Mid Atlantic
Engineering & Environmental Solutions

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VAPOR INTRUSION ASSESSMENT REPORT
CITY OF WINSTON-SALEM
28TH STREET PROJECT – 3RD PHASE
WINTER 2016 INDOOR AIR AND SOIL GAS SAMPLING
WINSTON-SALEM, NORTH CAROLINA

Mid-Atlantic Associates Job No. 000R2693.00

June 24, 2016

Prepared For:

Andy Allen
Special Projects Coordinator
Stormwater/Erosion Control Division
City of Winston-Salem
101 North Main Street
Winston-Salem, North Carolina 27101

Prepared By:

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1.0 INTRODUCTION

Volatile organic compound (VOC) contamination has been characterized in groundwater, surface water, and soil vapor between 25th and 28th Streets south of the Hanes/Lowrance School Middle School campus in Winston-Salem, NC. The data are detailed in two reports by Griffith Enterprises, Inc. titled "Results of Environmental Media Sampling" dated May 21, 2015, and "Results of Additional Environmental Assessment" dated September 3, 2015; in a report by Piedmont Geologic, Inc., titled "Vapor Intrusion Assessment Report: Stokes Avenue and E. 28th Street" dated September 1, 2015; and in three reports by Mid-Atlantic Associates, Inc. (Mid-Atlantic), titled "Vapor Intrusion Assessment Report" dated October 23, 2015, "Vapor Intrusion Assessment Report, City of Winston-Salem 28th Street Project, Stokes Avenue Second Round Sampling" dated December 31, 2015, and "Vapor Intrusion Assessment Report, City of Winston-Salem 28th Street Project – 2nd Phase, Winter 2016 Indoor Air and Soil Gas Sampling" dated April 4, 2016.

Through public meetings and other community outreach methods, the City of Winston-Salem (the City) has identified five residential buildings that have not been sampled in the 28th Street area where residents and/or property owners have requested sampling for vapor intrusion assessment (Appendix A). Mid-Atlantic developed a work plan for indoor air and sub-slab soil gas sampling that was submitted to Division of Waste Management (DWM) and the City on May 6, 2016. The work plan was approved by DWM on May 9, 2016.

2.0 SUMMARY OF ACTIVITIES

2.1 Community Contact

Staff from the City received requests from property owners and residents to have their homes sampled for vapor intrusion assessment. In response, the City sent letters to these residents and property owners of the five homes (Appendix A) which provided general information about the project, reference information regarding vapor intrusion and a request to execute a right-of-entry agreement to provide permission to sample in the home. City staff also made repeated trips on-site to request execution of right-of-entry agreements from adult residents of each home. Indoor air sampling was conducted only in homes where permission to enter was provided by an adult resident of each home. Sub-slab sampling, which requires drilling through the building slab (i.e., disturbance of building materials), was conducted in homes only where permission was obtained from the property owner.

In total, City staff obtained permission to enter five homes (Drawing 1.1) to collect indoor air samples. All five of those homes had basements; however, indoor air samples were only collected from four of the basements due to an unexpected request for participation in the program (2714 Patrick Avenue) during field work and not enough additional samplers were available. Permission was granted by three property owners to collect sub-slab soil gas samples.

A list of all homes identified by volunteer participation, physical characteristics of homes obtained from tax records, and results of efforts to obtain permission to sample from residents and property owners are documented by the City staff in Appendix A.

2.2 Building Preparation for Sampling

Mid-Atlantic attempted to identify and remove possible sources of chlorinated VOC (CVOC) contaminants (e.g., chemical or equipment storage) from the spaces where air samples were collected. No CVOC sources were identified other than apparent potable water or wastewater plumbing leaks in several basements (municipal water supplies often contain low concentrations of CVOCs).

2.3 Sampling Activities

On May 16, 2016, Mid-Atlantic mobilized to the subject site with City staff to place passive volatile organic compound samplers (Radiello samplers) in four homes and place one ambient air sample. The City placed an additional radiello sampler in one home on May 18, 2016. Sample locations are shown in Drawing 1.1.

Radiello samplers were placed in the living area of all five homes (Photo 1). All five homes had basements; however, only four basements were sampled because not enough additional radiello samplers were available for the basement at 2714 Patrick Avenue, who requested to participate in the program while conducting the field work. Samplers were placed at the approximate adult standing breathing zone and were left in place for a sample period up to 10 days. One outdoor (ambient) sampler (Photo 2) was placed using the same methods for collection of basement air samples in order to identify and characterize potential outdoor air source contamination.

At the end of the sampling period, on May 25, 2016, Mid-Atlantic and City staff remobilized to the subject site to collect the samplers at each home as well as the ambient air sampler. These samplers were then submitted to Enthalpy Analytical, Inc. in Durham, North Carolina under proper chain of custody for analysis. The samplers were analyzed using standard laboratory turnaround time for the site contaminants of concern: tetrachloroethylene (PCE) and trichloroethylene (TCE).

Immediately following collection of the Radiello samplers on May 25, 2016, a sub-slab soil gas sample was collected at two homes where permission had been given by the property owner. A total of three sub-slab soil gas samples (including one duplicate sample) were collected during this sampling event from two homes (Photo 3). At one of the three homes where permission to collect a sub-slab sample was obtained, thin slab construction would not allow installation of a sampling point with an adequate indoor to sub-slab seal. A sub-slab sample was not collected at that home. Each sub-slab sample was collected close to the center of the building foundation and at least 10 feet from exterior walls. To create a sub-slab sampling port, a rotary-impact drill equipped with a decontaminated spline drill bit was utilized to drill a 5/8-inch diameter hole through the concrete slab. A vapor sampling probe was established using a new "Vapor Pin™", a brass barb fitting with a silicone sleeve that creates a seal with the concrete when inserted snugly into the hole via an installation/extraction tool. The Vapor Pin was then fitted with small diameter (1/8- or 1/4-inch outer diameter - OD) rigid-wall Teflon tubing to complete the vapor sampling probe

assembly. Sub-slab samples were collected using 1-liter "SUMMA" canisters at a maximum flow rate of 200 ml/min.

A leak check was performed at each probe location using a plastic shroud, helium gas and a portable helium gas detector. A plastic shroud was placed over the sub-slab vapor probe location with the tubing of the probe exiting the shroud through a small hole. A 3-way valve placed on the probe termination was connected to the sampling apparatus that was used. Helium was released into the shroud via tubing from the cylinder into the shroud. A Tedlar bag grab sample was collected from the probe by connecting to the exhaust port of the purge syringe to fill. Helium monitoring indicated that there were no leaks in the sampling train.

After collection, the sub-slab soil gas SUMMA canister samples were shipped to Con-Test Analytical Laboratory in East Longmeadow, Massachusetts under proper chain of custody for analysis. The canisters were analyzed using standard laboratory turnaround times in accordance with EPA Method TO-15 for the site contaminants of concern: PCE and TCE.

3.0 SUMMARY OF LABORATORY TEST RESULTS

The laboratory analytical report and chain-of-custody records for the samples collected at the site are provided in Appendix B. Analytical results for basement and living area indoor air samples are summarized in Table 3.1 and analytical results for sub-slab soil gas samples are summarized in Table 3.2. Risk calculations were not performed because constituent concentrations did not exceed their respective residential screening levels. Sample locations are shown on Drawing 1.1.

There were no exceedances of DWM screening levels for residential indoor air for the five total indoor air samples collected from the living areas and the four indoor air samples collected from the basement areas in all five homes sampled. Additionally, there were no exceedances of DWM screening levels for residential indoor air in the ambient air sample.

In total, three sub-slab soil gas samples (including one duplicate sample) were collected from two homes. TCE and PCE were not detected at concentrations exceeding the DWM residential soil gas screening levels in these samples.

4.0 CONCLUSIONS

Three were no detections of PCE or TCE in indoor air samples collected in living areas or basement areas of the homes sampled that exceeded DWM screening levels for residential indoor air. Additionally, there were no detections of PCE or TCE in sub-slab soil gas samples collected during the sampling event that exceeded DWM screening levels for residential soil gas.

