Vapor Intrusion Investigation: Results of Subslab Soil Vapor and Indoor Air Sampling

Alpha Mill Apartments
220 Alpha Mill Lane
Charlotte, North Carolina

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ENVIRON

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Executive Summary

ENVIRON International Corporation conducted an investigation to further evaluate the potential for vapor intrusion (VI) of volatile organic compounds (VOCs) into indoor air at the Alpha Mill Apartments, located at 220 Alpha Mill Lane in Charlotte, North Carolina ("site"). In particular, this investigation focuses on evaluating the potential for vapor intrusion of tetrachloroethylene (PCE) and trichloroethylene (TCE) at the site. The objective of this investigation was to develop data to support the calculation of building-specific VI attenuation factors using naturally occurring radon as a conservative tracer/surrogate for these two VOCs. The attenuation factors were then applied to subslab and indoor air VOC concentration data for the purpose of evaluating indoor air VOC concentrations associated with VI as opposed to other common sources, such as household products, dry cleaning residuals, and building material off-gassing.

For Buildings 3-7, building-specific attenuation factors were developed ranging from 0.002 to 0.018. This indicates that the indoor air concentrations of these VOCs in the first floors of these buildings potentially attributed to VI, without consideration for background contributions, were less than 2% of the subslab concentrations. For Building 1, which has a crawlspace, an attenuation factor of 0.096 was developed, which indicates that the indoor air concentrations of these VOCs in the first floors of that building potentially attributed to VI, without consideration for background contributions, were less than 10% of the crawlspace concentrations.

Indoor air concentrations were calculated based on measured subslab concentrations and building-specific attenuation factors based on radon data. Based on the lower of the measured or the calculated indoor air concentrations (using radon attenuation factors), the averaged results for each building are summarized below. Because these concentrations are all below the *IHSB Residential Vapor Intrusion Screening Level for Indoor Air*, there does not appear to be a vapor intrusion issue at the site and no VI mitigation activities appear to be necessary.

Table ES-1: Building-averaged Calculated Indoor Air Concentrations

Location		PCE ($\mu g/m^3$)	TCE ($\mu g/m^3$)
Building 1		3.2	0.27
Building 3		2.0	0.54
Building 4		0.27	0.14
Building 5		0.09	0.007
Building 6		0.39	0.009
Building 7		0.06	0.001
NCDENR Acceptable	HQ=0.2	8.3	0.42
Indoor Air Conc.	HQ=1.0	41.5	2.1
USEPA Upper-End Background Indoor Air Conc.		3.8	0.5

1 Introduction

1.1 Objectives

Between July 13 and July 19, 2012, ENVIRON International Corporation (ENVIRON) conducted an investigation to further evaluate the potential for vapor intrusion (VI) of volatile organic compounds (VOCs) into indoor air at the Alpha Mill Apartments, located at 220 Alpha Mill Lane in Charlotte, North Carolina ("site"). In particular, this investigation focuses on evaluating the potential for vapor intrusion of tetrachloroethylene (PCE) and trichloroethylene (TCE) into residential apartments at the site. The objective of this investigation was to collect data to support the calculation of building-specific VI attenuation factors using naturally occurring radon as a conservative tracer/surrogate for these two VOCs. The attenuation factors were then applied to subslab and indoor air VOC concentration data for the purpose of evaluating indoor air VOC concentrations associated with VI as opposed to other common sources, such as household products, dry cleaning residuals, and building material off-gassing.

1.2 Site Background

The site consists of seven apartment buildings and one clubhouse/fitness center building. The site has a long history of industrial use, dating back to 1889 including uses as a cotton and textile mill until the mid-1950s, followed by metal engraving, metal plating, and film processing from 1960 until 2001. The site includes two historic buildings that have been renovated into apartments (Buildings 1 and 3) and one historic building that has been renovated into a clubhouse and fitness center (Building 2). Additional multi-story apartment buildings were constructed in 2005/2006 (Buildings 4-8). None of the buildings have basements, although Building 1 has a crawlspace. A polyethylene vapor barrier was placed on the ground surface within accessible portions of the crawlspace in Building 1; the newly constructed buildings have moisture barriers beneath the concrete slab.

A Remedial Investigation (RI) in 2002 identified a groundwater plume containing predominantly PCE, TCE, and chromium beneath the site. The site was remediated in 2005-06 in accordance with a July 2005 Brownfields Agreement (BFA) with the North Carolina Department of Department of Environment and Natural Resources (NCDENR), and groundwater continues to be monitored from three on-site monitoring wells on the downgradient property boundary on an annual basis. Groundwater monitoring data collected from the site as recently as 2010 has identified PCE, TCE, 1,2-dichlorobenzene (1,2-DCB), and 1,4-dichlorobenzene (1,4-DCB) at concentrations that exceed generic NCDENR Residential Vapor Intrusion Screening Levels.

