hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

Via E- Mail

September 19, 2016

Mr. Billy Meyer
North Carolina Department of Environmental Quality
Division of Waste Management, Superfund Section
Dry Cleaning Solvent Cleanup Program
1646 Mail Service Center
Raleigh, NC 27699-1601

Re: Additional Post-Mitigation Vapor Intrusion Assessment
Hour Glass Cleaners
Asheville, Buncombe County
DSCA ID: DC110009
H&H Job No. DS0-72G

Dear Billy:

1.0 Introduction

Hart & Hickman, PC (H&H) is submitting this letter report to document additional post-mitigation sampling activities conducted at the Hour Glass Cleaners site. The Hour Glass Cleaners facility is located in the Innsbruck Mall Shopping Center at 85 Tunnel Road in Asheville, Buncombe County. A site location map is included as Figure 1. A sub-slab depressurization (SSD) system was installed in October 2012 and expanded in August 2013 to mitigate vapor intrusion at the site. In September 2015, H&H temporarily shut down the SSD system to evaluate post-mitigation sub-slab vapor concentrations. The SSD system currently remains off.

To evaluate if the mitigation system has effectively reduced sub-slab vapor concentrations at the site, H&H installed five permanent sub-slab vapor sampling points (HHVMP-1 through HHVMP-5) inside the Hour Glass Cleaners facility and adjacent mall tenant spaces. The sub-slab vapor points were previously sampled in October 2015 and March 2016, approximately one month and six months after shutdown of the SSD system. The October 2015 results indicated a

notable decrease in sub-slab vapor concentrations compared to pre-mitigation concentrations. However, sub-slab vapor concentrations increased in March 2016, trending back towards pre-mitigation concentrations. The October 2015 and March 2016 sampling activities and results were documented in a letter report submitted to the DSCA Program on May 17, 2016.

Due to the increase in sub-slab vapor concentrations observed between the October 2015 and March 2016 sampling events, the Dry-cleaning Solvent Cleanup Act (DSCA) Program requested additional sampling to further evaluate post-mitigation vapor intrusion potential at the site. Specifically, the DSCA Program requested re-sampling of the five permanent sub-slab vapor monitoring points and installation and sampling of two subsurface soil gas monitoring points. The purpose of the subsurface soil gas monitoring points is to evaluate if the elevated sub-slab vapor concentrations are associated with vapor intrusion from subsurface impacts or if the active dry-cleaning operations may be influencing the sub-slab vapor concentrations. This letter report describes the additional subsurface soil gas and sub-slab vapor sampling activities completed at the site in July 2016.

2.0 Subsurface Soil Gas and Sub-Slab Vapor Sampling Activities

On July 18, 2016, H&H installed one permanent soil gas monitoring point (HHSG-1) inside Hour Glass Cleaners. The point was installed adjacent to existing sub-slab vapor monitoring point HHVMP-2 to allow comparison of subsurface soil gas and sub-slab vapor data at this location. H&H attempted to install a second subsurface soil gas point adjacent to sub-slab vapor point HHVMP-1; however, shallow perched water was encountered from approximately 2 ft to 6 ft bgs. Thus, the borehole was abandoned. The locations of the soil gas sampling point and the previously installed permanent sub-slab vapor monitoring points are shown on Figure 2.

HHSG-1 was installed by first using a core drill to penetrate the concrete surface and then utilizing a 3.25-inch diameter stainless steel hand auger to advance a boring to a depth of approximately 6 feet below ground surface (ft bgs). A 6-inch stainless steel, soil vapor screen

fitted with ¼-inch diameter Teflon® tubing was then installed within the borehole. Well filter sand was placed around the annulus of the sampling point screened interval and extended to approximately 6-inches above the top of the screen interval. Hydrated bentonite was then installed from the top of the sand to approximately 2 ft bgs. The remaining portion of the borehole annulus was filled with cement grout to approximately 3 inches below grade. The monitoring point was completed with a flush-mount PVC cover. Upon completion, the end of the Teflon® tubing sampling assembly was secured inside the flush mount PVC cover.

On July 21, 2016, H&H collected samples from the soil gas and sub-slab vapor monitoring points. Prior to sampling, each sampling point was purged and a leak check was performed. Purging was performed using a syringe and three-way valve to evacuate air from each sampling point and tubing. A leak check was conducted by placing a shroud over the sample point and saturating the air within the shroud with helium gas to a concentration between approximately 80% and 90%. A helium gas detector was used to determine the concentration of helium within the shroud. Once concentrations in the shroud reached an acceptable level, the sample point was purged into a Tedlar® bag. The helium detector was then used to screen the contents of the Tedlar® bag to confirm it did not contain a helium concentration greater than 5% of that detected in the shroud. All of the sample points successfully passed the leak check criteria prior to sampling.

Following successful leak checks, laboratory-supplied 6-Liter Summa canisters were connected to each of the sample points. The Summa canisters were regulated to collect the samples at a flow rate of approximately 100 mL/min. After the samples were collected, the canisters were shipped to Con-Test Analytical Laboratory under chain-of-custody protocol for analysis of the dry-cleaning solvent tetrachloroethylene (PCE) and its degradation products, including trichloroethylene (TCE), cis-1,2-dichloroethylene (cis-1,2-DCE), trans-1,2-dichloroethylene (trans-1,2-DCE), and vinyl chloride (VC) by EPA Method TO-15. The laboratory analytical report is provided in Appendix B.

3.0 Analytical Results

Sub-Slab Vapor Results

The analytical results for the sub-slab vapor samples are summarized in Table 3 and presented on Figure 2, along with historical data for each point. PCE was detected in each of the sub-slab vapor samples at concentrations ranging from 59 µg/m^3 to 8,700 µg/m^3. Additionally, TCE was detected in each sample at concentrations ranging from 0.32 J µg/m^3 to 52 µg/m^3. Cis-1,2-DCE, trans-1,2-DCE, and VC were not detected in any of the July 2016 samples at concentrations above laboratory reporting limits.

The sub-slab vapor monitoring points have been sampled three times: approximately 1 month (October 2015), six months (March 2016), and ten months (July 2016) after shut down of the SSD system. The initial October 2015 sub-slab vapor concentrations were notably lower than pre-mitigation sub-slab vapor data; however, in March 2016 concentrations increased suggesting possible re-bound. The concentrations detected in July 2016 were notably lower than the March 2016 data at most sampling locations; thus, there does not appear to be a consistent increasing trend post-mitigation. Rather, it appears that sub-slab vapor concentrations may be fluctuating over time. Additional sampling is needed to further evaluate sub-slab vapor concentration trends at the site.

Subsurface Soil Gas Results

The analytical results for the subsurface soil gas sample are summarized in Table 4 and presented on Figure 2. PCE was detected in HHSG-1 at a concentration of 20,000 µg/m^3, and TCE was detected at a concentration of 18 µg/m^3. Cis-1,2-DCE, trans-1,2-DCE, and VC were not detected at concentrations exceeding the laboratory method detection limits.

Comparison of the subsurface soil gas sample concentrations (6 ft bgs) to the adjacent sub-slab vapor concentrations (in HHVMP-2) indicates PCE concentrations were higher in the subsurface soil gas sample (20,000 µg/m^3 in HHSG-1 compared to 8,700 µg/m^3 in HHVMP-2). However,

the TCE concentrations were higher in the sub-slab vapor sample (18 µg/m^3 in HHSG-1 compared to 52 µg/m^3 in HHVMP-2).

Risk Calculations

To evaluate the potential vapor intrusion risk associated with the detected sub-slab vapor and soil gas concentrations, H&H completed the DSCA Program's risk calculators. Previous assessment activities completed at the site identified a site-specific attenuation factor (AF) of 0.006 (see Table C-1, in Appendix C). Details regarding development of the site-specific attenuation factor are provided in the *On-Site Vapor Intrusion Assessment* letter report dated August 21, 2012. The default AF used in the DSCA Program's soil gas risk calculators is 0.01 for non-residential and 0.03 for residential.

