected
Trichloroethene	0.038	Not Detected	0.20	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: IA0400

Lab ID#: 1511412B-03A

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

File Name:	**v120109a**	**Date of Collection:**	**11/18/15 4:39:00 PM**
Dil. Factor:	**1.59**	**Date of Analysis:**	**12/1/15 01:19 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.80	Not Detected	3.9	Not Detected
Freon 11	0.16	0.32	0.89	1.8
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.63	Not Detected
Acetone	0.80	3.6	1.9	8.5
Methylene Chloride	0.32	0.53	1.1	1.8
cis-1,2-Dichloroethene	0.16	Not Detected	0.63	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.87	Not Detected
Benzene	0.16	0.17	0.51	0.55
Toluene	0.16	0.24	0.60	0.92
Tetrachloroethene	0.16	0.82	1.1	5.6
Chlorobenzene	0.16	Not Detected	0.73	Not Detected
Ethyl Benzene	0.16	Not Detected	0.69	Not Detected
m,p-Xylene	0.16	Not Detected	0.69	Not Detected
o-Xylene	0.16	Not Detected	0.69	Not Detected
1,3-Dichlorobenzene	0.16	Not Detected	0.96	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.96	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.96	Not Detected
1,2,4-Trichlorobenzene	0.80	Not Detected	5.9	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: IA0400

Lab ID#: 1511412B-03B

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

File Name:	**v120109sima**	**Date of Collection: 11/18/15 4:39:00 PM**	
Dil. Factor:	**1.59**	**Date of Analysis: 12/1/15 01:19 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.041	Not Detected
Carbon Tetrachloride	0.032	0.062	0.20	0.39
Trichloroethene	0.032	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

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

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Client Sample ID: IA0401

Lab ID#: 1511412B-04A

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

File Name:	**v120110a**	**Date of Collection:**	**11/18/15 4:42:00 PM**
Dil. Factor:	**1.58**	**Date of Analysis:**	**12/1/15 01:55 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.79	Not Detected	3.9	Not Detected
Freon 11	0.16	0.36	0.89	2.0
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.63	Not Detected
Acetone	0.79	73 E	1.9	170 E
Methylene Chloride	0.32	Not Detected	1.1	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.63	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.86	Not Detected
Benzene	0.16	0.16	0.50	0.53
Toluene	0.16	0.19	0.60	0.72
Tetrachloroethene	0.16	0.28	1.1	1.9
Chlorobenzene	0.16	Not Detected	0.73	Not Detected
Ethyl Benzene	0.16	Not Detected	0.69	Not Detected
m,p-Xylene	0.16	Not Detected	0.69	Not Detected
o-Xylene	0.16	Not Detected	0.69	Not Detected
1,3-Dichlorobenzene	0.16	Not Detected	0.95	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.95	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.95	Not Detected
1,2,4-Trichlorobenzene	0.79	Not Detected	5.9	Not Detected

E = Exceeds instrument calibration range.

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: IA0401

Lab ID#: 1511412B-04B

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

File Name:	**v120110sima**	**Date of Collection: 11/18/15 4:42:00 PM**	
Dil. Factor:	**1.58**	**Date of Analysis: 12/1/15 01:55 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
Carbon Tetrachloride	0.032	0.061	0.20	0.38
Trichloroethene	0.032	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: IA0402

Lab ID#: 1511412B-05A

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

File Name:	**v120111a**	**Date of Collection:**	**11/18/15 6:40:00 PM**
Dil. Factor:	**1.61**	**Date of Analysis:**	**12/1/15 02:30 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.80	Not Detected	4.0	Not Detected
Freon 11	0.16	0.56	0.90	3.2
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.64	Not Detected
Acetone	0.80	4.5	1.9	11
Methylene Chloride	0.32	Not Detected	1.1	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.64	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.88	Not Detected
Benzene	0.16	Not Detected	0.51	Not Detected
Toluene	0.16	Not Detected	0.61	Not Detected
Tetrachloroethene	0.16	Not Detected	1.1	Not Detected
Chlorobenzene	0.16	Not Detected	0.74	Not Detected
Ethyl Benzene	0.16	Not Detected	0.70	Not Detected
m,p-Xylene	0.16	Not Detected	0.70	Not Detected
o-Xylene	0.16	Not Detected	0.70	Not Detected
1,3-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected
1,2,4-Trichlorobenzene	0.80	Not Detected	6.0	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	89	70-130

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Client Sample ID: IA0402

Lab ID#: 1511412B-05B

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

File Name:	**v120111sima**	**Date of Collection: 11/18/15 6:40:00 PM**	
Dil. Factor:	**1.61**	**Date of Analysis: 12/1/15 02:30 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.041	Not Detected
Carbon Tetrachloride	0.032	0.069	0.20	0.43
Trichloroethene	0.032	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: IA0404