5.0 RECOMMENDATIONS

The following recommendations are offered for homes sampled during this sampling event in the 28th Street study area and are based on indoor air and sub-slab soil gas sampling results obtained during the event:

- For the homes in this sampling event, indoor air results were below residential indoor air screening levels and sub-slab results were less than ten times the residential soil gas screening levels or sub-slab soil gas data was not collected. No additional monitoring appears warranted for these homes unless sub-surface conditions change (i.e., groundwater or soil gas plume migration); and

- This report should be provided to DWM.

DRAWING

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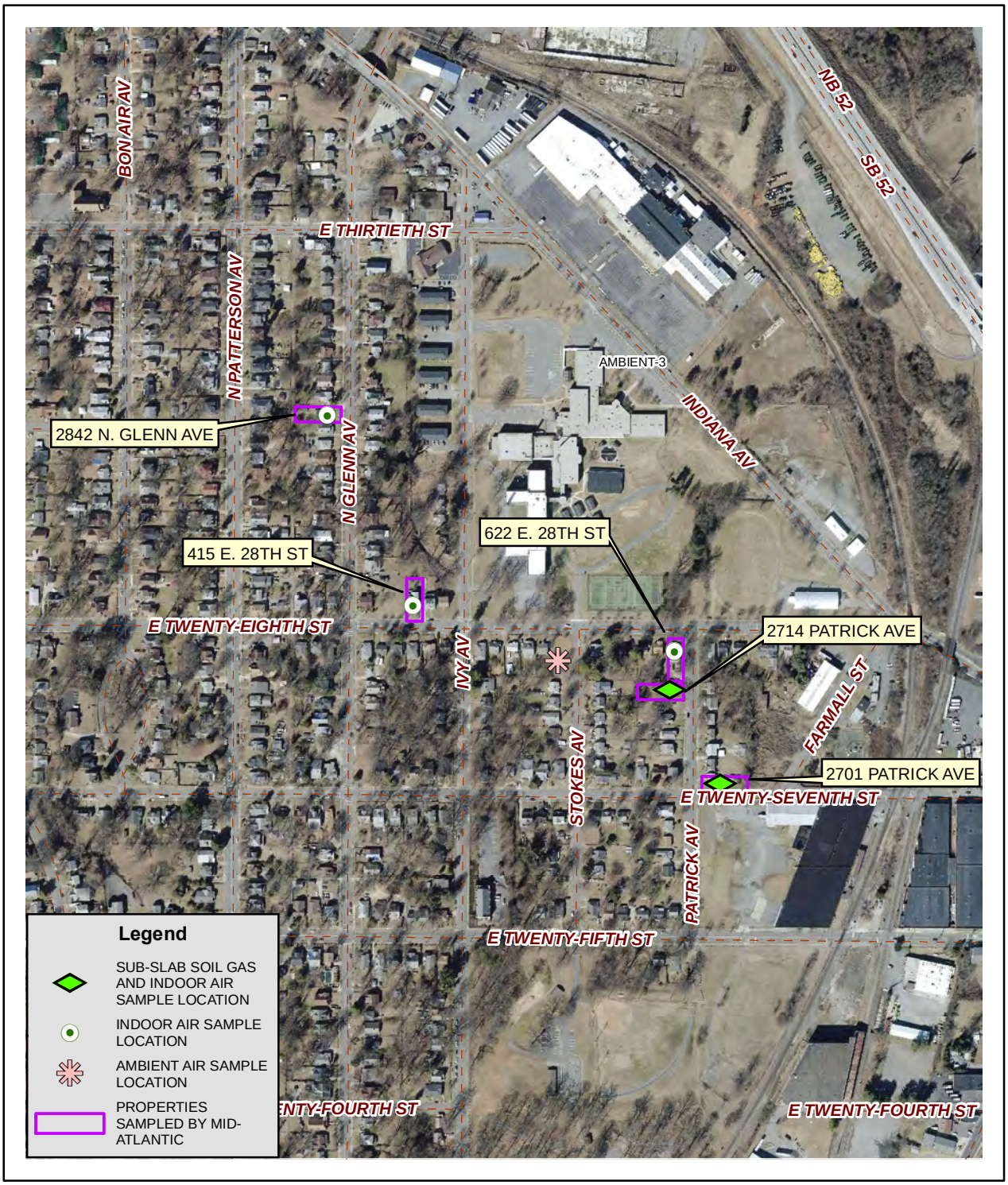

REFERENCES: 1. 2014 AERIAL PHOTOGRAPH FROM NC ONE MAP.
2. PROPERTY BOUNDARY INFORMATION FROM FORSYTH CO. GIS
3. STREET DATA FROM FORSYTH CO. GIS

SCALE: 1:6,000

0 500 1,000 Feet

Mid Atlantic Engineering & Environmental Solutions

SITE MAP WITH SAMPLED PROPERTIES

28TH STREET ASSESSMENT
3RD PHASE
WINSTON-SALEM, NC

DRAWN BY:	DATE: JUNE 2016
DRAFT CHECK: WS	JOB NO: 000R2693.00
ENG. CHECK: DHN	GIS NO: 03G-R2693.00-12
APPROVAL: DHN	DWG NO: 1.1

TABLES

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TABLE 3.1 (PAGE 1 OF 3)
SUMMARY OF CHEMICAL CONSTITUENTS DETECTED IN INDOOR AND AMBIENT AIR
CITY OF WINSTON-SALEM 28TH STREET PROJECT
WINSTON-SALEM, NORTH CAROLINA
MID-ATLANTIC PROJECT NO. 000R2693.00

Analyte	NCDENR DWM Residential Indoor Air Screening Levels Sept. 2015 (ug/m3)	SAMPLING LOCATION (SAMPLING DURATION)			
		2701 PATRICK AVENUE		2842 N. GLENN AVENUE	
		LIVING AREA (5/16/16 - 5/25/16)	BASEMENT (5/16/16 - 5/25/16)	LIVING AREA (5/16/16 - 5/25/16)	BASEMENT (5/16/16 - 5/25/16)
	Residential Indoor Air (A), ug/m3	Analyte Concentration (ug/m3)			
Tetrachloroethylene, PCE	8.34	0.392	0.571 m	0.130 m	0.113 m
Trichloroethylene; Trichloroethene; TCE	0.417	0.0704 m J	0.0220 m J	ND	ND

NOTES:
ND = Not detected above the lab reporting limits shown in parenthesis.
J = Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration and was not used in risk calculations
m = Manual integration
Risk Calculations were only performed for samples that contained one or more analyte concentration in exceedence of the DWM Residential Screening Levels

TABLE 3.1 (PAGE 2 OF 3)
SUMMARY OF CHEMICAL CONSTITUENTS DETECTED IN INDOOR AND AMBIENT AIR
CITY OF WINSTON-SALEM 28TH STREET PROJECT
WINSTON-SALEM, NORTH CAROLINA
MID-ATLANTIC PROJECT NO. 000R2693.00

Analyte	NCDENR DWM Residential Indoor Air Screening Levels Sept. 2015 (ug/m3)	SAMPLING LOCATION (SAMPLING DURATION)			
		415 E. 28TH STREET		622 E. 28TH STREET	
		LIVING AREA (5/16/16 - 5/25/16)	BASEMENT (5/16/16 - 5/25/16)	LIVING AREA (5/18/16 - 5/25/16)	BASEMENT (5/18/16 - 5/25/16)
	Residential Indoor Air (A), ug/m3	Analyte Concentration (ug/m3)			
Tetrachloroethylene, PCE	8.34	0.117 m	0.114 m	1.85	2.46
Trichloroethylene; Trichloroethene; TCE	0.417	ND	ND	ND	0.0311 m J

NOTES:
ND = Not detected above the lab reporting limits shown in parenthesis.
J = Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration and was not used in risk calculations
m = Manual integration
Risk Calculations were only performed for samples that contained one or more analyte concentration in exceedence of the DWM Residential Screening Levels

TABLE 3.1 (PAGE 3 OF 3)
SUMMARY OF CHEMICAL CONSTITUENTS DETECTED IN INDOOR AND AMBIENT AIR
CITY OF WINSTON-SALEM 28TH STREET PROJECT
WINSTON-SALEM, NORTH CAROLINA
MID-ATLANTIC PROJECT NO. 000R2693.00