H&H utilized the site-specific AF of 0.006 to evaluate the risk associated with the detected sub-slab vapor and soil gas concentrations. First, H&H calculated the predicted indoor air concentrations by multiplying the detected sub-slab vapor and soil gas concentrations by the site-specific average AF of 0.006 (see Table C-2 in Appendix C). Then, H&H entered the predicted indoor air concentrations into the DSCA Program's Indoor Air Risk Calculators to evaluate the cumulative risk associated with the predicted indoor air concentrations. H&H calculated the risks for both non-residential and residential use scenarios. Copies of the risk calculators are provided in Appendix D and the calculated carcinogenic risk levels and non-carcinogenic hazard index (HI) values are summarized below.

Sample Location	Sample ID	Sample Date	Non-Residential Worker		Resident	
			Carcinogenic Risk	Hazard Index	Carcinogenic Risk	Hazard Index
Hour Glass Cleaners	HHSG-1	7/21/16	2.6×10^{-6}	0.70	1.1×10^{-5}	2.9
	HHVMP-1	7/21/16	2.5×10^{-8}	0.0069	1.1×10^{-7}	0.029
	HHVMP-2	7/21/16	1.2×10^{-6}	0.33	5.5×10^{-6}	1.4

Sample Location	Sample ID	Sample Date	Non-Residential Worker		Resident	
			Carcinogenic Risk	Hazard Index	Carcinogenic Risk	Hazard Index
Quality Asheville Alterations	HHVMP-3	7/21/16	9.9×10^{-8}	0.027	4.3×10^{-7}	0.11
Vacant Tenant Space	HHVMP-4	7/21/16	1.0×10^{-8}	0.0030	5.0×10^{-8}	0.012
Innsbruck Mall Hallway (near cleaners)	HHVMP-5	7/21/16	1.9×10^{-7}	0.052	8.4×10^{-7}	0.22

The risk calculations indicate acceptable risk levels (carcinogenic risk less than 1×10^{-5} and HI values less than 1) for a non-residential worker based on the predicted indoor air concentrations associated with each of the sub-slab vapor samples (HHVMP-1 through HHVMP-5) and the soil gas sample (HHSG-1) during the July 2016 sampling event. For a residential exposure scenario, the HI exceeds the acceptable level of 1 for HHVMP-2 and HHSG-1, which are both located inside the Hour Glass Cleaners facility.

The Innsbruck Mall is currently zoned for commercial use and is primarily used for commercial purposes. However, the current tenant of the Quality Asheville Alterations shop appears to utilize the space as a residence during the week.

5.0 Summary

H&H conducted assessment activities to further evaluate the effectiveness of the SSD system in mitigating sub-slab vapor concentrations at the Hour Glass Cleaners site. H&H collected sub-slab vapor samples from five permanent monitoring points in July 2016 to evaluate concentrations approximately ten months after shutdown of the SSD systems. H&H also installed and sampled a deeper soil gas monitoring point (6 ft bgs) to compare subsurface soil gas concentrations to sub-slab vapor concentrations at the site.

To evaluate the potential vapor intrusion risk associated with the detected sub-slab vapor and soil gas concentrations, H&H calculated the predicted indoor air PCE and TCE concentrations based on the site-specific AF of 0.006. H&H then used the DSCA Program's Indoor Air Risk Calculators to evaluate the cumulative risk associated with the predicted indoor air concentrations. The risk calculations indicate acceptable risk levels (carcinogenic risk less than 1×10^{-5} and HI values less than 1) for a non-residential worker based on the predicted indoor air concentrations for the July 2016 sampling event. For a residential exposure scenario, the HI exceeded the acceptable level of 1 based on the predicted indoor air concentrations in HHSG-1 and HHVMP-2. Soil gas monitoring point HHSG-1 and sub-slab vapor monitoring point HHVMP-2 are both located inside the Hour Glass Cleaners facility.

The results for the July 2016 sampling event indicated that sub-slab vapor concentrations generally decreased compared to the March 2016 concentrations. PCE and TCE were detected in each of the July 2016 sub-slab vapor samples at concentrations ranging from 59 $\mu g/m^3$ to 8,700 $\mu g/m^3$ and from 0.32 J $\mu g/m^3$ to 52 $\mu g/m^3$, respectively. It appears that sub-slab vapor concentrations may be fluctuating over time and additional sampling may be needed to further evaluate concentration trends.

PCE and TCE were also detected in the deeper subsurface soil gas monitoring point at concentrations of 20,000 $\mu g/m^3$ to 18 $\mu g/m^3$, respectively. The detected PCE soil gas concentration was higher than the sub-slab vapor PCE concentration (8,700 $\mu g/m^3$ in HHVMP-2), but the detected TCE concentration was lower than the sub-slab vapor TCE concentration (52 $\mu g/m^3$ in HHVMP-2).

To evaluate the potential vapor intrusion risk associated with the detected sub-slab vapor and soil gas concentrations, H&H calculated the predicted indoor air PCE and TCE concentrations based on the site-specific AF of 0.006. H&H then used the DSCA Program's Indoor Air Risk Calculators to evaluate the cumulative risk associated with the predicted indoor air concentrations. The risk calculations indicate acceptable risk levels (carcinogenic risk less than

1 x 10^{-5} and HI values less than 1) for a non-residential worker based on the predicted indoor air concentrations for the July 2016 sampling event. For a residential exposure scenario, the HI exceeded the acceptable level of 1 based on the predicted indoor air concentrations in HHSG-1 and HHVMP-2. Soil gas monitoring point HHSG-1 and sub-slab vapor monitoring point HHVMP-2 are both located inside the Hour Glass Cleaners facility.

H&H appreciates the opportunity to work with you on this project. If you have any questions or require additional information, please do not hesitate to contact us at 704-586-0007.

Sincerely,

Hart & Hickman, PC

Brett Lawrence
Assistant Project Geologist

Christie Zawtocki, PE
Principal Engineer

NORTH CAROLINA PROFESSIONAL SEAL 027221 ENGINEER CHRISTIE E. ZAWTOCKI
9/19/16

Attachments

TABLES

Table 3: Analytical Data for Sub-slab Gas **ADT 3**

DSCA ID No.: DC110009

Sample ID	Depth [inches bgs]	Slab Thickness [inches]	Sampling Duration [1]	Sampling Date (mm/dd/yy)	Benzene	cis-1,2-Dichloroethylene	Ethylbenzene	Methyl tert-butyl ether (MTBE)	Naphthalene	Tetrachloroethylene	Toluene	trans-1,2-Dichloroethylene	Trichloroethylene	Vinyl chloride	Xylenes (total)
					[µg/m^3]										
VMP-1	5.5	5	1 h	3/15/12	NA	3.3 J	NA	NA	NA	29,000	NA	1.4 J	1,600	<5.1	NA
VMP-2	5.5	5	1 h	3/15/12	NA	<7.9	NA	NA	NA	18,000	NA	4.9 J	370	<5.1	NA
VMP-3	5.5	5	1 h	3/15/12	NA	<7.9	NA	NA	NA	15,000	NA	1.7 J	9.2 J	<5.1	NA
VMP-4	5.5	5	1 h	3/15/12	NA	<0.79	NA	NA	NA	1,200	NA	0.17 J	190	<0.51	NA
VMP-5	5.5	5	1 h	3/15/12	NA	<2.0	NA	NA	NA	5,700	NA	<2.0	1.0 J	<1.3	NA
HHVMP-1	5.5	5	1 h	10/15/15	NA	0.46 J	NA	NA	NA	54	NA	<0.79	1.3	<0.51	NA
			1 h	3/10/16	NA	<7.9	NA	NA	NA	1,300	NA	<7.9	70	<5.1	NA
			1 h	7/21/16	NA	<0.79	NA	NA	NA	190	NA	<0.79	0.9 J	<0.51	NA
HHVMP-2	5.5	5	1 h	10/15/15	NA	<2.0	NA	NA	NA	11,000	NA	<2.0	25	<1.3	NA
			1 h	3/10/16	NA	<7.9	NA	NA	NA	12,000	NA	<7.9	100	<5.1	NA
			1 h	7/21/16	NA	<7.9	NA	NA	NA	8,700	NA	<7.9	52	<5.1	NA
HHVMP-3	5.5	5	1 h	10/15/15	NA	<0.79	NA	NA	NA	880	NA	0.24 J	0.67 J	<0.51	NA
			1 h	3/10/16	NA	<7.9	NA	NA	NA	12,000	NA	<7.9	4.3 J	<5.1	NA
			1 h	7/21/16	NA	<0.79	NA	NA	NA	760	NA	<0.79	0.71 J	<0.51	NA
HHVMP-4	5.5	5	1 h	10/15/15	NA	<0.79	NA	NA	NA	510	NA	<0.79	4.3	<0.51	NA
			1 h	3/10/16	NA	<7.9	NA	NA	NA	1,700	NA	<7.9	11	<5.1	NA
			1 h	7/21/16	NA	<0.79	NA	NA	NA	59	NA	<0.79	1.4	<0.51	NA
HHVMP-5	5.5	5	1 h	10/15/15	NA	<0.79	NA	NA	NA	940	NA	<0.79	<1.1	<0.51	NA
			1 h	3/10/16	NA	<7.9	NA	NA	NA	1,200	NA	<7.9	<11	<5.1	NA
			1 h	7/21/16	NA	<0.79	NA	NA	NA	1,500	NA	<0.79	0.32 J	<0.51	NA
DWM Residential Soil Gas Screening Level					--	NE	--	--	--	278	--	NE	13.9	76.8	--
DWM Non-Residential Soil Gas Screening Level					--	NE	--	--	--	3,500	--	NE	175	2,790	--