Lab ID#: 1511412B-06A

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

File Name:	**v120112a**	**Date of Collection:**	**11/18/15 4:47:00 PM**
Dil. Factor:	**1.54**	**Date of Analysis:**	**12/1/15 03:05 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.77	Not Detected	3.8	Not Detected
Freon 11	0.15	0.32	0.86	1.8
Freon 113	0.15	0.16	1.2	1.2
1,1-Dichloroethene	0.15	Not Detected	0.61	Not Detected
Acetone	0.77	3.3	1.8	7.9
Methylene Chloride	0.31	Not Detected	1.1	Not Detected
cis-1,2-Dichloroethene	0.15	Not Detected	0.61	Not Detected
1,1,1-Trichloroethane	0.15	Not Detected	0.84	Not Detected
Benzene	0.15	Not Detected	0.49	Not Detected
Toluene	0.15	0.41	0.58	1.6
Tetrachloroethene	0.15	0.98	1.0	6.7
Chlorobenzene	0.15	Not Detected	0.71	Not Detected
Ethyl Benzene	0.15	Not Detected	0.67	Not Detected
m,p-Xylene	0.15	Not Detected	0.67	Not Detected
o-Xylene	0.15	Not Detected	0.67	Not Detected
1,3-Dichlorobenzene	0.15	Not Detected	0.92	Not Detected
1,4-Dichlorobenzene	0.15	Not Detected	0.92	Not Detected
1,2-Dichlorobenzene	0.15	Not Detected	0.92	Not Detected
1,2,4-Trichlorobenzene	0.77	Not Detected	5.7	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified Calscience)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	88	70-130

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Client Sample ID: IA0404

Lab ID#: 1511412B-06B

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

File Name:	**v120112sima**	**Date of Collection: 11/18/15 4:47:00 PM**	
Dil. Factor:	**1.54**	**Date of Analysis: 12/1/15 03:05 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.015	Not Detected	0.039	Not Detected
Carbon Tetrachloride	0.031	0.067	0.19	0.42
Trichloroethene	0.031	0.035	0.16	0.19

Container Type: 6 Liter Summa Canister (SIM Certified Calscience)

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

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Client Sample ID: IA0405

Lab ID#: 1511412B-07A

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

File Name:	**v120113a**	**Date of Collection:**	**11/18/15 7:31:00 PM**
Dil. Factor:	**1.58**	**Date of Analysis:**	**12/1/15 03:40 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.79	Not Detected	3.9	Not Detected
Freon 11	0.16	0.35	0.89	2.0
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.63	Not Detected
Acetone	0.79	3.6	1.9	8.6
Methylene Chloride	0.32	Not Detected	1.1	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.63	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.86	Not Detected
Benzene	0.16	Not Detected	0.50	Not Detected
Toluene	0.16	Not Detected	0.60	Not Detected
Tetrachloroethene	0.16	0.17	1.1	1.1
Chlorobenzene	0.16	Not Detected	0.73	Not Detected
Ethyl Benzene	0.16	Not Detected	0.69	Not Detected
m,p-Xylene	0.16	Not Detected	0.69	Not Detected
o-Xylene	0.16	Not Detected	0.69	Not Detected
1,3-Dichlorobenzene	0.16	Not Detected	0.95	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.95	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.95	Not Detected
1,2,4-Trichlorobenzene	0.79	Not Detected	5.9	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	93	70-130
4-Bromofluorobenzene	83	70-130

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Client Sample ID: IA0405

Lab ID#: 1511412B-07B

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

File Name:	**v120113sima**	**Date of Collection:**	**11/18/15 7:31:00 PM**
Dil. Factor:	**1.58**	**Date of Analysis:**	**12/1/15 03:40 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
Carbon Tetrachloride	0.032	0.059	0.20	0.37
Trichloroethene	0.032	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: IA0417

Lab ID#: 1511412B-08A

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

File Name:	**v120114a**	**Date of Collection:**	**11/18/15 6:11:00 PM**
Dil. Factor:	**1.68**	**Date of Analysis:**	**12/1/15 04:15 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.84	Not Detected	4.2	Not Detected
Freon 11	0.17	0.49	0.94	2.7
Freon 113	0.17	Not Detected	1.3	Not Detected
1,1-Dichloroethene	0.17	Not Detected	0.67	Not Detected
Acetone	0.84	2.6	2.0	6.2
Methylene Chloride	0.34	Not Detected	1.2	Not Detected
cis-1,2-Dichloroethene	0.17	Not Detected	0.67	Not Detected
1,1,1-Trichloroethane	0.17	Not Detected	0.92	Not Detected
Benzene	0.17	Not Detected	0.54	Not Detected
Toluene	0.17	Not Detected	0.63	Not Detected
Tetrachloroethene	0.17	0.48	1.1	3.3
Chlorobenzene	0.17	Not Detected	0.77	Not Detected
Ethyl Benzene	0.17	Not Detected	0.73	Not Detected
m,p-Xylene	0.17	Not Detected	0.73	Not Detected
o-Xylene	0.17	Not Detected	0.73	Not Detected
1,3-Dichlorobenzene	0.17	Not Detected	1.0	Not Detected
1,4-Dichlorobenzene	0.17	Not Detected	1.0	Not Detected
1,2-Dichlorobenzene	0.17	Not Detected	1.0	Not Detected
1,2,4-Trichlorobenzene	0.84	Not Detected	6.2	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	91	70-130