In connection with due diligence activities, ENVIRON conducted two rounds of indoor air sampling – a preliminary screening sampling event in August 2011 and a more comprehensive sampling event in November 2011 (see Figure 1). As a result of these sampling efforts, potential subsurface soil vapor VOC influences in indoor air were identified. Specifically, elevated indoor air concentrations of PCE and TCE and concentration trends potentially indicative of VI were identified in four buildings at the site. It should be noted that no information

was collected from the residents regarding potential indoor sources (e.g., dry cleaned clothes, crafting adhesives, etc. as indoor sources).

Following discussion of these results, NCDENR requested the collection of subslab vapor samples using a tracer substance such as radon. The intent of this approach was to provide additional data regarding whether VOCs in indoor air are sourced from potential vapor intrusion from the subsurface.

2 Methods and Materials

Sampling was conducted in general accordance with NCDENR's 2011 *Supplemental Guidelines for the Evaluation of Structural Vapor Intrusion Potential for Site Assessments and Remedial Actions Under the Inactive Hazardous Sites Branch* and as described in the *Vapor Intrusion Workplan: Subslab Soil Vapor and Indoor Air Sampling* prepared by ENVIRON ("2012 ENVIRON Workplan"), dated June 19, 2012. The 2012 ENVIRON Workplan was approved by NCDENR on June 20, 2012.

ENVIRON collected subslab, crawlspace, and indoor air samples for VOC and radon analysis from certain locations at the site for calculation of building specific attenuation factors between the subsurface and the living space. In order to calculate the attenuation factor, ENVIRON used naturally occurring radon as a tracer/surrogate for PCE and TCE. By measuring the concentration of radon below the building in subslab soil vapor and in the indoor air of a ground floor living space, an attenuation factor (i.e., ratio of the indoor air concentration arising from VI) can be calculated. The attenuation factor can then be applied to subslab VOC concentration data to estimate the VI contribution to indoor air VOC concentrations.

ENVIRON conducted indoor air, crawlspace, and subslab sampling in July 2012 as follows:

Table 1: Dates and Duration of Collected Samples

Sample Location	Radon			VOCs		
	Indoor Air	Crawlspace	Subslab	Indoor Air	Crawlspace	Subslab
Building 1	7/13-16 (72-hr)	7/13-19 (72-hr)	N/A	7/13-16 (72-hr)	7/13-19 (72-hr)	N/A
Buildings 3-7	7/13-16 (72-hr)	N/A	7/18-19 (2x30-60 min)	7/13-16 (72-hr)	N/A	7/18-19 (2x5-min)

Prior to field mobilization, ENVIRON prepared a site-specific Health and Safety Plan (HASP), and reviewed available information regarding the presence of underground piping and electrical conduit associated with the site buildings. Additionally, ENVIRON engaged a private utility locator, Ground Penetrating Radar Systems, Inc. of Charlotte, North Carolina, to identify any subsurface utilities, and rebar and tension cable within the slab.

2.1 Subslab Soil Vapor Probe Installation

As discussed in the 2012 ENVIRON Workplan, VI assessments were performed for each of the buildings except Buildings 2 and 8.

- Building 2 is used as a fitness center and residential exposures are short relative to the time assumed in the living spaces of apartments; as such, exposures are expected to be lower than those in the living space and risk estimates are within the acceptable risk range, as discussed in the 2012 ENVIRON Workplan.

- In Building 8, all of the living quarters are on the second floor and higher, situated above a parking garage. The parking garage will interrupt VI from the subsurface and makes additional assessment unnecessary in those buildings.

Indoor air samples were collected from apartments in Building 1 and 3 through 7 (Figure 2 [site-wide] and Figures 2A-2F [building details]). These indoor air samples were analyzed for radon and VOCs. Radon and VOC samples were then collected and analyzed from subslab locations in Buildings 3 through 7 following sampling port installation.