Notes:
1. NE = Not Established; DWM = Division of Waste Management; NA = Not Analyzed; -- = Not Applicable
2. DWM Non-Residential and Residential Soil Gas Screening Levels (March 2016) are provided for reference.
3. J flag denotes estimated concentration between the laboratory reporting limit and method detection limit.

[1] Indicate "G" for grab sample or for longer samples indicate the number of hours followed by "h".

Table 4: Analytical Data for Soil Gas **ADT 4**

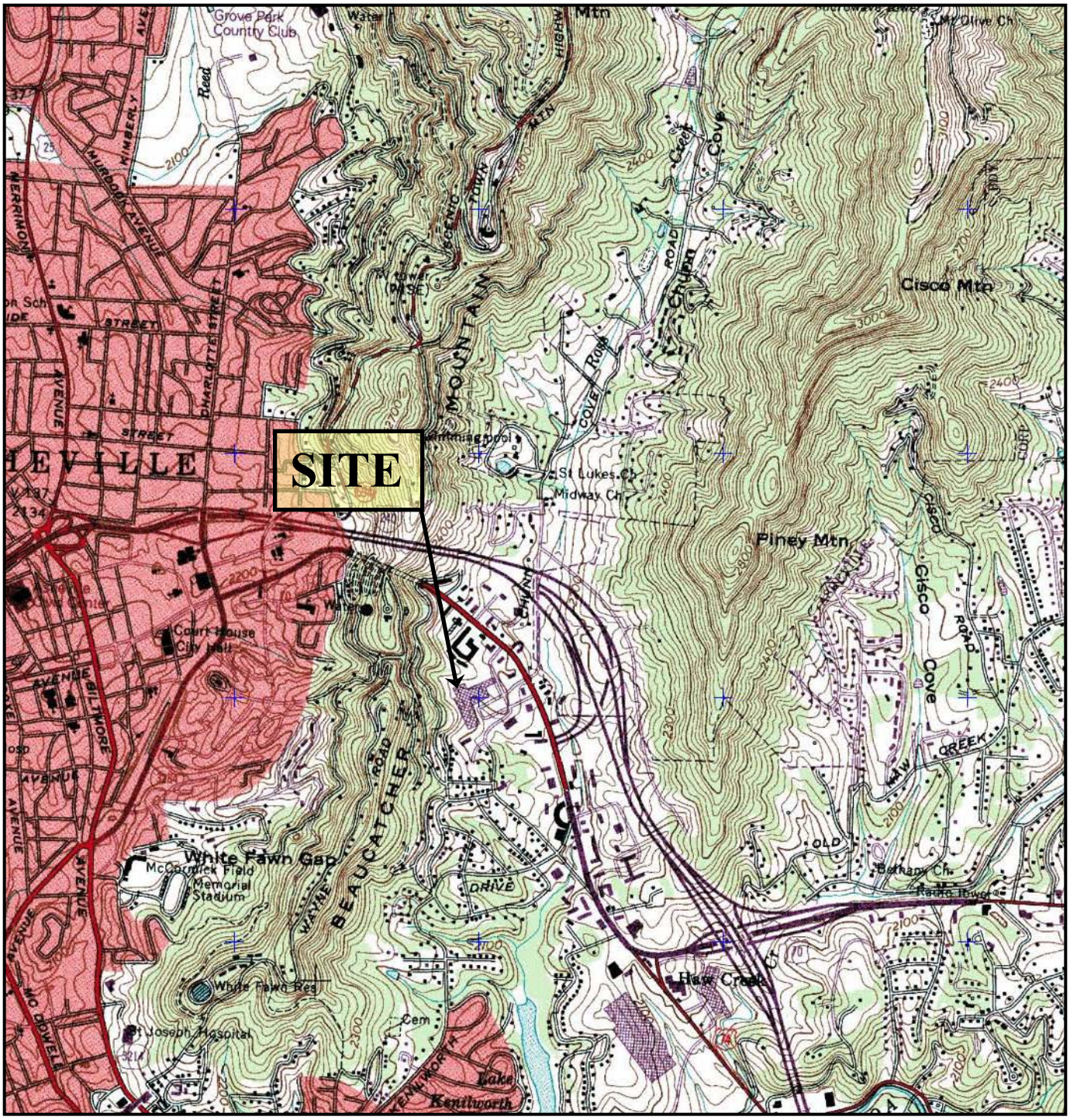
DSCA ID No.: DC110009

Sample ID	Depth [feet bgs]	Sample Duration[1]	Sampling Date (mm/dd/yy)	Benzene	cis-1,2-Dichloroethylene	Ethylbenzene	Methyl tert-butyl ether (MTBE)	Naphthalene	Tetrachloroethylene	Toluene	trans-1,2-Dichloroethylene	Trichloroethylene	Vinyl chloride	Xylenes (total)
				[µg/m^3]										
HHSG-1	6	1 h	7/21/16	NA	<7.9	NA	NA	NA	20,000	NA	<7.9	18	<5.1	NA
DWM Residential Soil Gas Screening Level				--	NE	--	--	--	278	--	NE	13.9	76.8	--
DWM Non-Residential Soil Gas Screening Level				--	NE	--	--	--	3,500	--	NE	175	2,790	--

Notes:
1. NE = Not Established; DWM = Division of Waste Management; NA = Not Analyzed
2. DWM Non-Residential and Residential Soil Gas Screening Levels (March 2016) are provided for reference.

[1] Indicate "G" for grab sample or for longer samples indicate the number of hours followed by "h".