Analyte	NCDENR DWM Residential Indoor Air Screening Levels Sept. 2015 (ug/m3)	SAMPLING LOCATION (SAMPLING DURATION)	
		2714 PATRICK AVENUE	AMBIENT - 3
		LIVING AREA (5/16/16 - 5/25/16)	(5/16/16 - 5/25/16)
	Residential Indoor Air (A), ug/m3	Analyte Concentration (ug/m3)	
Tetrachloroethylene, PCE	8.34	0.256 m	0.126 m
Trichloroethylene; Trichloroethene; TCE	0.417	ND	ND

NOTES:
ND = Not detected above the lab reporting limits shown in parenthesis.
J = Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration and was not used in risk calculations
m = Manual integration
Risk Calculations were only performed for samples that contained one or more analyte concentration in exceedence of the DWM Residential Screening Levels

TABLE 3.2
SUMMARY OF CHEMICAL CONSTITUENTS DETECTED IN SUB-SLAB SOIL GAS
CITY OF WINSTON-SALEM 28TH STREET PROJECT
WINSTON-SALEM, NORTH CAROLINA
MID-ATLANTIC PROJECT NO. 000R2693.00

Analyte	NCDENR DWM Residential Soil Gas Screening Levels September 2015 (ug/m3)	SAMPLE LOCATION / COLLECTION DATE		
		VP-2714 PATRICK AVENUE 5/25/2016	DUPLICATE (VP-2714 PATRICK AVENUE) 5/25/2016	2701 PATRICK AVENUE 5/25/2016
		Analyte Concentration (ug/m3)		
Tetrachloroethylene, PCE	278	17	1.5	6.5 J
Trichloroethylene; Trichloroethene; TCE	13.9	ND	ND	ND

NOTES:
ND = Not detected above the lab reporting limits shown in parenthesis.
J = Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration and was not used in risk calculations
Risk Calculations were only performed for samples that contained one or more analyte concentration in exceedence of the DWM Residential Screening Levels

APPENDIX A

City of Winston-Salem Stormwater/Erosion Control Division - 4 Houses Designated for Investigative Sub-slab & Indoor Air Testing (selected Volunteer Participation). Version #9

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City of Winston-Salem Stormwater/Erosion Control Division

Five Houses Designated for Investigative Sub-slab & Indoor Air Testing (selected Volunteer Participation)

Version #9, Updated May 26, 2016

House Number (from IHSB's map)	Physical Address	Owner's Name	Owner's Address	Tenant's Name & Contact Information	Living Area (and ft2)	Basement (and ft2)	Year Built	Estimated Number of Air Samples	Received Certified Mail Receipt?	Status of ROE Agreement?	Scheduled Date & Time for Field Recon and Indoor Air Sampling	Scheduled Date & Time for Sub-slab Air Sampling	Comments
37	2701 Patrick Avenue	Steve Myers Vice-President CW Myers Trading Post, Inc. (336) 725-2393	2718 N. Liberty Street, Winston-Salem, NC 27105	David and Regina Hooper (336) 791-3167	816	816 unfinished basement	1946	3	Yes	Signed Owner & Tenant Agreements		Wednesday, May 25th at 9:00 A.M.	
38	415 E. 28th Street	Delores Harris (336) 682-1030 (336) 759-0086	415 E. 28th Street Winston-Salem, NC 27105	NA	1,589	787 unfinished basement	1925	2	NA	Signed Owner Agreement		Wednesday, May 25th at 11:00 A.M.	Sub-slab air sample not obtained since basement floor was too thin and crumbly to insert brass fitting.
39	622 E. 28th Street	Elizabeth Ogburn Vice-President Sam Ogburn Real Estate Company, Inc. (336)722-1137	P.O. Box 20189 Winston-Salem, NC 27120-0189	Shelia Cochran (336) 997-2617	1,599	1,599 unfinished basement - **duplex**	1945	2	NA	Signed Tenant Agreement			
~~40~~	~~2845 N. Glenn Avenue~~	Darryl Murray (336) 688-8500	2845 N. Glenn Avenue Winston-Salem, NC 27105	NA	1,259	1,379 unfinished basement	1921	0	NA	NA	NA	NA	Delivered ROE Agreement packet into mailbox on 4.8.2016. Redelivered ROE Agreement packet on 4.19.16 and placed in mailbox. Called Mr. Murray back on April 20, 22, and 26 regarding his phone message of ROE execution and indoor air sampling. No reply, as of 5.2.16, thus no further action by City.
41	2842 N. Glenn Avenue	Claudio De Castro Manager Vieira & Castro Enterprises	1381 Still Point Court Winston-Salem, NC 27103	Gloria Mills (336)493-1189	1,092	546 unfinished basement	1935	2	Returned certified mail from property owner	Signed Tenant Agreement			
42	2714 Patrick Avenue	Willie Weaks Hiers Irene Weaks (336)721-1830	2714 Patrick Avenue Winston-Salem, NC 27105	NA	900	450 unfinished basement	1948	2 (1 living space & 1 sub-slab)	NA	Signed Owner Agreement	In-field request from Ms. Weaks	Wednesday, May 25th at 1:30 P.M.	No basement indoor air sample was collected due to an unexpected, in-field request by Ms. Hiers. Not enough Radiello samplers on-hand, thus staff determined to collect the most important location - living space.

Total Executed ROE Participants =	5
Sub-slab air samples =	2
Indoor air samples =	9
	11

Total Air Samples

= Homeowner resides in house

APPENDIX B

Laboratory Analytical Reports and Chain-of-Custody Records

Mid Atlantic
Engineering & Environmental Solutions

Mid-Atlantic Associates, Inc.

409 Rogers View Court
Raleigh, NC 27610

28th St. Project

Winston-Salem, NC
Client Project # R2693.00

Analytical Report
(0516-15)

GC/MS SIM Analysis

Trichloroethylene
Tetrachloroethylene

Enthalpy Analytical, Inc.

Phone: (919) 850 - 4392 / Fax: (919) 850 - 9012 / www.enthalpy.com
800-1 Capitola Drive Durham, NC 27713-4385

I certify that to the best of my knowledge all analytical data presented in this report:

- Have been checked for completeness
- Are accurate, error-free, and legible
- Have been conducted in accordance with approved protocol, and that all deviations and analytical problems are summarized in the appropriate narrative(s)

This analytical report was prepared in Portable Document Format (.PDF) and contains 24 pages.

Michael Steven Schapira

QA Review Performed by: Michael Steven Schapira

Report Issued: 6/10/16

Results

Sample Name	: 2701 Patrick Ave-L
Sample Info	:
Sampling Date	: 2016-05-16 10:40:00
Data File	: W1600810.D
Dilution	: 1
Extraction Volume	: 2 mL
Sampling Time	: 12885 min
Acquisition Date	: 2016-06-01 22:50:14
Instrument Method	: RAD624-SIM-NEWRAD-F.M
Matrix	: AIR

Target Compound	Detection Limit (ug/m3)	Quantitation Limit (ug/m3)	Catch Weight (ug)	Concentration (ug/m3)	Flag *
Trichloroethylene	0.0137	0.0920	0.0626	0.0704	m J
Tetrachloroethylene	0.0143	0.106	0.298	0.392	

Internal Standards	Response	Retention Time (min)	Concentration (ug/mL)	Flag *
Toluene-d8	32,415	6.92	0.516	PASS

(ND) = Not Detected

*** (J) = Below Calibration Range, (E) = Above Calibration Range, (m) = Manual Integration, (C) = Estimated Flow Rate**

IS Acceptance Criteria: RT +/- 20 sec, Response +/- 40%

Sample Name	: 2701 Patrick Ave-B
Sample Info	:
Sampling Date	: 2016-05-16 10:50:00
Data File	: W1600811.D
Dilution	: 1
Extraction Volume	: 2 mL
Sampling Time	: 12865 min
Acquisition Date	: 2016-06-01 23:08:43
Instrument Method	: RAD624-SIM-NEWRAD-F.M
Matrix	: AIR

Target Compound	Detection Limit (ug/m3)	Quantitation Limit (ug/m3)	Catch Weight (ug)	Concentration (ug/m3)	Flag *
Trichloroethylene	0.0137	0.0921	0.0195	0.0220	m J
Tetrachloroethylene	0.0143	0.106	0.434	0.571	m

Internal Standards	Response	Retention Time (min)	Concentration (ug/mL)	Flag *
Toluene-d8	32,411	6.92	0.516	PASS