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Client Sample ID: IA0417

Lab ID#: 1511412B-08B

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

File Name:	**v120114sima**	**Date of Collection: 11/18/15 6:11:00 PM**	
Dil. Factor:	**1.68**	**Date of Analysis: 12/1/15 04:15 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.017	Not Detected	0.043	Not Detected
Carbon Tetrachloride	0.034	0.063	0.21	0.40
Trichloroethene	0.034	Not Detected	0.18	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: IA0436

Lab ID#: 1511412B-09A

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

File Name:	**v120115a**	**Date of Collection:**	**11/18/15 4:58:00 PM**
Dil. Factor:	**1.61**	**Date of Analysis:**	**12/1/15 05:28 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.80	Not Detected	4.0	Not Detected
Freon 11	0.16	0.40	0.90	2.2
Freon 113	0.16	0.23	1.2	1.8
1,1-Dichloroethene	0.16	Not Detected	0.64	Not Detected
Acetone	0.80	3.3	1.9	7.8
Methylene Chloride	0.32	Not Detected	1.1	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.64	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.88	Not Detected
Benzene	0.16	0.19	0.51	0.60
Toluene	0.16	0.19	0.61	0.71
Tetrachloroethene	0.16	2.3	1.1	15
Chlorobenzene	0.16	Not Detected	0.74	Not Detected
Ethyl Benzene	0.16	Not Detected	0.70	Not Detected
m,p-Xylene	0.16	Not Detected	0.70	Not Detected
o-Xylene	0.16	Not Detected	0.70	Not Detected
1,3-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected
1,2,4-Trichlorobenzene	0.80	Not Detected	6.0	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	83	70-130

eurofins | Air Toxics

Client Sample ID: IA0436

Lab ID#: 1511412B-09B

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

File Name:	**v120115sima**	**Date of Collection: 11/18/15 4:58:00 PM**	
Dil. Factor:	**1.61**	**Date of Analysis: 12/1/15 05:28 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.041	Not Detected
Carbon Tetrachloride	0.032	0.064	0.20	0.40
Trichloroethene	0.032	0.039	0.17	0.21

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	91	70-130

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1511412B-13A

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

File Name:	**v120106**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/1/15 11:29 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 11	0.10	Not Detected	0.56	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
1,1-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
Methylene Chloride	0.20	Not Detected	0.69	Not Detected
cis-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
1,1,1-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Benzene	0.10	Not Detected	0.32	Not Detected
Toluene	0.10	Not Detected	0.38	Not Detected
Tetrachloroethene	0.10	Not Detected	0.68	Not Detected
Chlorobenzene	0.10	Not Detected	0.46	Not Detected
Ethyl Benzene	0.10	Not Detected	0.43	Not Detected
m,p-Xylene	0.10	Not Detected	0.43	Not Detected
o-Xylene	0.10	Not Detected	0.43	Not Detected
1,3-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,4-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2,4-Trichlorobenzene	0.50	Not Detected	3.7	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	90	70-130

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1511412B-13B

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

File Name:	**v120106sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/1/15 11:29 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
Carbon Tetrachloride	0.020	Not Detected	0.12	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	94	70-130

eurofins | Air Toxics

Client Sample ID: CCV

Lab ID#: 1511412B-14A

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

File Name:	**v120102**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/1/15 08:58 AM**	

Compound	%Recovery
Freon 12	107
Freon 11	96
Freon 113	90
1,1-Dichloroethene	99
Acetone	105
Methylene Chloride	99
cis-1,2-Dichloroethene	96
1,1,1-Trichloroethane	90
Benzene	98
Toluene	90
Tetrachloroethene	88
Chlorobenzene	90
Ethyl Benzene	88
m,p-Xylene	89
o-Xylene	83
1,3-Dichlorobenzene	77
1,4-Dichlorobenzene	78
1,2-Dichlorobenzene	77
1,2,4-Trichlorobenzene	70

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	89	70-130

eurofins | Air Toxics

Client Sample ID: CCV

Lab ID#: 1511412B-14B

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

File Name:	**v120102sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/1/15 08:58 AM**	

Compound	%Recovery
Vinyl Chloride	99
Carbon Tetrachloride	94
Trichloroethene	87

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	93	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1511412B-15A

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

File Name:	**v120103**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/1/15 09:38 AM**	

Compound	%Recovery	Method Limits
Freon 12	106	70-130
Freon 11	100	70-130
Freon 113	90	70-130
1,1-Dichloroethene	95	70-130
Acetone	98	70-130
Methylene Chloride	94	70-130
cis-1,2-Dichloroethene	101	70-130
1,1,1-Trichloroethane	90	70-130
Benzene	100	70-130
Toluene	88	70-130
Tetrachloroethene	90	70-130
Chlorobenzene	91	70-130
Ethyl Benzene	87	70-130
m,p-Xylene	86	70-130
o-Xylene	94	70-130
1,3-Dichlorobenzene	80	70-130
1,4-Dichlorobenzene	78	70-130
1,2-Dichlorobenzene	80	70-130
1,2,4-Trichlorobenzene	87	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	90	70-130