FIGURES



N

APPROXIMATE

0 2000 4000

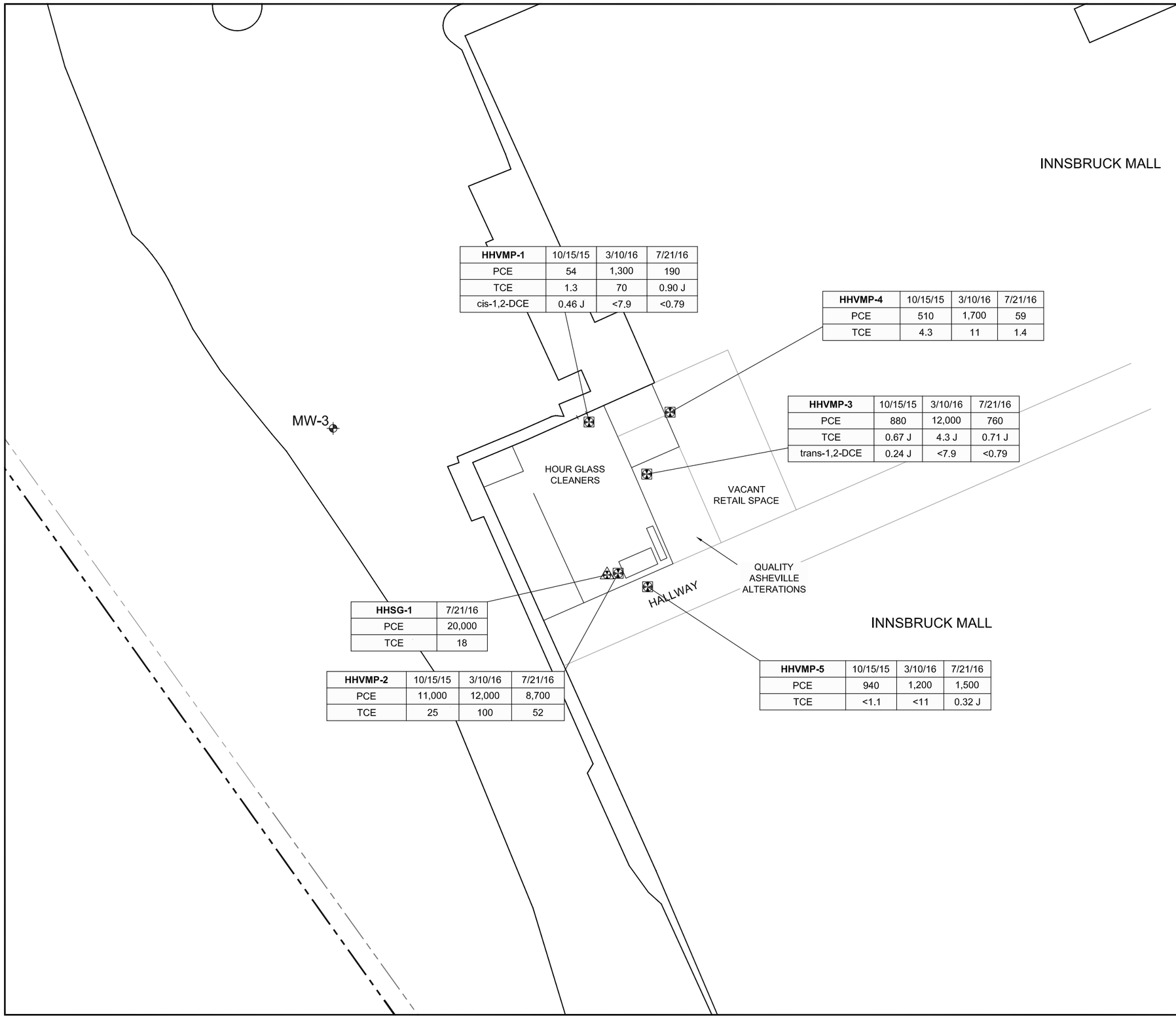
SCALE IN FEET

U.S.G.S. QUADRANGLE MAP

ASHEVILLE, NC 1961
(PHOTOREVISED 1991)

QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

TITLE	**SITE LOCATION MAP**
PROJECT	**HOUR GLASS CLEANERS** **DSCA ID: DC110009** 85 TUNNEL ROAD ASHEVILLE, BUNCOMBE COUNTY
hart hickman	*2923 S. Tryon Street, Suite 100* *Charlotte, NC 28203* *704.586.0007(p) 704.586.0373(f)*
DATE: 9/19/2016	REVISION NO. 0
JOB NO. DS0-72	FIGURE NO. 1



HHVMP-1	10/15/15	3/10/16	7/21/16
PCE	54	1,300	190
TCE	1.3	70	0.90 J
cis-1,2-DCE	0.46 J	<7.9	<0.79

HHVMP-4	10/15/15	3/10/16	7/21/16
PCE	510	1,700	59
TCE	4.3	11	1.4

HHVMP-3	10/15/15	3/10/16	7/21/16
PCE	880	12,000	760
TCE	0.67 J	4.3 J	0.71 J
trans-1,2-DCE	0.24 J	<7.9	<0.79

HHSG-1	7/21/16
PCE	20,000
TCE	18

HHVMP-2	10/15/15	3/10/16	7/21/16
PCE	11,000	12,000	8,700
TCE	25	100	52

HHVMP-5	10/15/15	3/10/16	7/21/16
PCE	940	1,200	1,500
TCE	<1.1	<11	0.32 J

LEGEND

- SITE PROPERTY BOUNDARY
- BUILDING
- WATER LINE (APPROXIMATE LOCATION)
- SEWER LINE (APPROXIMATE LOCATION)
- UNDERGROUND ELECTRICAL LINE (APPROXIMATE LOCATION)
- TYPE II MONITORING WELL
- SUB-SLAB VAPOR MONITORING POINT
- SOIL GAS MONITORING POINT

SAMPLE ID — SAMPLE DATE

HHVMP-4	10/15/15	3/10/16	7/21/16
PCE	510	1,700	59
TCE	4.3	11	1.4

CONSTITUENT — CONCENTRATION (µg/m³)

NOTES:

1. J FLAG DENOTES ESTIMATED VALUE BETWEEN METHOD DETECTION LIMIT AND LABORATORY REPORTING LIMIT.
2. PCE = TETRACHLOROETHYLENE
   TCE = TRICHLOROETHYLENE
   cis-1,2-DCE = cis-1,2-DICHLOROETHYLENE
   trans-1,2-DCE = trans-1,2-DICHLOROETHYLENE
3. HHSG-1 INSTALLED TO A DEPTH OF 6' BELOW GROUND SURFACE.

N

APPROXIMATE

0 30 60

SCALE IN FEET

TITLE
SUB-SLAB SOIL VAPOR & SUBSURFACE SOIL GAS CONTAMINANT CONCENTRATION MAP

PROJECT
HOUR GLASS CLEANERS
DSCA ID: DC110009
85 TUNNEL ROAD
ASHEVILLE, BUNCOMBE COUNTY

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 9–19–16	REVISION NO. 0
JOB NO. DS0–72	FIGURE NO. 2

S:\AAA-Master Projects\DSCA - DS0\DS0-72 Hour Glass\Reports\07-2016 VI & GW\Figures\DC110009_20160517_Figures.dwg: FIG 2, 9/19/2016 10:49:37 AM, zbarlow

APPENDIX A
PHOTOGRAPHS

Photograph 1: HHVMP-1, Hour Glass Cleaners, Suite #39

Photograph 2: HHVMP-2, Hour Glass Cleaners, Suite #39

hart hickman
2923 S. Tryon Street, Suite 100
Charlotte, NC 28203
704.586.0007(p) 704.586.0373(f)

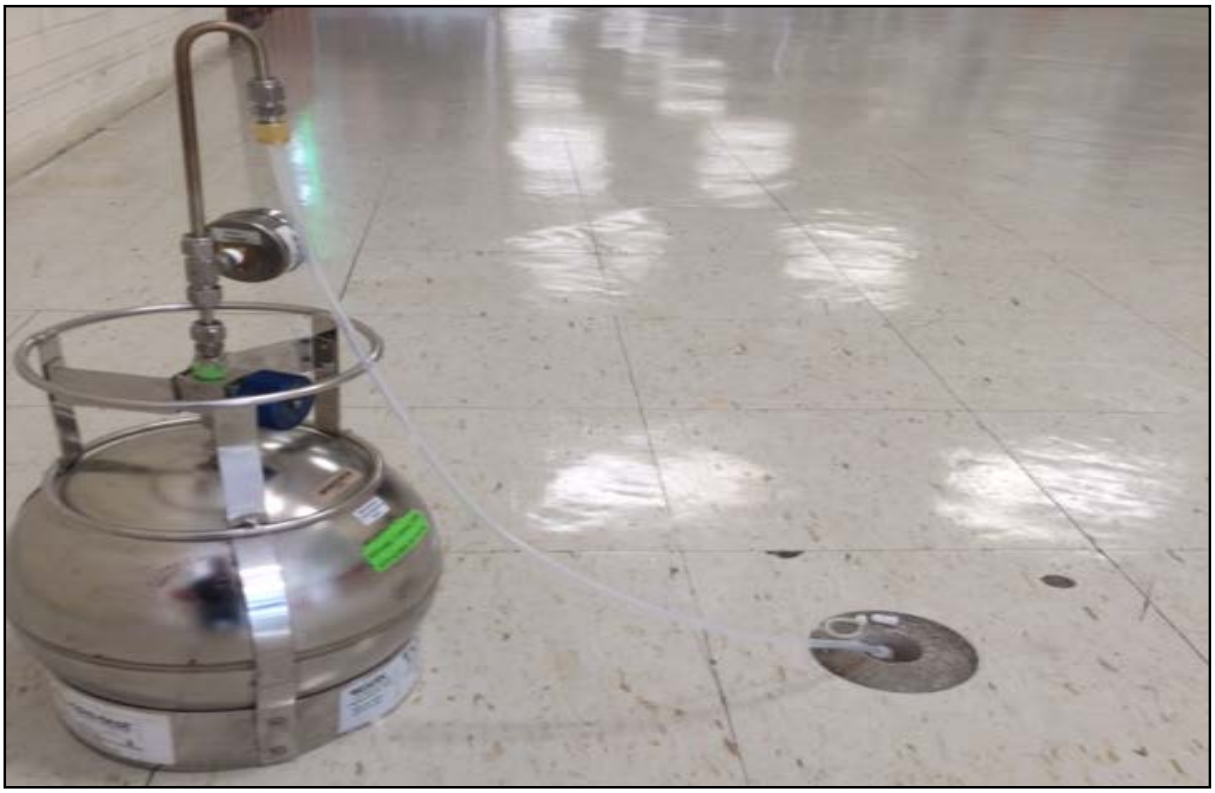
HOUR GLASS CLEANERS
DSCA ID: DC110009
ASHEVILLE, NORTH CAROLINA