(ND) = Not Detected

*** (J) = Below Calibration Range, (E) = Above Calibration Range, (m) = Manual Integration, (C) = Estimated Flow Rate**

IS Acceptance Criteria: RT +/- 20 sec, Response +/- 40%

Sample Name	: 2842 N Glenn Ave-L
Sample Info	:
Sampling Date	: 2016-05-16 11:35:00
Data File	: W1600812.D
Dilution	: 1
Extraction Volume	: 2 mL
Sampling Time	: 12910 min
Acquisition Date	: 2016-06-01 23:29:22
Instrument Method	: RAD624-SIM-NEWRAD-F.M
Matrix	: AIR

Target Compound	Detection Limit (ug/m3)	Quantitation Limit (ug/m3)	Catch Weight (ug)	Concentration (ug/m3)	Flag *
Trichloroethylene	0.0136	0.0918	ND	ND	
Tetrachloroethylene	0.0143	0.106	0.0990	0.130	m

Internal Standards	Response	Retention Time (min)	Concentration (ug/mL)	Flag *
Toluene-d8	32,202	6.92	0.516	PASS

(ND) = Not Detected
*** (J) = Below Calibration Range, (E) = Above Calibration Range, (m) = Manual Integration, (C) = Estimated Flow Rate**
IS Acceptance Criteria: RT +/- 20 sec, Response +/- 40%

Sample Name	: 2842 N Glenn Ave-B
Sample Info	:
Sampling Date	: 2016-05-16 11:30:00
Data File	: W1600813.D
Dilution	: 1
Extraction Volume	: 2 mL
Sampling Time	: 12910 min
Acquisition Date	: 2016-06-01 23:47:51
Instrument Method	: RAD624-SIM-NEWRAD-F.M
Matrix	: AIR

Target Compound	Detection Limit (ug/m3)	Quantitation Limit (ug/m3)	Catch Weight (ug)	Concentration (ug/m3)	Flag *
Trichloroethylene	0.0136	0.0918	ND	ND	
Tetrachloroethylene	0.0143	0.106	0.0861	0.113	m

Internal Standards	Response	Retention Time (min)	Concentration (ug/mL)	Flag *
Toluene-d8	31,047	6.92	0.516	PASS

(ND) = Not Detected

*** (J) = Below Calibration Range, (E) = Above Calibration Range, (m) = Manual Integration, (C) = Estimated Flow Rate**

IS Acceptance Criteria: RT +/- 20 sec, Response +/- 40%

Sample Name	: 415 E 28th St-L
Sample Info	:
Sampling Date	: 2016-05-16 14:25:00
Data File	: W1600814.D
Dilution	: 1
Extraction Volume	: 2 mL
Sampling Time	: 12885 min
Acquisition Date	: 2016-06-02 00:08:11
Instrument Method	: RAD624-SIM-NEWRAD-F.M
Matrix	: AIR

Target Compound	Detection Limit (ug/m3)	Quantitation Limit (ug/m3)	Catch Weight (ug)	Concentration (ug/m3)	Flag *
Trichloroethylene	0.0137	0.0920	ND	ND	
Tetrachloroethylene	0.0143	0.106	0.0889	0.117	m

Internal Standards	Response	Retention Time (min)	Concentration (ug/mL)	Flag *
Toluene-d8	29,686	6.92	0.516	PASS

(ND) = Not Detected

*** (J) = Below Calibration Range, (E) = Above Calibration Range, (m) = Manual Integration, (C) = Estimated Flow Rate**

IS Acceptance Criteria: RT +/- 20 sec, Response +/- 40%

Sample Name	: 415 E 28th St-B
Sample Info	:
Sampling Date	: 2016-05-16 14:30:00
Data File	: W1600815.D
Dilution	: 1
Extraction Volume	: 2 mL
Sampling Time	: 12855 min
Acquisition Date	: 2016-06-02 00:26:38
Instrument Method	: RAD624-SIM-NEWRAD-F.M
Matrix	: AIR

Target Compound	Detection Limit (ug/m3)	Quantitation Limit (ug/m3)	Catch Weight (ug)	Concentration (ug/m3)	Flag *
Trichloroethylene	0.0137	0.0922	ND	ND	
Tetrachloroethylene	0.0143	0.106	0.0865	0.114	m

Internal Standards	Response	Retention Time (min)	Concentration (ug/mL)	Flag *
Toluene-d8	30,149	6.92	0.516	PASS

(ND) = Not Detected
*** (J) = Below Calibration Range, (E) = Above Calibration Range, (m) = Manual Integration, (C) = Estimated Flow Rate**
IS Acceptance Criteria: RT +/- 20 sec, Response +/- 40%

Sample Name	: 2714 Patrick Ave
Sample Info	:
Sampling Date	: 2016-05-16 15:00:00
Data File	: W1600816.D
Dilution	: 1
Extraction Volume	: 2 mL
Sampling Time	: 12840 min
Acquisition Date	: 2016-06-02 00:47:06
Instrument Method	: RAD624-SIM-NEWRAD-F.M
Matrix	: AIR

Target Compound	Detection Limit (ug/m3)	Quantitation Limit (ug/m3)	Catch Weight (ug)	Concentration (ug/m3)	Flag *
Trichloroethylene	0.0137	0.0923	ND	ND	
Tetrachloroethylene	0.0144	0.106	0.194	0.256	m

Internal Standards	Response	Retention Time (min)	Concentration (ug/mL)	Flag *
Toluene-d8	31,209	6.92	0.516	PASS

(ND) = Not Detected

*** (J) = Below Calibration Range, (E) = Above Calibration Range, (m) = Manual Integration, (C) = Estimated Flow Rate**

IS Acceptance Criteria: RT +/- 20 sec, Response +/- 40%

Sample Name	: 622 E 28th St-L
Sample Info	:
Sampling Date	: 2016-05-18 08:58:00
Data File	: W1600817.D
Dilution	: 1
Extraction Volume	: 2 mL
Sampling Time	: 10132 min
Acquisition Date	: 2016-06-02 01:05:38
Instrument Method	: RAD624-SIM-NEWRAD-F.M
Matrix	: AIR

Target Compound	Detection Limit (ug/m3)	Quantitation Limit (ug/m3)	Catch Weight (ug)	Concentration (ug/m3)	Flag *
Trichloroethylene	0.0174	0.117	ND	ND	
Tetrachloroethylene	0.0182	0.134	1.10	1.85	

Internal Standards	Response	Retention Time (min)	Concentration (ug/mL)	Flag *
Toluene-d8	30,189	6.92	0.516	PASS

(ND) = Not Detected
*** (J) = Below Calibration Range, (E) = Above Calibration Range, (m) = Manual Integration, (C) = Estimated Flow Rate**
IS Acceptance Criteria: RT +/- 20 sec, Response +/- 40%

Sample Name	: 622 E 28th St-B
Sample Info	:
Sampling Date	: 2016-05-18 08:27:00
Data File	: W1600818.D
Dilution	: 1
Extraction Volume	: 2 mL
Sampling Time	: 10158 min
Acquisition Date	: 2016-06-02 01:26:10
Instrument Method	: RAD624-SIM-NEWRAD-F.M
Matrix	: AIR

Target Compound	Detection Limit (ug/m3)	Quantitation Limit (ug/m3)	Catch Weight (ug)	Concentration (ug/m3)	Flag *
Trichloroethylene	0.0173	0.117	0.0218	0.0311	m J
Tetrachloroethylene	0.0182	0.134	1.47	2.46	

Internal Standards	Response	Retention Time (min)	Concentration (ug/mL)	Flag *
Toluene-d8	29,090	6.92	0.516	PASS

(ND) = Not Detected
*** (J) = Below Calibration Range, (E) = Above Calibration Range, (m) = Manual Integration, (C) = Estimated Flow Rate**
IS Acceptance Criteria: RT +/- 20 sec, Response +/- 40%

Sample Name	: Ambient
Sample Info	:
Sampling Date	: 2016-05-16 13:30:00
Data File	: W1600820.D
Dilution	: 1
Extraction Volume	: 2 mL
Sampling Time	: 12975 min
Acquisition Date	: 2016-06-02 02:05:30
Instrument Method	: RAD624-SIM-NEWRAD-F.M
Matrix	: AIR

Target Compound	Detection Limit (ug/m3)	Quantitation Limit (ug/m3)	Catch Weight (ug)	Concentration (ug/m3)	Flag *
Trichloroethylene	0.0136	0.0914	ND	ND	
Tetrachloroethylene	0.0142	0.105	0.0967	0.126	m