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 1511412B-15AA

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

File Name:	**v120104**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/1/15 10:18 AM**	

Compound	%Recovery	Method Limits
Freon 12	102	70-130
Freon 11	91	70-130
Freon 113	87	70-130
1,1-Dichloroethene	96	70-130
Acetone	91	70-130
Methylene Chloride	92	70-130
cis-1,2-Dichloroethene	98	70-130
1,1,1-Trichloroethane	90	70-130
Benzene	98	70-130
Toluene	93	70-130
Tetrachloroethene	88	70-130
Chlorobenzene	92	70-130
Ethyl Benzene	87	70-130
m,p-Xylene	89	70-130
o-Xylene	91	70-130
1,3-Dichlorobenzene	88	70-130
1,4-Dichlorobenzene	83	70-130
1,2-Dichlorobenzene	85	70-130
1,2,4-Trichlorobenzene	84	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	91	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1511412B-15B

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

File Name:	**v120103sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/1/15 09:38 AM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	99	70-130
Carbon Tetrachloride	64	60-140
Trichloroethene	86	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	96	70-130

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 1511412B-15BB

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

File Name:	**v120104sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/1/15 10:18 AM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	101	70-130
Carbon Tetrachloride	66	60-140
Trichloroethene	85	70-130

Container Type: NA - Not Applicable

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

APPENDIX E

DATA VALIDATION REPORT (330C)

Data Usability Review
Method TO-15 Hi/Lo Analysis

Client:	Sanborn, Head & Associates, Inc., Concord, New Hampshire (SHA)
Site:	IBM East Fishkills Facility, Hopewell Junction, New York Building 330C
Laboratory:	Eurofins Air Toxics, Inc. (EATL), Folsom, California
SDG:	1511412B & 1511413
Date(s) of Collection:	November 18, 2015 – November 19, 2015
Number and type Samples & analyses:	15 Indoor Air, 1 Ambient Air, and 1 Field Equipment Blank samples for twenty-two 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:	December 31, 2015

This Data Usability Report was performed on the Work Order identified with the following intentions: 1) to determine if the data were generated and reported in accordance with the *Work Plan, RCRA Facility Investigation (RFI), VOC Source Assessment IBM East Fishkill Facility, Hopewell Junction, New York*, prepared by Sanborn, Head & Associates, June 2009; NYSDEC Analytical Services Protocol, June 2005 with NYSDEC Modifications to the EPA Region 9 TO-15 QA/QC Criteria, February 2008; USEPA Region 9, *Volatile Organic Compounds (VOCs) in Air (Ambient Air/Soil Vapor/Stack Gas) Samples Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/ Mass Spectrometry (GC/MS), EPA Method TO-15* (January 1999), 01/21/2000 revision; USEPA Region II SOP HW-31, *Validating Air Samples, Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15*, Rev. 4, August 2009; and 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; 2) to determine if the data met project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with appropriate data quality qualifiers.

I. 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 and 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
AA-1	1511412B-01	11/18/15	Ambient Air	VOCs	Field Sample
Blank	1511412B-02	11/18/15	Nitrogen	VOCs	Equipment Blank
IA0400	1511412B-03	11/18/15	Indoor Air	VOCs	Field Sample
IA0401	1511412B-04	11/18/15	Indoor Air	VOCs	Field Sample
IA0402	1511412B-05	11/18/15	Indoor Air	VOCs	Field Sample
IA0404	1511412B-06	11/18/15	Indoor Air	VOCs	Field Sample
IA0405	1511412B-07	11/18/15	Indoor Air	VOCs	Field Sample
IA0417	1511412B-08	11/18/15	Indoor Air	VOCs	Field Sample
IA0436	1511412B-09	11/18/15	Indoor Air	VOCs	Field Sample
IA0458	1511413-01	11/18/15	Indoor Air	VOCs	Field Sample
IA0467	1511413-02	11/18/15	Indoor Air	VOCs	Field Sample
IA0468	1511413-03	11/18/15	Indoor Air	VOCs	Field Sample
IA0469	1511413-04	11/18/15	Indoor Air	VOCs	Field Sample
IA0470	1511413-05	11/18/15	Indoor Air	VOCs	Field Sample
IA0472	1511413-06	11/18/15	Indoor Air	VOCs	Field Sample
IA0455	1511413-07	11/19/15	Indoor Air	VOCs	Field Sample
IA0455 Dup	1511413-08	11/19/15	Indoor Air	VOCs	Field Duplicate of IA0455

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

II. 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) recoveries
- Internal Standard (IS) 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, EB, 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.

The laboratory reported results for 22 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 (page 4) 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.