Photograph 3: HHVMP-3, Quality Asheville Alterations, Suite #38

Photograph 4: HHVMP-4, Vacant Tenant Space, Suite #37

hart hickman
2923 S. Tryon Street, Suite 100
Charlotte, NC 28203
704.586.0007(p) 704.586.0373(f)

HOUR GLASS CLEANERS
DSCA ID: DC110009
ASHEVILLE, NORTH CAROLINA



Photograph 5: HHVMP-5, Innsbruck Mall Hallway (adjacent to Hour Glass Cleaners)

Photograph 6: HHSG-1, Hour Glass Cleaners, Suite #39

hart hickman
2923 S. Tryon Street, Suite 100
Charlotte, NC 28203
704.586.0007(p) 704.586.0373(f)

HOUR GLASS CLEANERS
DSCA ID: DC110009
ASHEVILLE, NORTH CAROLINA

APPENDIX B
LABORATORY ANALYTICAL REPORT

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

August 2, 2016

Brett Lawrence
Hart & Hickman - Charlotte, NC
2923 South Tryon Street, Suite 100
Charlotte, NC 28203

Project Location: Asheville, NC
Client Job Number:
Project Number: DS0-72
Laboratory Work Order Number: 16G1218

Enclosed are results of analyses for samples received by the laboratory on July 22, 2016. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Lisa A. Worthington
Project Manager

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

Hart & Hickman - Charlotte, NC
2923 South Tryon Street, Suite 100
Charlotte, NC 28203
ATTN: Brett Lawrence

REPORT DATE: 8/2/2016

PURCHASE ORDER NUMBER:

PROJECT NUMBER: DS0-72

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 16G1218

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

PROJECT LOCATION: Asheville, NC

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
HHVMP-1	16G1218-01	Sub Slab		EPA TO-15	
HHVMP-2	16G1218-02	Sub Slab		EPA TO-15	
HHVMP-3	16G1218-03	Sub Slab		EPA TO-15	
HHVMP-4	16G1218-04	Sub Slab		EPA TO-15	
HHVMP-5	16G1218-05	Sub Slab		EPA TO-15	
HHSG-1	16G1218-06	Soil Gas		EPA TO-15	

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

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:

Laboratory fortified blank/laboratory control sample recovery is outside of control limits. Reported value for this compound is likely to be biased on the low side.

Analyte & Samples(s) Qualified:

Vinyl Chloride

16G1218-01[HHVMP-1], 16G1218-02[HHVMP-2], 16G1218-03[HHVMP-3], 16G1218-04[HHVMP-4], 16G1218-05[HHVMP-5], 16G1218-06[HHSG-1], B155017-BLK1, B155017-BS1, B155019-BLK1, B155019-BS1

Continuing calibration did not meet method specifications and was biased on the low side for this compound. Increased uncertainty is associated with the reported value which is likely to be biased on the low side.

Analyte & Samples(s) Qualified:

Vinyl Chloride

16G1218-01[HHVMP-1], 16G1218-02[HHVMP-2], 16G1218-03[HHVMP-3], 16G1218-04[HHVMP-4], 16G1218-05[HHVMP-5], 16G1218-06[HHSG-1], B155017-BLK1, B155017-BS1, B155019-BLK1, B155019-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

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

ANALYTICAL RESULTS

Project Location: Asheville, NC
Date Received: 7/22/2016
Field Sample #: HHVMP-1
Sample ID: 16G1218-01
Sample Matrix: Sub Slab
Sampled: 7/21/2016 16:50

Sample Description/Location:
Sub Description/Location:
Canister ID: 2143
Canister Size: 6 liter
Flow Controller ID: 4116
Sample Type: 1 hr

Work Order: 16G1218
Initial Vacuum(in Hg): -25
Final Vacuum(in Hg): -3
Receipt Vacuum(in Hg): -3.7
Flow Controller Type: Fixed-Orifice
Flow Controller Calibration
RPD Pre and Post-Sampling:

EPA TO-15

Analyte	ppbv Results	ppbv RL	MDL	Flag	ug/m3 Results	ug/m3 RL	Dilution	Date/Time Analyzed	Analyst
cis-1,2-Dichloroethylene	ND	0.20	0.076		ND	0.79	4	8/1/16 7:36	CMR
trans-1,2-Dichloroethylene	ND	0.20	0.053		ND	0.79	4	8/1/16 7:36	CMR
Tetrachloroethylene	27	0.20	0.057		190	1.4	4	8/1/16 7:36	CMR
Trichloroethylene	0.17	0.20	0.059	J	0.90	1.1	4	8/1/16 7:36	CMR
Vinyl Chloride	ND	0.20	0.086	L-03, V-05	ND	0.51	4	8/1/16 7:36	CMR

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	106	70-130	8/1/16 7:36

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ANALYTICAL RESULTS

Project Location: Asheville, NC
Date Received: 7/22/2016
Field Sample #: HHVMP-2
Sample ID: 16G1218-02
Sample Matrix: Sub Slab
Sampled: 7/21/2016 16:50

Sample Description/Location:
Sub Description/Location:
Canister ID: 1159
Canister Size: 6 liter
Flow Controller ID: 4117
Sample Type: 1 hr

Work Order: 16G1218
Initial Vacuum(in Hg): -28
Final Vacuum(in Hg): -5
Receipt Vacuum(in Hg): -5.1
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**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
cis-1,2-Dichloroethylene	ND	2.0	0.76		ND	7.9	40	7/31/16 9:05	CMR
trans-1,2-Dichloroethylene	ND	2.0	0.53		ND	7.9	40	7/31/16 9:05	CMR
Tetrachloroethylene	1300	2.0	0.57		8700	14	40	7/31/16 9:05	CMR
Trichloroethylene	9.7	2.0	0.59		52	11	40	7/31/16 9:05	CMR
Vinyl Chloride	ND	2.0	0.86	L-03, V-05	ND	5.1	40	7/31/16 9:05	CMR

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	107	70-130	7/31/16 9:05

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ANALYTICAL RESULTS

Project Location: Asheville, NC
Date Received: 7/22/2016
Field Sample #: HHVMP-3
Sample ID: 16G1218-03
Sample Matrix: Sub Slab
Sampled: 7/21/2016 16:52

Sample Description/Location:
Sub Description/Location:
Canister ID: 1105
Canister Size: 6 liter
Flow Controller ID: 4118
Sample Type: 1 hr

Work Order: 16G1218
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -6
Receipt Vacuum(in Hg): -6.6
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**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
cis-1,2-Dichloroethylene	ND	0.20	0.076		ND	0.79	4	8/1/16 6:57	CMR
trans-1,2-Dichloroethylene	ND	0.20	0.053		ND	0.79	4	8/1/16 6:57	CMR
Tetrachloroethylene	110	0.20	0.057		760	1.4	4	8/1/16 6:57	CMR
Trichloroethylene	0.13	0.20	0.059	J	0.71	1.1	4	8/1/16 6:57	CMR
Vinyl Chloride	ND	0.20	0.086	L-03, V-05	ND	0.51	4	8/1/16 6:57	CMR