Internal Standards	Response	Retention Time (min)	Concentration (ug/mL)	Flag *
Toluene-d8	29,488	6.92	0.516	PASS

(ND) = Not Detected

*** (J) = Below Calibration Range, (E) = Above Calibration Range, (m) = Manual Integration, (C) = Estimated Flow Rate**

IS Acceptance Criteria: RT +/- 20 sec, Response +/- 40%

Sample Collection Time Calculation Sheet

Job Number: 0516-15

	Start		Stop		Collection Time
Sample ID	Date	Time	Date	Time	(min)
2701 Patrck Ave - L	05/16/16	10:40	05/25/16	9:25	12,885
2701 Patrick ave - B	05/16/16	10:50	05/25/16	9:15	12,865
2842 N. Glenn Ave - L	05/16/16	11:35	05/25/16	10:45	12,910
2842 N. Glenn Ave - B	05/16/16	11:30	05/25/16	10:40	12,910
415 E. 28th St. - L	05/16/16	14:25	05/25/16	13:10	12,885
415 E. 28th St. - B	05/16/16	14:30	05/25/16	12:45	12,855
2714 Patrick Ave.	05/16/16	15:00	05/25/16	13:00	12,840
622 E. 28th St. - L	05/18/16	8:58	05/25/16	9:50	10,132
622 E. 28th St. - B	05/18/16	8:27	05/25/16	9:45	10,158
Ambient 3	05/16/16	13:30	05/25/16	13:45	12,975
					0

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	Mid-Atlantic Associates, Inc.
Analyst	TDD
Parameters	GC/MS SIM Analysis

Client #	R2693.00
Job #	0516-15
# Samples	10 Radiello Tubes

Custody

David Eckard received the samples on 5/26/16 after being relinquished by Mid-Atlantic Associates, Inc. The samples were received at ambient temperature and in good condition. Prior to, during, and after analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, Inc.

Analysis

The samples were analyzed for trichloroethylene and tetrachloroethylene using the general analytical procedures for Selected Ion Monitoring (SIM) analysis.

The Agilent Technologies Model 6890N, Gas Chromatograph "Wiley" (S/N CN10244010). Wiley was equipped with a 5973N Mass Selective Detector and a Restek Rtx-624 MS, 40 m x 0.18 mm x 1.0 µm capillary column (S/N 1207064) for these analyses.

The Radiello sampling cartridges were desorbed with 2 mL of extraction solvent consisting of carbon disulfide with toluene-d8 at 0.5162 ug/mL. The samples were placed on a 2-dimensional shaker for 30 minutes at 450 rev/min.

Calibration

The instrument's calibration range was approximately 0.04 to 16 µg/mL for each analyte. The initial calibration (***W040816A-RAD)*** was processed using linear regression with an inverse square weighting. The coefficient of determination (R^2) for each target analyte was greater than 0.99.

The initial calibration verification met 20% recovery criteria. The continuing calibration verifications met 20% recovery criteria for all compounds. The calibration data has not been included in this report but is available upon request.

Chromatographic Conditions

The instrument analysis method (*RAD624-SIM-RAD130F.M*) has not been included in this report but is available upon request.

QC Notes

All internal standard response and retention time criteria were met.

The Laboratory Duplicates associated with this analysis met 25% difference criteria.

Enthalpy Analytical Narrative Summary
(continued)

QC Notes (continued)	No target compounds were identified in the analysis of the reagent blank at concentrations greater than the detection limit.
Reporting Notes	The results presented in this report are representative of the samples as provided to the laboratory.
	The samples, calibrations and standards for the data presented in this report were analyzed at 2202 Ellis Road, Durham, NC 27703.

General Reporting Notes

The following are general reporting notes that are applicable to all Enthalpy Analytical, Inc. data reports, unless specifically noted otherwise.

- Any analysis which refers to the method as ***"Type"*** represents a planned deviation from the reference method. For instance a Hydrogen Sulfide assay from a Tedlar bag would be labeled as "EPA Method 16-Type" because Tedlar bags are not mentioned as one of the collection options in EPA Method 16.
- The acronym ***MDL*** represents the Minimum Detection Limit. Below this value the laboratory cannot determine the presence of the analyte of interest reliably.
- The acronym ***LOQ*** represents the Limit of Quantification. Below this value the laboratory cannot quantitate the analyte of interest within the criteria of the method.
- The acronym ***ND*** following a value indicates a non-detect or analytical result below the MDL.
- The letter ***J*** in the Qualifier or Flag column in the results indicates that the value is between the MDL and the LOQ. The laboratory can positively identify the analyte of interest as present, but the value should be considered an estimate.
- The letter ***E*** in the Qualifier or Flag column indicates an analytical result exceeding 100% of the highest calibration point. The associated value should be considered as an estimate.
- The acronym ***DF*** represents Dilution Factor. This number represents dilution of the sample during the preparation and/or analysis process. The analytical result taken from a laboratory instrument is multiplied by the DF to determine the final undiluted sample results.
- The addition of ***MS*** to the Sample ID represents a Matrix Spike. An aliquot of an actual sample is spiked with a known amount of analyte so that a percent recovery value can be determined. The MS analysis indicates what effect the sample matrix may have on the target analyte, i.e. whether or not anything in the sample matrix interferes with the analysis of the analyte(s).
- The addition of ***MSD*** to the Sample ID represents a Matrix Spike Duplicate. Prepared in the same manner as a MS, the use of duplicate matrix spikes allows further confirmation of laboratory quality by showing the consistency of results gained by performing the same steps multiple times.
- The addition of ***LD*** to the Sample ID represents a Laboratory Duplicate. The analyst prepares an additional aliquot of sample for testing and the results of the duplicate analysis are compared to the initial result. The result should have a difference value of within 10% of the initial result (if the results of the original analysis are greater than the LOQ).
- The addition of ***AD*** to the Sample ID represents an Alternate Dilution. The analyst prepares an additional aliquot at a different dilution factor (usually double the initial factor). This analysis helps confirm that no additional compound is present and coeluting or sharing absorbance with the analyte of interest, as they would have a different response/absorbance than the analyte of interest.

General Reporting Notes

(continued)

- The Sample ID ***LCS*** represents a Laboratory Control Sample. Clean matrix, similar to the client sample matrix, prepared and analyzed by the laboratory using the same reagents, spiking standards and procedures used for the client samples. The LCS is used to assess the control of the laboratory's analytical system. Whenever spikes are prepared for our client projects, two spikes are retained as LCSs. The LCSs are labeled with the associated project number and kept in-house at the appropriate temperature conditions. When the project samples are received for analysis, the LCSs are analyzed to confirm that the analyte could be recovered from the media, separate from the samples which were used on the project and which may have been affected by source matrix, sample collection and/or sample transport.
- **Significant Figures**: Where the reported value is much greater than unity (1.00) in the units expressed, the number is rounded to a whole number of units, rather than to 3 significant figures. For example, a value of 10,456.45 ug catch is rounded to 10,456 ug. There are five significant digits displayed, but no confidence should be placed on more than two significant digits.
- **Manual Integration**: The data systems used for processing will flag manually integrated peaks with an "M". There are several reasons a peak may be manually integrated. These reasons will be identified by the following two letter designations on sample chromatograms, if provided in the report. The peak was ***not integrated*** by the software **"NI"**, the peak was ***integrated incorrectly*** by the software **"II"** or the ***wrong peak*** was integrated by the software **"WP"**. These codes will accompany the analyst's manual integration stamp placed next to the compound name on the chromatogram.

Sample Custody

Chain of Custody Record

ENTHALPY analytical, inc.

Page 1 of 3

Special Handling:

☑ Standard Turn Around Time (10 business days)

☐ Rush Turn Around Time -- Date Needed_____

- All TATs Subject to Approval by Enthalpy Analytical, Inc.
- All Bag/Can Samples Disposed of 1 Month from Receipt.
- All Other Samples Disposed of 4 Months from Receipt.

Client Name: Mid-Atlantic Associates, Inc.
Project Manager: Will Service
Report To: Will Service

Project Number: R2693.00
Site Name: 28th St Project
Location: Winston-Salem, NC

PO#: R2693.00
Telephone#: 919-250-9918
Email: WService@maaonline.com

For spiked or duplicate samples: please provide sample volumes for recovery calculations. For Particulates: please provide tare weights and/or condensed water volumes.