There were two issues with sample receiving and Chain-of-Custody (COC) documentation as follows:

- The sample tags on the canisters and the COC information for AA-1 and Blank did not match; however, the COC IDs were used for reporting of results for these two samples.
- The original Work Order (W.O.) #1511412 was split into A and B fractions. Samples IA0408, IA0400 (collected 11/17/15), and IA BA-39 were reported in W.O. #1511412AR1 while AA-1, Blank, IA0400, IA0401, IA0402, IA0404, IA0405, IA0417, and IA0436 are reported in this W.O. #1511412B. One sample ID was changed after sample receipt from IA4008 to IA0408 - a revised COC with this change was sent from SHA to ATL on 12/9/15 (this was reported in W.O. #1511412AR1, which is not included in this Data Usability Review).

Accuracy was compromised for the analysis of target compound 1,2,4-trichlorobenzene since the initial and/or continuing calibrations did not meet method acceptance criteria. All results for this

compound were estimated (UJ) with indeterminate bias due to calibration issues, as shown in Table 2.

Acetone in sample IA0401 was reported at a level above the reporting limit and flagged "E" by the laboratory. The sample was not analyzed at a higher dilution and no reason was given in the narrative for not reporting a more accurate value for acetone in this sample. Acetone in IA0401 was estimated (J) with indeterminate bias due to uncertainty in quantitation above the instrument calibration range, as shown in Table 2.

The Equipment Blank, "Blank" reported in W.O. # 1511412B, is associated with all samples collected at the Building 330C location. This Blank reported a detected value for acetone. A comparison between the "Blank" result and the samples led to estimation (EB) of 10 results with possible high bias, unless other issues affect the data, as shown in Table 2.

Precision was acceptable for all VOCs in the Field Duplicate pair of IA0455 and IA0455 Dup except for acetone. The results for acetone in samples IA0455 and IA0455 Dup were estimated (J) with indeterminate bias. This is an indication of acceptable precision and representativeness of the samples for this site location for the project-specific VOCs except acetone.

All reporting limits were at a level below the Project required RL (as shown in Table B.1 of the QAPP) except for Freon 12, which had RLs exceeding the expected RL due to an instrument calibration issue. The data users will need to evaluate the non-detects for Freon 12 at the elevated levels (~5 times higher than expected) for project use.

All other quality control information associated with accuracy, precision, and sensitivity for the VOCs reported met method 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
AA-1 Blank IA0400 IA0401 IA0402 IA0404 IA0405 IA0417 IA0436	1,2,4-Trichlorobenzene	UJ	I	Initial Calibration outside criteria
IA0458 IA0467 IA0468 IA0469 IA0470 IA0472 IA0455 IA0455 Dup	1,2,4-Trichlorobenzene	UJ	I	Initial Calibration outside criteria + Low Calibration verification
IA0401	Acetone	J	I	Result uncertain above the calibration range
AA-1 IA0400 IA0402 IA0404 IA0405 IA0417 IA0436 IA0467 IA0469	Acetone	EB	H	Equipment Blank Action
IA0455	Acetone	JEB	I	Equipment Blank Action + FD imprecision
IA0455 Dup	Acetone	J	I	FD imprecision

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; 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

The attached Data Review Checklists document the method and matrix-specific QC reviewed and the issues that required action (as listed in Table 2) or affected the data certainty in terms of data quality objectives (DQO) of accuracy, precision, and sensitivity.

Date Sampled: 11/18/15 No. Samples 7 IA + AA + 1 EB

Method of Analysis: TO-15 Hi/Lo

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			Estimate (UJ) 9 results					Estimate (J) 1 "E" value

Other Issues : ***Blank Actions:*** 7 results estimated (EB) since "Blank" contained a result comparable to results in samples.

A combined Full Scan and SIM Analysis was performed for each sample for 22 Project-specific VOCs listed in Table B.1 of the Work Plan, as shown on page 4 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.

The samples were received intact and in good condition on 11/23/15. The sample IDs on the canister tags didn't match the COC IDs for AA-1 and Blank - the COC IDs were used for reporting of results for these samples. The original Work Order #1511412 was split into A and B fractions. Samples IA0408, IA0400 (collected 11/17/15), and IA BA-39 were reported in W.O. #1511412AR1 while AA-1, Blank, IA0400, IA0401, IA0402, IA0404, IA0405, IA0417, and IA0436 are reported in this W.O. #1511412B. One sample ID was changed after sample receipt from IA4008 to IA0408 - a revised COC with this change was sent from SHA to ATL on 12/9/15 (this was reported in W.O. #1511412AR1).

Canisters reported for samples evaluated in this Work Order were Certified pre-cleaned - certificates of analysis were reported in W.O. #15114512AR1. These indicate that all Target compounds were non-detect in the canisters prior to being sent to the field.

The canister vacuums (field initial, field final and lab receipt) were all acceptable; therefore, no action required.

Samples were analyzed on 12/1/15; therefore HT was met. No Action required.