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	108	70-130	8/1/16 6:57

con-test® ANALYTICAL LABORATORY

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ANALYTICAL RESULTS

Project Location: Asheville, NC
Date Received: 7/22/2016
Field Sample #: HHVMP-4
Sample ID: 16G1218-04
Sample Matrix: Sub Slab
Sampled: 7/21/2016 16:53

Sample Description/Location:
Sub Description/Location:
Canister ID: 2166
Canister Size: 6 liter
Flow Controller ID: 4119
Sample Type: 1 hr

Work Order: 16G1218
Initial Vacuum(in Hg): -25
Final Vacuum(in Hg): -3
Receipt Vacuum(in Hg): -3.2
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**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
cis-1,2-Dichloroethylene	ND	0.20	0.076		ND	0.79	4	8/1/16 5:40	CMR
trans-1,2-Dichloroethylene	ND	0.20	0.053		ND	0.79	4	8/1/16 5:40	CMR
Tetrachloroethylene	8.7	0.20	0.057		59	1.4	4	8/1/16 5:40	CMR
Trichloroethylene	0.26	0.20	0.059		1.4	1.1	4	8/1/16 5:40	CMR
Vinyl Chloride	ND	0.20	0.086	L-03, V-05	ND	0.51	4	8/1/16 5:40	CMR

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	107	70-130	8/1/16 5:40

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

ANALYTICAL RESULTS

Project Location: Asheville, NC
Date Received: 7/22/2016
Field Sample #: HHVMP-5
Sample ID: 16G1218-05
Sample Matrix: Sub Slab
Sampled: 7/21/2016 16:52

Sample Description/Location:
Sub Description/Location:
Canister ID: 2156
Canister Size: 6 liter
Flow Controller ID: 4130
Sample Type: 1 hr

Work Order: 16G1218
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -6
Receipt Vacuum(in Hg): -4.8
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**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
cis-1,2-Dichloroethylene	ND	0.20	0.076		ND	0.79	4	8/1/16 6:18	CMR
trans-1,2-Dichloroethylene	ND	0.20	0.053		ND	0.79	4	8/1/16 6:18	CMR
Tetrachloroethylene	220	0.20	0.057		1500	1.4	4	8/1/16 6:18	CMR
Trichloroethylene	0.060	0.20	0.059	J	0.32	1.1	4	8/1/16 6:18	CMR
Vinyl Chloride	ND	0.20	0.086	L-03, V-05	ND	0.51	4	8/1/16 6:18	CMR

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	109	70-130	8/1/16 6:18

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ANALYTICAL RESULTS

Project Location: Asheville, NC
Date Received: 7/22/2016
Field Sample #: HHSG-1
Sample ID: 16G1218-06
Sample Matrix: Soil Gas
Sampled: 7/21/2016 16:41

Sample Description/Location:
Sub Description/Location:
Canister ID: 2138
Canister Size: 6 liter
Flow Controller ID: 4131
Sample Type: 1 hr

Work Order: 16G1218
Initial Vacuum(in Hg): -29
Final Vacuum(in Hg): -6
Receipt Vacuum(in Hg): -8.5
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**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
cis-1,2-Dichloroethylene	ND	2.0	0.76		ND	7.9	40	7/31/16 11:42	CMR
trans-1,2-Dichloroethylene	ND	2.0	0.53		ND	7.9	40	7/31/16 11:42	CMR
Tetrachloroethylene	3000	2.0	0.57		20000	14	40	7/31/16 11:42	CMR
Trichloroethylene	3.4	2.0	0.59		18	11	40	7/31/16 11:42	CMR
Vinyl Chloride	ND	2.0	0.86	L-03, V-05	ND	5.1	40	7/31/16 11:42	CMR

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	106	70-130	7/31/16 11:42

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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
16G1218-02 [HHVMP-2]	B155017	1.5	1	N/A	1000	400	15	07/30/16
16G1218-06 [HHSG-1]	B155017	1.5	1	N/A	1000	400	15	07/30/16

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
16G1218-01 [HHVMP-1]	B155019	1.5	1	N/A	1000	400	150	07/31/16
16G1218-03 [HHVMP-3]	B155019	1.5	1	N/A	1000	400	150	07/31/16
16G1218-04 [HHVMP-4]	B155019	1.5	1	N/A	1000	400	150	07/31/16
16G1218-05 [HHVMP-5]	B155019	1.5	1	N/A	1000	400	150	07/31/16

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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
Batch B155017 - TO-15 Prep												
Blank (B155017-BLK1)					Prepared & Analyzed: 07/30/16							
cis-1,2-Dichloroethylene	ND	0.034										
trans-1,2-Dichloroethylene	ND	0.034										
Tetrachloroethylene	ND	0.034										
Trichloroethylene	ND	0.034										
Vinyl Chloride	ND	0.034										L-03, V-05
Surrogate: 4-Bromofluorobenzene (1)	*8.36*				*8.00*		*104*		*70-130*			
LCS (B155017-BS1)					Prepared & Analyzed: 07/30/16							
cis-1,2-Dichloroethylene	4.71				5.00		94.1		70-130			
trans-1,2-Dichloroethylene	4.64				5.00		92.8		70-130			
Tetrachloroethylene	6.21				5.00		124		70-130			
Trichloroethylene	5.41				5.00		108		70-130			
Vinyl Chloride	3.17				5.00		**63.3**	*	70-130			L-03, V-05
Surrogate: 4-Bromofluorobenzene (1)	*8.49*				*8.00*		*106*		*70-130*			
Batch B155019 - TO-15 Prep												
Blank (B155019-BLK1)					Prepared & Analyzed: 07/31/16							
cis-1,2-Dichloroethylene	ND	0.034										
trans-1,2-Dichloroethylene	ND	0.034										
Tetrachloroethylene	ND	0.034										
Trichloroethylene	ND	0.034										
Vinyl Chloride	ND	0.034										L-03, V-05
Surrogate: 4-Bromofluorobenzene (1)	*8.34*				*8.00*		*104*		*70-130*			
LCS (B155019-BS1)					Prepared & Analyzed: 07/31/16							
cis-1,2-Dichloroethylene	4.48				5.00		89.5		70-130			
trans-1,2-Dichloroethylene	4.55				5.00		91.0		70-130			
Tetrachloroethylene	5.24				5.00		105		70-130			
Trichloroethylene	5.19				5.00		104		70-130			
Vinyl Chloride	3.14				5.00		**62.7**	*	70-130			L-03, V-05
Surrogate: 4-Bromofluorobenzene (1)	*8.52*				*8.00*		*107*		*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
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-03	Laboratory fortified blank/laboratory control sample recovery is outside of control limits. Reported value for this compound is likely to be biased on the low side.
V-05	Continuing calibration did not meet method specifications and was biased on the low side for this compound. Increased uncertainty is associated with the reported value which is likely to be biased on the low side.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA TO-15 in Air	
cis-1,2-Dichloroethylene	AIHA,FL,NY,VA
trans-1,2-Dichloroethylene	AIHA,NJ,NY,VA
Tetrachloroethylene	AIHA,FL,NJ,NY,VA
Trichloroethylene	AIHA,FL,NJ,NY,VA
Vinyl Chloride	AIHA,FL,NJ,NY,VA

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	06/30/2017
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	06/30/2017
FL	Florida Department of Health	E871027 NELAP	06/30/2017
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2017
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

1661218

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Doc #378 Rev 0 5/8/15

con-test ANALYTICAL LABORATORY
Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

CHAIN OF CUSTODY RECORD (AIR)

39 Spruce Street
East Longmeadow, MA 01028

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: blawrence@harthickman.com
Fax To #:

Company Name: Hart & Hickman
Address: 2923 S. Tryon St., Charlotte, NC
Phone: (704) 586-0007
Project Name: Hour Glass Cleaners
Project Location: Asheville, NC
Project Number: DS0-72
Project Manager: Brett Lawrence
Con-Test Bid:
Invoice Recipient:
Sampled By: Shane Sisco