Special Instructions:
Radiello Samplers

A=Air 1=H2SO4 2=NaOH W=Water O=Other
X=XAD C=Charcoal SG=Silica Gel
G=Grab C=Composite Q=Quality Control O=Other

Sample ID	Date	Time	Sample Volume	Type	Matrix	Sample Containers: # of VOA Vials	# of Glass	# of Plastic	# of Bags	# of Canisters	# of Tubes	# Other	Analyses: TCE	PCE						Notes:
2701 Patrick Ave. - L																				
START :	5/16/16	10:40		O								1	X	X						1 cylinder for location and sampling event
END :	5/25/16	09:25	214h 45min																	
2701 Patrick Ave. - B												1	X	X						
START :	5/16/16	10:50		O																1 cylinder for location and sampling event
END :	5/25/16	09:15	214h 25min																	
2848 N. Glenn Ave. - L												1	X	X						
START :	5/16/16	11:35		O																1 cylinder for location and sampling event
END :	5/25/16	10:45	215h 10min																	
2842 N. Glenn Ave. - B												1	X	X						
START :	5/16/16	11:30		O	A															1 cylinder for location and sampling event
END :	5/25/16	10:40	215h 10min																	

Relinquished By:	Date:	Received By:	Date:	Time:	Sample Condition Upon Receipt:
BOglesby	5.26.16	[signature]	5/26/16	1645	☐ Iced ☒ Ambient ☐ °C_____
		[signature]	05/27/16	0800 AM	☐ Iced ☒ Ambient ☐ °C_____
					☐ Iced ☐ Ambient ☐ °C_____

Chain of Custody Record

ENTHALPY analytical, inc.

Page 2 of 3

Special Handling:

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PO#: R2693.00
Telephone#: 919-250-9918
Email: WService@maaonline.com

For spiked or duplicate samples: please provide sample volumes for recovery calculations. For Particulates: please provide tare weights and/or condensed water volumes.

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Radiello Samplers

A=Air 1=H2SO4 2=NaOH W=Water O=Other
X=XAD C=Charcoal SG=Silica Gel
G=Grab C=Composite Q=Quality Control O=Other

Sample ID	Date	Time	Sample Volume	Type	Matrix	Sample Containers: # of VOA Vials	# of Glass	# of Plastic	# of Bags	# of Canisters	# of Tubes	# Other	Analyses: TCE	PCE	Notes:
415 E. 28th St. - L															
START :	5/16/16	14:25		O								1	X	X	1 cylinder for location and sampling event
END :	5/25/16	13:10	214h 45min												
415 E. 28th St. - B												1	X	X	
START :	5/16/16	14:30		O											1 cylinder for location and sampling event
END :	5/25/16	12:45	214h 15min												
2714 Partick Ave.															
START :	5/16/16	15:00		O								1	X	X	1 cylinder for location and sampling event
END :	5/25/16	13:00	214h 0min												

Relinquished By:	Date:	Received By:	Date:	Time:	Sample Condition Upon Receipt:
BOglesby	5-26-16	Samuel Edwards	5/26/16	1445	☐ Iced ☑ Ambient ☐ °C_____
		Patricia Ann	05/27/16	0800 AM	☐ Iced ☑ Ambient ☐ °C_____
					☐ Iced ☐ Ambient ☐ °C_____

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Chain of Custody Record

ENTHALPY analytical, inc.

Page 2 of 3

Special Handling:
- ☑ Standard Turn Around Time (10 business days)
- ☐ Rush Turn Around Time -- Date Needed_____
- All TATs Subject to Approval by Enthalpy Analytical, Inc.
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Radiello Samplers

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X=XAD C=Charcoal SG=Silica Gel
G=Grab C=Composite Q=Quality Control O=Other

Sample ID	Date	Time	Sample Volume	Type	Matrix	Sample Containers: # of VOA Vials	# of Glass	# of Plastic	# of Bags	# of Canisters	# of Tubes	# Other	Analyses: TCE	PCE	Notes:
622 E. 28th St. - L															
START :	5/18/16	08:58		O								1	X	X	1 cylinder for location and sampling event
END :	5/25/16	09:50	168h 52min												
622E. 28th St. - B												1	X	X	
START :	5/18/16	08:27		O											1 cylinder for location and sampling event
END :	5/25/16	09:45	169h 18min												
Ambient 3															
START :	5/16/16	13:30		O								1	X	X	1 cylinder for location and sampling event
END :	5/25/16	13:45	216h 15min												

Relinquished By:	Date:	Received By:	Date:	Time:	Sample Condition Upon Receipt:
BOgles by	5.26.16	[signature]	5.26.16	1493	☐ Iced ☑ Ambient ☐ °C_____
		[signature]	05/27/16	0800 AM	☐ Iced ☑ Ambient ☐ °C_____
					☐ Iced ☐ Ambient ☐ °C_____

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This Is The Last Page Of This Report.

con-test®
ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

June 7, 2016

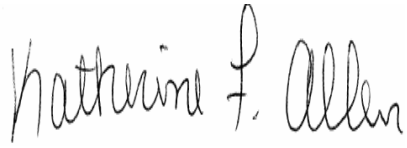
Kelly Johnson
Mid-Atlantic Associates, Inc. - Raleigh, NC
409 Rogers View Court
Raleigh, NC 27610

Project Location: Winston-Salem
Client Job Number:
Project Number: 2693.00
Laboratory Work Order Number: 16E1358

Enclosed are results of analyses for samples received by the laboratory on May 26, 2016. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Lisa A. Worthington
Project Manager



QA Officer
Katherine Allen

Laboratory Manager
Daren Damboragian

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Mid-Atlantic Associates, Inc. - Raleigh, NC
409 Rogers View Court
Raleigh, NC 27610
ATTN: Kelly Johnson

REPORT DATE: 6/7/2016

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 2693.00

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 16E1358

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Winston-Salem

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
VP-2714 Patrick Ave.	16E1358-01	Soil Gas		EPA TO-15	
Duplicate	16E1358-02	Soil Gas		EPA TO-15	
VP-2701 Patrick Ave.	16E1358-03	Soil Gas		EPA TO-15	

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CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

EPA TO-15

Qualifications:

Elevated reporting limit due to high concentration of an interfering analyte(s).

Analyte & Samples(s) Qualified:

16E1358-03[VP-2701 Patrick Ave.]

Laboratory fortified blank /laboratory control sample recovery outside of control limits. Data validation is not affected since all results are "not detected" for all samples in this batch for this compound and bias is on the high side.

Analyte & Samples(s) Qualified:

1,1,2-Trichloroethane

B150824-BS1

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa A. Worthington
Project Manager

con-test® ANALYTICAL LABORATORY
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ANALYTICAL RESULTS

Project Location: Winston-Salem
Date Received: 5/26/2016
Field Sample #: VP-2714 Patrick Ave.
Sample ID: 16E1358-01
Sample Matrix: Soil Gas
Sampled: 5/25/2016 15:33

Sample Description/Location:
Sub Description/Location:
Canister ID: 2125
Canister Size: 1 liter
Flow Controller ID: 4206
Sample Type: 10 min

Work Order: 16E1358
Initial Vacuum(in Hg): -28
Final Vacuum(in Hg): -5
Receipt Vacuum(in Hg): -5.7
Flow Controller Type: Fixed-Orifice
Flow Controller Calibration
RPD Pre and Post-Sampling:

EPA TO-15

	ppbv				ug/m3				Date/Time	
Analyte	**Results**	**RL**	**MDL**	**Flag/Qual**	**Results**	**RL**	**MDL**	**Dilution**	**Analyzed**	**Analyst**
Chloroform	1.0	0.20	0.047		5.0	0.98	0.23	4	6/3/16 12:30	TPH
1,2-Dichloroethane	ND	0.20	0.056		ND	0.81	0.23	4	6/3/16 12:30	TPH
1,1-Dichloroethylene	ND	0.20	0.049		ND	0.79	0.19	4	6/3/16 12:30	TPH
cis-1,2-Dichloroethylene	ND	0.20	0.076		ND	0.79	0.30	4	6/3/16 12:30	TPH
Methylene Chloride	0.88	2.0	0.24	J	3.1	6.9	0.84	4	6/3/16 12:30	TPH
Tetrachloroethylene	2.5	0.20	0.057		17	1.4	0.39	4	6/3/16 12:30	TPH
1,1,1-Trichloroethane	0.052	0.20	0.036	J	0.28	1.1	0.20	4	6/3/16 12:30	TPH
1,1,2-Trichloroethane	ND	0.20	0.061		ND	1.1	0.33	4	6/3/16 12:30	TPH
Trichloroethylene	ND	0.20	0.059		ND	1.1	0.32	4	6/3/16 12:30	TPH