Date: ***12/29/15***

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

Associated Blanks: Method Blank: v120106 & v120106sim
Field Blanks: Blank

Blank ID	Contaminant / Level (µg/m^3)	Action Level DF= 1.88	Sample and reported result (µg/m3)		Corrected Database Result
v120106	None		No Blank Action Required		
v120106sim	None		No Blank Action Required		
Blank	Acetone 2.6	10.4	AA-1	4.4	4.4 EB
		11.0	IA0400	8.5	8.5 EB
		10.9	IA0401	170 E	No Action
		11.1	IA0402	11	11 EB
		10.6	IA0404	7.9	7.9 EB
		10.9	IA0405	8.6	8.6 EB
		11.6	IA0417	6.2	6.2 EB
		11.1	IA0436	7.8	7.8 EB

Additional Notes:

ICALs : Instrument V Full Scan and SIM performed on 10/8/15. Full Scan = 6- to 9-level calibration from 0.05, 0.1, 0.2, or 0.5 to 40 ppbV for all 22 Target compounds plus several non-target compounds. SIM = 9- to 11-level calibration from 0.003, 0.005, or 0.01 to 20 ppbV for 3 Target plus several other non-target compounds. %RSD ≤ 30% for all 22 Target Compounds except 1,2,4-Trichlorobenzene by Full Scan had %RSD = 30.019%. RLs reported were supported by the ICALs.
****ACTION: 1,2,4-Trichlorobenzene results estimated (UJ) with indeterminate bias in all samples due to the Initial Calibration being outside criteria for this compound.***

CCALs: v120102 / v120102sim - % Recovery 70-130% for all 22 Target compounds - No Action required.

BFB Tunes: Instrument V 3 Tunes (2 for ICAL + 1 for CCAL) - all criteria in all tunes were met and all samples were analyzed within 12 hours of tune; therefore, No Action Required.

Surrogates & Internal Standards **:** All 3 Surrogates had %Recovery within criteria and all IS' had areas and RTs within criteria in all analyses; therefore, No Action Required.

LCS/LCSD : v120103/v120104 & v120103sim/v120104sim - %Recovery acceptable for all 22 Targets in LCS and LCSD and LCS/LCSD RPDs all OK; therefore, acceptable accuracy and precision demonstrated for analysis of the 22 VOCs by Full Scan + SIM analysis.

Date: ***12/29/15***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Additional Notes:

LD analysis not performed for the samples in this Work Order. LCS/LCSD reported instead, which reported acceptable precision except as listed above.

FD: There were no FDs reported in this Work Order. See W.O. #1511413 where a FD pair is reported associated with this sampling event.

There were no "J" results reported; however, acetone in sample IA0401 was reported at a level exceeding the instrument calibration range and was flagged with an "E" by the lab. The sample was not analyzed at a higher dilution and no reason was given in the narrative for not reporting a more accurate value for acetone in this sample. This "E" qualified result was accepted as an estimated (J) value with indeterminate bias due to uncertainty in quantitation at a level above the calibration range. There were no other qualifiers (except "U") reported on the data.

All reporting limits were at a level below the Project required RL (as shown in Table B.1, which is reproduced on page 4 of this Checklist) except for Freon 12, which had RLs exceeding the expected RL since the lowest calibration standard was 0.5 ppbV rather than 0.1 ppbV (0.1 ppbV standard was not reported in the data and narrative indicated there was a calibration linearity problem). The data users will need to evaluate the non-detects for Freon 12 at the elevated level (~5 times higher than expected) for project use.

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

Method of Analysis: TO-15 Hi/Lo

Compound List and Project-required Reporting Limits (RL)

Target Analyte Name	Full Scan (Full) or SIM	RL (µg/m^3)
Tetrachloroethene (PCE)	Full	1.4
Trichloroethene (TCE)	SIM	0.22
cis-1,2-Dichloroethene (cDCE)	Full	0.8
1,1-Dichloroethene (DCE)	Full	0.8
Vinyl chloride (VC)	SIM	0.06
1,1,1-Trichloroethane (TCA)	Full	1.1
Carbon Tetrachloride	SIM	0.2
Methylene chloride (MeCL)	Full	1.4
Chlorobenzene	Full	0.92
1,2,4-Trichlorobenzene	Full	7.4
1,2-Dichlorobenzene	Full	1.2
1,3-Dichlorobenzene	Full	1.2
1,4-Dichlorobenzene	Full	1.2
Acetone	Full	2.4
Benzene	Full	0.64
Ethylbenzene	Full	0.86
m-Xylene	Full	0.86
p-Xylene		
o-Xylene	Full	0.86
Toluene	Full	0.77
Trichlorofluoromethane (Freon 11)	Full	1.1
Dichlorodifluoromethane (Freon 12)	Full	1
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	Full	1.5

Date: ***12/29/15***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Actions (see References below):

Canister Integrity:	If certification forms indicate issues, J/U or UJ results in samples
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:	Action Level = 5 x Level in Blank; Sample-specific Blank Action Level = Action Level x (Sample DF/Blank DF) Method Blank (MB): Result < RL, U result at RL; RL<Result<Blank Action, U result at level reported Equipment Blank (EB): Result<Blank Action, EB result at level reported
BFB Tune:	SW-846 method 8260B 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)