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: Con-Test Work Order#	Client Use: Client Sample ID / Description	Collection Data: Beginning Date/Time	Collection Data: Ending Date/Time	Duration: Total Minutes Sampled	Flow Rate: ☐ m³/min ☒ L/min	Matrix: Code	Volume: ☒ Liters ☐ m³	TO-15 *				Initial Pressure (" Hg)	Final Pressure (" Hg)	Lab Receipt Pressure (" Hg)	Summa Can ID	Flow Controller ID
01	HHVMP-1	7/21/16 1550	7/21 1650	60	100 mL/m	SS	6 L	X				-25	-3	-3.7	BC 2143	4116
02	HHVMP-2	1550	1650									-28	-5	-5.1	BC 1159	4117
03	HHVMP-3	1552	1652									-30	-6	-6.6	BC 1105	4118
04	HHVMP-4	1553	1653									-25	-3	-3.2	BC 2166	4119
05	HHVMP-5	1552	1652									-30	-6	-4.8	BC 2156	4130
06	HHSG-2	1551	1651			SG						-29	-6	-8.5	BC 2132	4131

Comments: *PCE, TCE, cis/trans 1,2-DCE, VC
BC 1067/4653 sent in empty due to no sample needed

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:
[signature]	7/22/16 1100
Received by: (signature) [signature]	Date/Time: 7/22/16 1240
Relinquished by: (signature) [signature]	Date/Time: 7/22/16 1630
Received by: (signature) Paula Blakeborough	Date/Time: 7-26-16 12:07
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

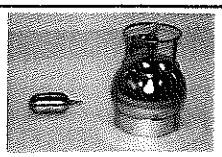
Detection Limit Requirements
MA
CT
Other:

Special Requirements
☐ MA MCP Required
☐ CT RCP Required
☐ Enhanced Data Package Required

NELAC and AIHA-LAP, LLC Accredited

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



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

AIR Only Receipt Checklist

CLIENT NAME Hart + Hickman RECEIVED BY: PB DATE: 7·26·13

1) Was the chain(s) of custody relinquished and signed? Yes ✓ No ____

2) Does the chain agree with the samples? Yes ✓ No ____
If not, explain:

3) Are all the samples in good condition? Yes ✓ No ____
If not, explain:

4) Are there any samples "On Hold"? Yes ____ No ✓ Stored where: ____

5) Are there any RUSH or SHORT HOLDING TIME samples? Yes ____ No ✓
Who was notified ____ Date ____ Time ____

6) Location where samples are stored: Air Lab

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)		7	6 Lit
Tedlar Bags			
TO-17 Tubes			
Regulators		7	1 hr
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:

Unused Regulators:

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:																
						2143	2156		4253	4131						
						1159	2138		4117	4118						
						1105	1067		4116	4119						
						2166			4130							

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.	T	
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:**

Log-In Technician Initials: PB **Date/Time:** 7-26-16 12:07

Doc #278 Rev. 5 October 2014

APPENDIX C
ATTENUATION FACTOR EVALUATION

Table C-1
Site-Specific Attenuation Factor Evaluation
Hour Glass Cleaners
DSCA No. DC110009

	Radon Results		
Sample Location	Indoor Air Radon Concentration	Sub-Slab Vapor Radon Concentration	Radon Attenuation Factor (AF)
	pCi/L		
Hour Glass Cleaners 85 Tunnel Rd, Suite #39 Asheville, NC	0.66	225	0.003
Vacant Tenant Space 85 Tunnel Rd, Suite #37 Asheville, NC	1.17	2.9	0.403[(1)]

Table C-2
Predicted Indoor Air Concentrations Based on Site-Specific Attenuation Factor
Hour Glass Cleaners
DSCA ID No. DC110009

			Sub-Slab Vapor and Soil Gas Sample Results		Predicted Indoor Air Concentrations (AF = 0.006)[1]	
Sample Location	Sample ID	Sampling Date	Tetrachloroethylene	Trichloroethylene	Tetrachloroethylene (Sub-slab concentration x AF)	Trichloroethylene (Sub-slab concentration x AF)
			µg/m^3		µg/m^3	
Hour Glass Cleaners, Suite #39	HHSG-1	7/21/2016	20,000	18	120	0.11
	HHVMP-1	7/21/16	190	0.9 J	1.1	0.0054
	HHVMP-2	7/21/16	8,700	52	52	0.31
Quality Asheville Alterations, Suite #38	HHVMP-3	7/21/16	760	0.71 J	4.6	0.0043
Vacant Tenant Space, Suite #37	HHVMP-4	7/21/16	59	1.4	0.35	0.0084
Innsbruck Mall Hallway (adjacent to Cleaners)	HHVMP-5	7/21/16	1,500	0.32 J	9.0	0.0019

Notes:
1) Site-specific attenuation factor = 0.006, based on June 2012 indoor air and sub-slab radon data.
HHVMP = Sub-Slab Vaport Monitoring Point
HHSG = Soil Gas Monitoring Point

APPENDIX D
DSCA INDOOR AIR RISK CALCULATORS

DSCA Indoor Air Risk Calculator - Cumulative Risk for Resident
Version 5, Sept 2016

DSCA ID No: DC110009
Name/Address of DSCA Site: Hour Glass Cleaners, 85 Tunnel Road, Asheville, Buncombe County
Name/Address of Sampling Location: Hour Glass Cleaners, 85 Tunnel Road, Suite #39, Asheville, Buncombe County

Sampling Date: 7/21/2016
Sample ID: HHSG-1 (AF = 0.006)

All concentrations are in ug/m^3

CAS #	Chemical Name:	Indoor Air Concentration (ug/m^3)	Indoor Air Screening Level for Carcinogens @ TCR = 1E-06	Indoor Air Screening Level for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	120	1.08E+01	8.34E+00	1.1E-05	2.9E+00
79-01-6	Trichloroethylene	0.11	4.78E-01	4.17E-01	2.3E-07	5.3E-02
				Cumulative:	1.1E-05	2.9E+00

DSCA Indoor Air Risk Calculator - Cumulative Risk for Non-Residential Worker
Version 5, September 2016

DSCA ID No: DC110009
Name/Address of DSCA Site: Hour Glass Cleaners, 85 Tunnel Road, Asheville, Buncombe County
Name/Address of Sampling Location: Hour Glass Cleaners, 85 Tunnel Road, Suite #39, Asheville, Buncombe County

Sampling Date: 7/21/2016
Sample ID: HHSG-1 (AF = 0.006)

All concentrations are in ug/m^3

CAS #	Chemical Name:	Indoor Air Concentration (ug/m^3)	Indoor Air Screening Level for Carcinogens @ TCR = 1E-06	Indoor Air Screening Level for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	120	4.72E+01	3.50E+01	2.5E-06	6.8E-01
79-01-6	Trichloroethylene	0.11	2.99E+00	1.75E+00	3.7E-08	1.3E-02
				Cumulative:	2.6E-06	7.0E-01

DSCA Indoor Air Risk Calculator - Cumulative Risk for Resident
Version 5, Sept 2016

DSCA ID No: DC110009
Name/Address of DSCA Site: Hour Glass Cleaners, 85 Tunnel Road, Asheville, Buncombe County
Name/Address of Sampling Location: Hour Glass Cleaners, 85 Tunnel Road, Suite #39, Asheville, Buncombe County

Sampling Date: 7/21/2016
Sample ID: HHVMP-1 (AF = 0.006)

All concentrations are in ug/m^3

CAS #	Chemical Name:	Indoor Air Concentration (ug/m^3)	Indoor Air Screening Level for Carcinogens @ TCR = 1E-06	Indoor Air Screening Level for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	1.1	1.08E+01	8.34E+00	1.0E-07	2.6E-02
79-01-6	Trichloroethylene	0.0054	4.78E-01	4.17E-01	1.1E-08	2.6E-03
				Cumulative:	1.1E-07	2.9E-02

DSCA Indoor Air Risk Calculator - Cumulative Risk for Non-Residential Worker
Version 5, September 2016

DSCA ID No: DC110009
Name/Address of DSCA Site: Hour Glass Cleaners, 85 Tunnel Road, Asheville, Buncombe County
Name/Address of Sampling Location: Hour Glass Cleaners, 85 Tunnel Road, Suite #39, Asheville, Buncombe County