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	97.0	70-130	6/3/16 12:30

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ANALYTICAL RESULTS

Project Location: Winston-Salem
Date Received: 5/26/2016
Field Sample #: Duplicate
Sample ID: 16E1358-02
Sample Matrix: Soil Gas
Sampled: 5/25/2016 15:47

Sample Description/Location:
Sub Description/Location:
Canister ID: 2113
Canister Size: 1 liter
Flow Controller ID: 4295
Sample Type: 10 min

Work Order: 16E1358
Initial Vacuum(in Hg): -27
Final Vacuum(in Hg): -4
Receipt Vacuum(in Hg): -6.3
Flow Controller Type: Fixed-Orifice
Flow Controller Calibration
RPD Pre and Post-Sampling:

EPA TO-15

	ppbv				ug/m3				Date/Time	
Analyte	**Results**	**RL**	**MDL**	**Flag/Qual**	**Results**	**RL**	**MDL**	**Dilution**	**Analyzed**	**Analyst**
Chloroform	1.4	0.20	0.047		6.7	0.98	0.23	4	6/3/16 13:09	TPH
1,2-Dichloroethane	ND	0.20	0.056		ND	0.81	0.23	4	6/3/16 13:09	TPH
1,1-Dichloroethylene	ND	0.20	0.049		ND	0.79	0.19	4	6/3/16 13:09	TPH
cis-1,2-Dichloroethylene	ND	0.20	0.076		ND	0.79	0.30	4	6/3/16 13:09	TPH
Methylene Chloride	0.80	2.0	0.24	J	2.8	6.9	0.84	4	6/3/16 13:09	TPH
Tetrachloroethylene	0.23	0.20	0.057		1.5	1.4	0.39	4	6/3/16 13:09	TPH
1,1,1-Trichloroethane	0.076	0.20	0.036	J	0.41	1.1	0.20	4	6/3/16 13:09	TPH
1,1,2-Trichloroethane	ND	0.20	0.061		ND	1.1	0.33	4	6/3/16 13:09	TPH
Trichloroethylene	ND	0.20	0.059		ND	1.1	0.32	4	6/3/16 13:09	TPH

Surrogates	% Recovery	% REC Limits		
4-Bromofluorobenzene (1)	98.5	70-130		6/3/16 13:09

con-test® ANALYTICAL LABORATORY
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ANALYTICAL RESULTS

Project Location: Winston-Salem
Date Received: 5/26/2016
Field Sample #: VP-2701 Patrick Ave.
Sample ID: 16E1358-03
Sample Matrix: Soil Gas
Sampled: 5/25/2016 10:37

Sample Description/Location:
Sub Description/Location:
Canister ID: 2115
Canister Size: 1 liter
Flow Controller ID: 4038
Sample Type: 10 min

Work Order: 16E1358
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -4
Receipt Vacuum(in Hg): -4.1
Flow Controller Type: Fixed-Orifice
Flow Controller Calibration
RPD Pre and Post-Sampling:

EPA TO-15

Sample Flags: DL-04

	ppbv				ug/m3				Date/Time	
Analyte	**Results**	**RL**	**MDL**	**Flag/Qual**	**Results**	**RL**	**MDL**	**Dilution**	**Analyzed**	**Analyst**
Chloroform	ND	2.0	0.47		ND	9.8	2.3	40	6/3/16 4:48	TPH
1,2-Dichloroethane	ND	2.0	0.56		ND	8.1	2.3	40	6/3/16 4:48	TPH
1,1-Dichloroethylene	ND	2.0	0.49		ND	7.9	1.9	40	6/3/16 4:48	TPH
cis-1,2-Dichloroethylene	ND	2.0	0.76		ND	7.9	3.0	40	6/3/16 4:48	TPH
Methylene Chloride	ND	20	2.4		ND	69	8.4	40	6/3/16 4:48	TPH
Tetrachloroethylene	0.96	2.0	0.57	J	6.5	14	3.9	40	6/3/16 4:48	TPH
1,1,1-Trichloroethane	ND	2.0	0.36		ND	11	2.0	40	6/3/16 4:48	TPH
1,1,2-Trichloroethane	ND	2.0	0.61		ND	11	3.3	40	6/3/16 4:48	TPH
Trichloroethylene	ND	2.0	0.59		ND	11	3.2	40	6/3/16 4:48	TPH

Surrogates	% Recovery	% REC Limits		
4-Bromofluorobenzene (1)	97.7	70-130		6/3/16 4:48

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method: TO-15 Prep-EPA TO-15

Lab Number [Field ID]	Batch	Pressure Dilution	Pre Dilution	Pre-Dil Initial mL	Pre-Dil Final mL	Default Injection mL	Actual Injection mL	Date
16E1358-01 [VP-2714 Patrick Ave.]	B150824	2	1	N/A	1000	400	200	06/02/16
16E1358-02 [Duplicate]	B150824	2	1	N/A	1000	400	200	06/02/16
16E1358-03 [VP-2701 Patrick Ave.]	B150824	2	1	N/A	1000	400	20	06/02/16

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Air Toxics by EPA Compendium Methods - Quality Control

Analyte	ppbv Results	ppbv RL	ug/m3 Results	ug/m3 RL	Spike Level ppbv	Source Result	%REC		%REC Limits	RPD	RPD Limit	Flag/Qual
Batch B150824 - TO-15 Prep												
Blank (B150824-BLK1)					Prepared & Analyzed: 06/02/16							
Chloroform	ND	0.050										
1,2-Dichloroethane	ND	0.050										
1,1-Dichloroethylene	ND	0.050										
cis-1,2-Dichloroethylene	ND	0.050										
Methylene Chloride	0.15	0.50										J
Tetrachloroethylene	ND	0.050										
1,1,1-Trichloroethane	ND	0.050										
1,1,2-Trichloroethane	ND	0.050										
Trichloroethylene	ND	0.050										
Surrogate: 4-Bromofluorobenzene (1)	*7.37*				*8.00*		*92.1*		*70-130*			
LCS (B150824-BS1)					Prepared & Analyzed: 06/02/16							
Chloroform	4.66				5.00		93.1		70-130			
1,2-Dichloroethane	4.82				5.00		96.3		70-130			
1,1-Dichloroethylene	5.14				5.00		103		70-130			
cis-1,2-Dichloroethylene	5.27				5.00		105		70-130			
Methylene Chloride	5.48				5.00		110		70-130			
Tetrachloroethylene	5.68				5.00		114		70-130			
1,1,1-Trichloroethane	5.34				5.00		107		70-130			
1,1,2-Trichloroethane	6.53				5.00		**131**	*	70-130			L-01
Trichloroethylene	6.01				5.00		120		70-130			
Surrogate: 4-Bromofluorobenzene (1)	*7.71*				*8.00*		*96.4*		*70-130*			

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
RL	Reporting Limit
MDL	Method Detection Limit
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
LCS Dup	Duplicate Laboratory Control Sample
MS	Matrix Spike Sample
MS Dup	Duplicate Matrix Spike Sample
REC	Recovery
QC	Quality Control
ppbv	Parts per billion volume
EPA	United States Environmental Protection Agency
% REC	Percent Recovery
ND	Not Detected
N/A	Not Applicable
DL	Detection Limit
NC	Not Calculated
LFB/LCS	Lab Fortified Blank/Lab Control Sample
ORP	Oxidation-Reduction Potential
wet	Not dry weight corrected
% wt	Percent weight
Kg	Kilogram
g	Gram
mg	Milligram
µg	Microgram
ng	Nanogram
L	Liter
mL	Milliliter
µL	Microliter
m3	Cubic Meter
EPH	Extractable Petroleum Hydrocarbons
VPH	Volatile Petroleum Hydrocarbons
APH	Air Petroleum Hydrocarbons
FID	Flame Ionization Detector
PID	Photo Ionization Detector
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
DL-04	Elevated reporting limit due to high concentration of an interfering analyte(s).
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-01	Laboratory fortified blank /laboratory control sample recovery outside of control limits. Data validation is not affected since all results are "not detected" for all samples in this batch for this compound and bias is on the high side.