In order to minimize the impact of sampling port installation on indoor air concentration, the sampling ports were not installed in Buildings 3 through 7 until after the indoor air samples were collected. Subslab soil vapor probes were installed in the following apartments, as shown in Figures 2B-2F:

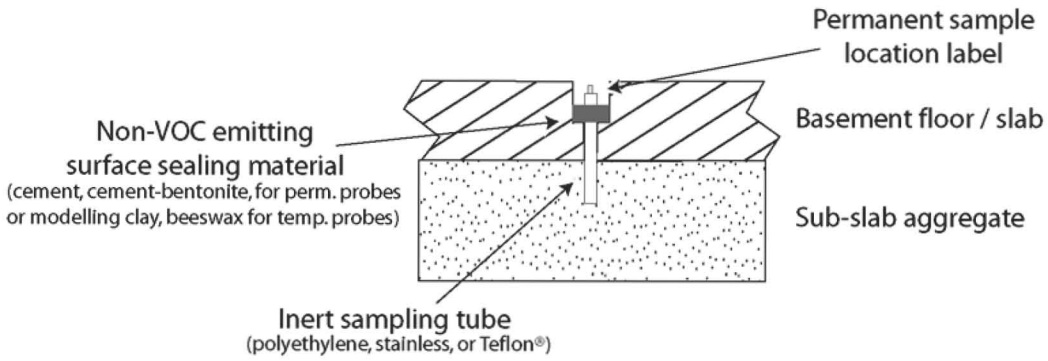
Table 2: Subslab Vapor Probe Locations

Building	Unit	Subslab Location Description	Floor Covering
3	1B	Laundry room, adjacent to kitchen	Vinyl composite tile
3	1I	Laundry room, adjacent to kitchen	Vinyl composite tile
4	105	Living room, interior corner	Wall-to-wall carpet
4	112	Living room, interior corner	Wall-to-wall carpet
5	101	Laundry room, adjacent to kitchen	Vinyl composite tile
5	104	Laundry room, adjacent to kitchen	Vinyl composite tile
6	102	Laundry room, adjacent to kitchen	Vinyl composite tile
6	108	Laundry room, adjacent to kitchen	Vinyl composite tile
7	101	Laundry room, adjacent to kitchen	Vinyl composite tile
7	104	Laundry room, adjacent to kitchen	Vinyl composite tile

Permanent subslab sampling ports were installed away from the exterior walls on July 16-17, 2012 in general accordance with the New York Department of Health's *Guidance for Evaluating Soil Vapor Intrusion in New York State*, October 2006, as referenced in the NCDENR *Supplemental Guidelines for the Evaluation of Structural Vapor Intrusion Potential for Site Assessments and Remedial Actions Under the Inactive Hazardous Sites Branch*, June 2011. A one-inch diameter, one-inch deep countersink hole to house the probe tubing couplings was drilled into ground floor slab using a hammer drill. Through the countersink hole, a small diameter drill bit (1/2-inch diameter) was advanced through the slab to access subslab soils. The probe was constructed of ¼-inch stainless steel (SS) tubing and SS swaging fittings. The probe tubes extended no deeper than one inch beyond the bottom of the slab into the subslab aggregate. Expanding quick-set hydraulic cement was placed to seal the probe to the surrounding concrete slab.

After leaving the concrete to cure overnight, helium tracer gas leak testing was conducted, with no leaks detected, except in Building 4 Unit 112. No sample was collected from this location

due to the failed leak test, which was likely caused by tight soils resulting in limited air flow beneath the slab. Finally, Teflon-lined sample tubing was attached to the probe using swage-type fittings and Teflon tape thread sealant, and VOC and radon sampling commenced.



Due to the presence of a crawlspace under Building 1, *in lieu* of subslab sampling, crawlspace air samples were collected from under apartments 102, 111, and 119 in Building 1 (Figure 2A).

2.2 VOC Sample Collection

The indoor air VOC samples were collected in six-liter SUMMA canisters with the sample collection point placed at breathing height on the first floor in two apartment units per building (Figure 2 [site-wide] and Figures 2A-2F [building details]). A flow controller was used on each canister to collect air continuously over a 72-hour period.

Following the sampling port installation, subslab VOC samples were collected in one liter SUMMA canisters, using a flow controller to collect air continuously over a five minute period.

All SUMMA canisters were shipped to Con-Test Analytical Laboratories of East Longmeadow, Massachusetts, a NCDENR-certified laboratory, for analysis by EPA Compendium Method TO-15, *Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* (EPA/625/R-96/010b). Samples were analyzed via TO-15 for only PCE and TCE.

2.3 Radon Sample Collection

The indoor air radon samples were over a 72-hour period (same as the VOCs) using a ProChek activated charcoal radon test kit, provided by Air Chek, Inc. of Mills River, North Carolina. Air Chek maintains a fully accredited laboratory that is used to analyze their activated charcoal radon sample using gamma ray spectroscopy, as described in Section 2.4 of USEPA's *Indoor Radon and Radon Decay Product Measurement Device Protocols* (EPA 402-R-92-004). The radon test kits were collocated with the VOC SUMMA canisters at breathing height on the apartment units.