Sampling Date: 7/21/2016
Sample ID: HHVMP-1 (AF = 0.006)

All concentrations are in ug/m^3

CAS #	Chemical Name:	Indoor Air Concentration (ug/m^3)	Indoor Air Screening Level for Carcinogens @ TCR = 1E-06	Indoor Air Screening Level for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	1.1	4.72E+01	3.50E+01	2.3E-08	6.3E-03
79-01-6	Trichloroethylene	0.0054	2.99E+00	1.75E+00	1.8E-09	6.2E-04
				Cumulative:	2.5E-08	6.9E-03

DSCA Indoor Air Risk Calculator - Cumulative Risk for Resident
Version 5, Sept 2016

DSCA ID No: DC110009
Name/Address of DSCA Site: Hour Glass Cleaners, 85 Tunnel Road, Asheville, Buncombe County
Name/Address of Sampling Location: Hour Glass Cleaners, 85 Tunnel Road, Suite #39, Asheville, Buncombe County

Sampling Date: 7/21/2016
Sample ID: HHVMP-2 (AF = 0.006)

All concentrations are in ug/m^3

CAS #	Chemical Name:	Indoor Air Concentration (ug/m^3)	Indoor Air Screening Level for Carcinogens @ TCR = 1E-06	Indoor Air Screening Level for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	52	1.08E+01	8.34E+00	4.8E-06	1.2E+00
79-01-6	Trichloroethylene	0.31	4.78E-01	4.17E-01	6.5E-07	1.5E-01
				Cumulative:	5.5E-06	1.4E+00

DSCA Indoor Air Risk Calculator - Cumulative Risk for Non-Residential Worker
Version 5, September 2016

DSCA ID No: DC110009
Name/Address of DSCA Site: Hour Glass Cleaners, 85 Tunnel Road, Asheville, Buncombe County
Name/Address of Sampling Location: Hour Glass Cleaners, 85 Tunnel Road, Suite #39, Asheville, Buncombe County

Sampling Date: 7/21/2016
Sample ID: HHVMP-2 (AF = 0.006)

All concentrations are in ug/m^3

CAS #	Chemical Name:	Indoor Air Concentration (ug/m^3)	Indoor Air Screening Level for Carcinogens @ TCR = 1E-06	Indoor Air Screening Level for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	52	4.72E+01	3.50E+01	1.1E-06	3.0E-01
79-01-6	Trichloroethylene	0.31	2.99E+00	1.75E+00	1.0E-07	3.5E-02
				Cumulative:	1.2E-06	3.3E-01

DSCA Indoor Air Risk Calculator - Cumulative Risk for Resident
Version 5, Sept 2016

DSCA ID No: DC110009
Name/Address of DSCA Site: Hour Glass Cleaners, 85 Tunnel Road, Asheville, Buncombe County
Name/Address of Sampling Location: Quality Asheville Alterations, 85 Tunnel Road, Suite #38, Asheville, Buncombe County

Sampling Date: 7/21/2016
Sample ID: HHVMP-3 (AF = 0.006)

All concentrations are in ug/m^3

CAS #	Chemical Name:	Indoor Air Concentration (ug/m^3)	Indoor Air Screening Level for Carcinogens @ TCR = 1E-06	Indoor Air Screening Level for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	4.6	1.08E+01	8.34E+00	4.3E-07	1.1E-01
79-01-6	Trichloroethylene	0.0043	4.78E-01	4.17E-01	9.0E-09	2.1E-03
				Cumulative:	4.3E-07	1.1E-01

DSCA Indoor Air Risk Calculator - Cumulative Risk for Non-Residential Worker
Version 5, September 2016

DSCA ID No: DC110009
Name/Address of DSCA Site: Hour Glass Cleaners, 85 Tunnel Road, Asheville, Buncombe County
Name/Address of Sampling Location: 85 Tunnel Road, Asheville, Buncombe County

Sampling Date: 7/21/2016
Sample ID: HHVMP-3 (AF = 0.006)

All concentrations are in ug/m^3

CAS #	Chemical Name:	Indoor Air Concentration (ug/m^3)	Indoor Air Screening Level for Carcinogens @ TCR = 1E-06	Indoor Air Screening Level for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	4.6	4.72E+01	3.50E+01	9.8E-08	2.6E-02
79-01-6	Trichloroethylene	0.0043	2.99E+00	1.75E+00	1.4E-09	4.9E-04
				Cumulative:	9.9E-08	2.7E-02

DSCA Indoor Air Risk Calculator - Cumulative Risk for Resident
Version 5, Sept 2016

DSCA ID No: DC110009
Name/Address of DSCA Site: Hour Glass Cleaners, 85 Tunnel Road, Asheville, Buncombe County
Name/Address of Sampling Location: Vacant Tenant Space, 85 Tunnel Road, Suite #37, Asheville, Buncombe County

Sampling Date: 7/21/2016
Sample ID: HHVMP-4 (AF = 0.006)

All concentrations are in ug/m^3

CAS #	Chemical Name:	Indoor Air Concentration (ug/m^3)	Indoor Air Screening Level for Carcinogens @ TCR = 1E-06	Indoor Air Screening Level for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	0.35	1.08E+01	8.34E+00	3.2E-08	8.4E-03
79-01-6	Trichloroethylene	0.0084	4.78E-01	4.17E-01	1.8E-08	4.0E-03
				Cumulative:	5.0E-08	1.2E-02

DSCA Indoor Air Risk Calculator - Cumulative Risk for Non-Residential Worker
Version 5, September 2016

DSCA ID No: DC110009
Name/Address of DSCA Site: Hour Glass Cleaners, 85 Tunnel Road, Asheville, Buncombe County
Name/Address of Sampling Location: Vacant Tenant Space, 85 Tunnel Road, Suite #37, Asheville, Buncombe County

Sampling Date: 7/21/2016
Sample ID: HHVMP-4 (AF = 0.006)

All concentrations are in ug/m^3

CAS #	Chemical Name:	Indoor Air Concentration (ug/m^3)	Indoor Air Screening Level for Carcinogens @ TCR = 1E-06	Indoor Air Screening Level for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	0.35	4.72E+01	3.50E+01	7.4E-09	2.0E-03
79-01-6	Trichloroethylene	0.0084	2.99E+00	1.75E+00	2.8E-09	9.6E-04
				Cumulative:	1.0E-08	3.0E-03

DSCA Indoor Air Risk Calculator - Cumulative Risk for Resident
Version 5, Sept 2016

DSCA ID No: DC110009
Name/Address of DSCA Site: Hour Glass Cleaners, 85 Tunnel Road, Asheville, Buncombe County
Name/Address of Sampling Location: Innsbruck Mall Hallway (near cleaners) 85 Tunnel Road, Asheville, Buncombe County

Sampling Date: 7/21/2016
Sample ID: HHVMP-5 (AF = 0.006)

All concentrations are in ug/m^3

CAS #	Chemical Name:	Indoor Air Concentration (ug/m^3)	Indoor Air Screening Level for Carcinogens @ TCR = 1E-06	Indoor Air Screening Level for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	9	1.08E+01	8.34E+00	8.3E-07	2.2E-01
79-01-6	Trichloroethylene	0.0019	4.78E-01	4.17E-01	4.0E-09	9.1E-04
				Cumulative:	8.4E-07	2.2E-01

DSCA Indoor Air Risk Calculator - Cumulative Risk for Non-Residential Worker
Version 5, September 2016

DSCA ID No: DC110009
Name/Address of DSCA Site: Hour Glass Cleaners, 85 Tunnel Road, Asheville, Buncombe County
Name/Address of Sampling Location: Innsbruck Mall Hallway (near cleaners) 85 Tunnel Road, Asheville, Buncombe County

Sampling Date: 7/21/2016
Sample ID: HHVMP-5 (AF = 0.006)

All concentrations are in ug/m^3

CAS #	Chemical Name:	Indoor Air Concentration (ug/m^3)	Indoor Air Screening Level for Carcinogens @ TCR = 1E-06	Indoor Air Screening Level for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	9	4.72E+01	3.50E+01	1.9E-07	5.1E-02
79-01-6	Trichloroethylene	0.0019	2.99E+00	1.75E+00	6.4E-10	2.2E-04
				Cumulative:	1.9E-07	5.2E-02