References: *Work Plan, RCRA Facility Investigation (RFI), VOC Source Assessment IBM East Fishkill Facility, Hopewell Junction, New York* , prepared by Sanborn, Head & Associates, June 2009; 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. 4, October 2006; and 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

Lab:Eurofins/Air Toxics, Inc. (EATL) | IBM - East Fishkill Facility, Hopewell Junction, New York | Work Order # 1511413

Air Data Review Checklist - Method TO-15

Date Sampled: 11/18/15-11/19/15 | No. Samples 7 IA + FD

Method of Analysis: TO-15 Hi/Lo

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 (UJ) 8 results				Estimate (J) 2 results [1 in each of the FD samples]	

Other Issues :

Blank Actions: 3 results estimated (EB) since "Blank" contained a result comparable to results in samples.

A combined Full Scan and SIM Analysis was performed for each sample for 22 Project-specific VOCs listed in Table B.1 of the Work Plan, as shown on page 4 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.

The samples were received intact and in good condition on 11/23/15. There were no COC issues noted.

Canisters reported for samples evaluated in this Work Order were Certified pre-cleaned - certificates of analysis were reported in the eCVP. These indicate that all Target compounds were non-detect in the canisters prior to being sent to the field.

The canister vacuums (field initial, field final and lab receipt) were all acceptable; therefore, no action required.

Samples were analyzed on 12/2/15; therefore HT was met. No Action required.

Date: ***12/29/15***

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

Associated Blanks: Method Blank: v120206 & v120206sim
Field Blanks: Blank (reported in W.O.#1511412B)

Blank ID	Contaminant / Level (µg/m^3)	Action Level DF= 1.88	Sample and reported result (µg/m3)		Corrected Database Result
v120206	None		No Blank Action Required		
v120206sim	None		No Blank Action Required		
Blank	Acetone 2.6	10.9	IA0458	37	No Action
		10.9	IA0467	9.2	9.2 EB
		10.8	IA0468	29	No Action
		11.5	IA0469	9.7	9.7 EB
		10.7	IA0470	12	No Action
		10.9	IA0472	14	No Action
		10.9	IA0455	5.3	5.3 EB
		11.1	IA0455 Dup	16	No Action

Additional Notes:

ICALs : Instrument V Full Scan and SIM performed on 10/8/15. Full Scan = 6- to 9-level calibration from 0.05, 0.1, 0.2, or 0.5 to 40 ppbV for all 22 Target compounds plus several non-target compounds. SIM = 9- to 11-level calibration from 0.003, 0.005, or 0.01 to 20 ppbV for 3 Target plus several other non-target compounds. %RSD ≤ 30% for all 22 Target Compounds except 1,2,4-Trichlorobenzene by Full Scan had %RSD = 30.019%. RLs reported were supported by the ICALs.
****ACTION: 1,2,4-Trichlorobenzene results estimated (UJ) with indeterminate bias in all samples due to the Initial Calibration being outside criteria for this compound.***

CCALs: v120202 / v120202sim - % Recovery 70-130% for all 22 Target compounds except 1,2,4-Trichlorobenzene %Rec low (65%).
****ACTION: All 1,2,4-Trichlorobenzene results estimated (UJ) due to low calibration verification - overall bias is indeterminate due to the ICAL exceedance.***

BFB Tunes: Instrument V 3 Tunes (2 for ICAL + 1 for CCAL) - all criteria in all tunes were met and all samples were analyzed within 12 hours of tune; therefore, No Action Required.

Surrogates & Internal Standards **:** All 3 Surrogates had %Recovery within criteria and all IS' had areas and RTs within criteria in all analyses; therefore, No Action Required.

LCS/LCSD : v120203/v120204 & v120203sim/v120204sim - %Recovery acceptable for all 22 Targets in LCS and LCSD and LCS/LCSD RPDs all OK; therefore, acceptable accuracy and precision demonstrated for analysis of the 22 VOCs by Full Scan + SIM analysis.

Date: ***12/29/15***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Additional Notes:

LD analysis not performed for the samples in this Work Order. LCS/LCSD reported instead, which reported acceptable precision except as listed above.

There were no "J" or "E" results reported or any other qualifiers (except "U") reported on the data.

All reporting limits were at a level below the Project required RL (as shown in Table B.1, which is reproduced on page 5 of this Checklist) except for Freon 12, which had RLs exceeding the expected RL since the lowest calibration standard was 0.5 ppbV rather than 0.1 ppbV (0.1 ppbV standard was not reported in the data and narrative indicated there was a calibration linearity problem). The data users will need to evaluate the non-detects for Freon 12 at the elevated level (~5 times higher than expected) for project use.