ANALYST

TPH	Thomas P. Hnitecki
MEK	Meghan E. Kelley
LAW	Lisa A. Worthington
JDL	Joseph D. Lawlor

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA TO-15 in Air	
Chloroform	AIHA,FL,NJ,NY,VA,ME
1,2-Dichloroethane	AIHA,FL,NJ,NY,VA,ME
1,1-Dichloroethylene	AIHA,FL,NJ,NY,VA,ME
cis-1,2-Dichloroethylene	AIHA,FL,NY,VA,ME
Methylene Chloride	AIHA,FL,NJ,NY,VA,ME
Tetrachloroethylene	AIHA,FL,NJ,NY,VA,ME
1,1,1-Trichloroethane	AIHA,FL,NJ,NY,VA,ME
1,1,2-Trichloroethane	AIHA,FL,NJ,NY,VA,ME
Trichloroethylene	AIHA,FL,NJ,NY,VA,ME

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC	100033	02/1/2018
MA	Massachusetts DEP	M-MA100	06/30/2016
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2017
NY	New York State Department of Health	10899 NELAP	04/1/2017
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2017
RI	Rhode Island Department of Health	LAO00112	12/30/2016
NC	North Carolina Div. of Water Quality	652	12/31/2016
NJ	New Jersey DEP	MA007 NELAP	06/30/2016
FL	Florida Department of Health	E871027 NELAP	06/30/2016
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2016
ME	State of Maine	2011028	06/9/2017
VA	Commonwealth of Virginia	460217	12/14/2016
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2016

con-test ANALYTICAL LABORATORY
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39 Spruce Street
East Longmeadow, MA 01028

CHAIN OF CUSTODY RECORD (AIR) 16E1358

Company Name: Mid-Atlantic Associates, Inc.
Address: 409 Rodgers View Ct.
Phone: 919-250-9918
Project Name:
Project Location: Winston-Salem
Project Number: 2693.00
Project Manager: Kelly Johnson
Con-Test Bid:
Invoice Recipient:
Sampled By: Sam Calloway

Requested Turnaround Time
7-Day ☑ 10-Day ☐
Other:

Rush Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
Enhanced Data Package Required: ☐
Email To: SCalloway@magonline.com
Fax To #:

ANALYSIS REQUESTED

Please fill out completely, sign, date and retain the yellow copy for your records

Summa canisters and flow controllers must be returned within 15 days of receipt or rental fees will apply

For summa canister and flow controller information please refer to Con-Test's Air Media Agreement

Lab Use	Client Use	Collection Data		Duration	Flow Rate	Matrix	Volume	TO-15 (modified)				" Hg				
Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	Total Minutes Sampled	☐ m³/min ☐ L/min	Code	☐ Liters ☐ m³					Initial Pressure	Final Pressure	Lab Receipt Pressure	Summa Can ID	Flow Controller ID
01	VP-2714 Patrick Ave.	5/25/16 15:28	15:33			SG		✓				-28	-5	-5.7	2125	4206
02	Duplicate	5/25/16 15:42	15:47			SG		✓				-27	-4	-6.3	2113	4295
03	VP-2701 Patrick Ave.	5/25/16 10:32	10:37			SG		✓				-30	-4	-4.1	2115	4038
04																

Comments: For TO-15 only report: chloroform, PCE, TCE, 1,1,1-Trichloroethane, 1,1,2-trichloroethane, 1,1-dichloroethene, 1,1-Dichloroethane, cis-1,2-dichloroethylene + methylene chloride

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Matrix Codes:
SG = SOIL GAS
IA = INDOOR AIR
AMB = AMBIENT
SS = SUB SLAB
D = DUP
BL = BLANK
O = Other_____

Relinquished by: (signature)	Date/Time:	Detection Limit Requirements	Special Requirements
BGalloway	5.26.16 12:25 pm	MA	
Received by: (signature)	Date/Time:		☐ MA MCP Required
David DeBard	5 26 16 1225		
Relinquished by: (signature)	Date/Time:	CT	☐ CT RCP Required
David DeBard	5 26 16 1448		
Received by: (signature)	Date/Time:	NC IHSB Residential	☐ Enhanced Data Package Required
Paul Lamm	5/26/16 1445	Other: SG	
Relinquished by: (signature)	Date/Time:		NELAC and AIHA-LAP, LLC Accredited
Paul Lamm	5/26/16 1600		
Received by: (signature)	Date/Time:		
Paul Lamm 5/31	16 9:47		

TURNAROUND TIME (BUSINESS DAYS) STARTS AT 9:00 AM THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON THIS CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME CANNOT START UNTIL ALL QUESTIONS HAVE BEEN ANSWERED.

PLEASE BE CAREFUL NOT TO CONTAMINATE THIS DOCUMENT

www.contestlabs.com

con-test® ANALYTICAL LABORATORY

39 Spruce St.
East Longmeadow, MA.
01028
P: 413-525-2332
F: 413-525-6405

AIR Only Receipt Checklist

CLIENT NAME Mid-Atlantic Associates, Inc. **RECEIVED BY**: JDL **DATE**: 5/31/2016

1) Was the chain(s) of custody relinquished and signed? **Yes** X **No** _____

2) Does the chain agree with the samples? **Yes** X **No** _____
If not, explain:

3) Are all the samples in good condition? **Yes** X **No** _____
If not, explain:

4) Are there any samples "On Hold"? **Yes** _____ **No** X Stored where: _____

5) Are there any RUSH or SHORT HOLDING TIME samples? **Yes** _____ **No** X

Who was notified _____ Date _____ Time _____

6) Location where samples are stored: Air

Permission to subcontract samples? Yes No
(Walk-in clients only) if not already approved
Client Signature: _____

7) Number of cans Individually Certified or Batch Certified? _____

Containers received at Con-Test

		# of Containers	Types (Size, Duration)
Summa Cans (TO-14/TO-15/APH)		4	1L
Tedlar Bags			
TO-17 Tubes			
Regulators		4	5min
Restrictors			
Hg/Hopcalite Tube (NIOSH 6009)			
(TO-4A/ TO-10A/TO-13) PUFs			
PCB Florisil Tubes (NIOSH 5503)			
Air cassette			
PM 2.5/PM 10			
TO-11A Cartridges			
Other			

Unused Summas/PUF Media: 2129

Unused Regulators: 4294

1) Was all media (used & unused) checked into the WASP?

2) Were all returned summa cans, Restrictors & Regulators and PUF's documented as returned in the Air Lab Inbound/Outbound Excel Spreadsheet?

Laboratory Comments:				Summa ID's:		2125			Regulators:		4206					
						2113					4295					
						2115					4038					

Login Sample Receipt Checklist

(Rejection Criteria Listing - Using Sample Acceptance Policy)

Any False statement will be brought to the attention of Client

Question	Answer (True/False) T/F/NA	Comment
1) The coolers'/boxes' custody seal, if present, is intact.	NA	
2) The cooler or samples do not appear to have been compromised or tampered with.	T	
3) Samples were received on ice.	NA	
4) Cooler Temperature is acceptable.	NA	
5) Cooler Temperature is recorded.	NA	
6) COC is filled out in ink and legible.	T	
7) COC is filled out with all pertinent information.	T	
8) Field Sampler's name present on COC.	T	
9) Samples are received within Holding Time.	T	
10) Sample containers have legible labels.	T	
11) Containers/media are not broken or leaking and valves and caps are closed tightly.	T	
12) Sample collection date/times are provided.	T	
13) Appropriate sample/media containers are used.	T	
14) There is sufficient volume for all requsted analyses, including any requested MS/MSDs.	T	
15) Trip blanks provided if applicable.	NA	

Who notified of False statements? **Date/Time:**

Doc #278 Rev. 5 October 2014 **Log-In Technician Initials:** **JDL** **5/31/16 0947**

APPENDIX C

Photos

Mid Atlantic
Engineering & Environmental Solutions

Photo 1 – Living Area Radiello Sampler

Photo 2 – Ambient Radiello Sampler

Photo 3 – Sub-slab Soil Gas Sample Collection