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

Additional Notes:

Field Duplicate Evaluation_ Sample IDs: Sample = IA0455 FD = IA0455 Dup

Analyte Name	CAS No.	DF = 1.63* RL (µg/m³)	Sample Result µg/m3	Q	FD Level	FD Result µg/m3	Q	Level	RPD	Action
Freon 12	75-71-8	3.9	3.9	U	RL	4	U	RL	NA	None
Freon 11	75-69-4	0.89	4.2		< 5xRL	4		< 5xRL	4.9	None
Freon 113	76-13-1	1.2	1.2	U	RL	1.2	U	RL	NA	None
1,1-Dichloroethene	75-35-4	0.63	0.63	U	RL	0.64	U	RL	NA	None
Acetone	67-64-1	1.9	5.3	EB	< 5xRL	16		> 5xRL	100.5	**J Both**
Methylene Chloride	75-09-2	1.1	1.1	U	RL	1.1	U	RL	NA	None
cis-1,2-Dichloroethene	156-59-2	0.63	0.63	U	RL	0.64	U	RL	NA	None
1,1,1-Trichloroethane	71-55-6	0.86	0.86	U	RL	0.88	U	RL	NA	None
Benzene	71-43-2	0.5	0.5	U	RL	0.51	U	RL	NA	None
Toluene	108-88-3	0.6	0.6	U	RL	0.61	U	RL	NA	None
Tetrachloroethene	127-18-4	1.1	3.6		< 5xRL	3		< 5xRL	18.2	None
Chlorobenzene	108-90-7	0.73	0.73	U	RL	0.74	U	RL	NA	None
Ethyl Benzene	100-41-4	0.69	0.69	U	RL	0.7	U	RL	NA	None
m,p-Xylene	108-38-3/ 106-42-3	0.69	0.69	U	RL	0.7	U	RL	NA	None
o-Xylene	95-47-6	0.69	0.69	U	RL	0.7	U	RL	NA	None
1,3-Dichlorobenzene	541-73-1	0.95	0.95	U	RL	0.97	U	RL	NA	None
1,4-Dichlorobenzene	106-46-7	0.95	0.95	U	RL	0.97	U	RL	NA	None
1,2-Dichlorobenzene	95-50-1	0.95	0.95	U	RL	0.97	U	RL	NA	None
1,2,4-Trichlorobenzene	120-82-1	5.9	5.9	UJ	RL	6	UJ	RL	NA	None
Vinyl Chloride	75-01-4	0.04	0.04	U	RL	0.041	U	RL	NA	None
Carbon Tetrachloride	56-23-5	0.2	0.38		< 5xRL	0.43		< 5xRL	12.3	None
Trichloroethene	79-01-6	0.17	0.17	U	RL	0.17	U	RL	NA	None

*The FD DF was 1.66

** Action only taken for RPD > 20% if one or both results are > 5 x RL

Q = Data Qualifier as reported by EATL and/or NEH; U = non-detect, J = estimated result; UJ = non-detect is estimated

NA = Not Applicable. RPD not calculated since one or both results were non-detect.

FD precision was acceptable for all 22 Target VOCs in the FD pair of IA0455 and IA0455 Dup except for Acetone.

ACTION: Acetone estimated (J) in IA0455 and IA0455 Dup with indeterminate bias due to FD imprecision.

Date: ***12/29/15***

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

Method of Analysis: TO-15 Hi/Lo

Compound List and Project-required Reporting Limits (RL)

Target Analyte Name		Full Scan (Full) or SIM		RL (µg/m^3)
Tetrachloroethene (PCE)		Full		1.4
Trichloroethene (TCE)		SIM		0.22
cis-1,2-Dichloroethene (cDCE)		Full		0.8
1,1-Dichloroethene (DCE)		Full		0.8
Vinyl chloride (VC)		SIM		0.06
1,1,1-Trichloroethane (TCA)		Full		1.1
Carbon Tetrachloride		SIM		0.2
Methylene chloride (MeCL)		Full		1.4
Chlorobenzene		Full		0.92
1,2,4-Trichlorobenzene		Full		7.4
1,2-Dichlorobenzene		Full		1.2
1,3-Dichlorobenzene		Full		1.2
1,4-Dichlorobenzene		Full		1.2
Acetone		Full		2.4
Benzene		Full		0.64
Ethylbenzene		Full		0.86
m-Xylene		Full		0.86
p-Xylene				
o-Xylene		Full		0.86
Toluene		Full		0.77
Trichlorofluoromethane (Freon 11)		Full		1.1
Dichlorodifluoromethane (Freon 12)		Full		1
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)		Full		1.5

Date: ***12/29/15***
Data Reviewer: ***Nancy C. Rothman, Ph.D.***

Actions (see References below):

Canister Integrity:	If certification forms indicate issues, J/U or UJ results in samples
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:	Action Level = 5 x Level in Blank; Sample-specific Blank Action Level = Action Level x (Sample DF/Blank DF) Method Blank (MB): Result < RL, U result at RL; RL<Result<Blank Action, U result at level reported Equipment Blank (EB): Result<Blank Action, EB result at level reported
BFB Tune:	SW-846 method 8260B 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)

References: *Work Plan, RCRA Facility Investigation (RFI), VOC Source Assessment IBM East Fishkill Facility, Hopewell Junction, New York* , prepared by Sanborn, Head & Associates, June 2009; 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. 4, October 2006; and 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