After the completion of subslab VOC sample collection, a Niton or Durridge RAD7 Radon Detector, a continuous radon monitoring instrument, was connected to the same Teflon-lined tubing for a purge period of up approximately 12 minutes and a sampling period of 30-60 minutes. The subslab radon sampling was conducted by Indoor Environmental of Charlotte, North Carolina.

Upon completion of the subslab sampling, the ports were plugged with SS swage plug fittings lined with Teflon tape.

Photo 1. Example of indoor air SUMMA canister and radon test kit setup

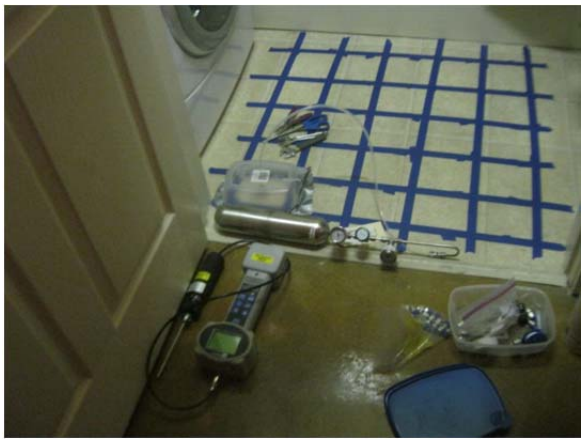


Photo 2. Example of subslab VOC sample collection setup

Photo 3. Example of subslab radon measurement setup

3 Results and Discussion

Vapor attenuation (i.e., the mitigation of VI) occurs as a result of the processes that control vapor transport in soil (e.g., diffusion, advection, sorption). The sum of these physical and chemical attenuation mechanisms can be quantified through the use of a VI attenuation factor (AF_{VI}), which is defined as the ratio of the concentration in indoor air ($C_{IA\text{-}VI}$) to the crawlspace concentration or subslab vapor concentration (C_{SV}):

$$AFVI = C_{IA\text{-}VI} / C_{SV}$$

Building-specific attenuation factors were calculated using indoor air and subslab radon and VOC data. These attenuation factors were used to calculate the VI contribution to indoor air concentrations, which were compared with the measured indoor air VOC concentrations. These concentrations were also compared to the *IHSB Residential Vapor Intrusion Screening Level for Indoor Air* (July 2012) and typical background indoor air concentrations from USEPA (2011).

3.1 Indoor Air and Subslab Sampling Results

3.1.1 Radon

Results for radon in samples collect from crawlspace, apartments and subslab sampling ports are presented in Table 3.

Thirteen indoor air radon samples were collected from first floor apartments in Buildings 1 and 3 through 7. Radon levels in 12 of 13 apartments ranged from <0.3 to 3.5 picocuries per liter (pCi/L). In one apartment in Building 5, radon was measured at a level of 5.9 pCi/L, which exceeds the USEPA action level of 4.0 pCi/L; the radon level measured in the other apartment in Building 5 is 2.0 pCi/L. Confirmatory radon sampling in Building 5 for a longer duration should be considered.

Radon levels in the three samples collected from the crawlspace of Building 1 ranged from 0.8 to 2.2 pCi/L.

Radon levels in samples collected in two rounds from subslab sampling ports ranged from 1.0 to 1,010 pCi/L. According to Indoor Environmental, the subcontractor that collected the subslab radon samples, the range of radon levels observed was consistent with levels typically observed in basements in the Charlotte, NC area. However, Indoor Environmental did note that the measurement of 1.0 pCi/L is unusually low and may have been diluted by indoor air due to a faulty seal.

3.1.2 VOCs

Results for PCE and TCE in samples collected from crawlspace, apartments, and subslab sampling ports are presented in Table 4. The measurements were compared to the *IHSB Residential Vapor Intrusion Screening Level for Indoor Air* (July 2012) (8.3 $\mu g/m^3$ for PCE and 0.42 $\mu g/m^3$ for TCE, both based on noncarcinogenic health effects). It should be noted that

these IHSB Screening Levels and their basis have been revised since the time that the initial two rounds of indoor air sampling were conducted. The August 2011 IHSB Screening Levels were 0.41 μg/m^3 for PCE and 1.2 μg/m^3 for TCE, and both of these screening levels were based on carcinogenic health effects.

In addition to comparing these results to the IHSB Screening Levels, we also compare the results to the upper-end background indoor air concentrations developed by USEPA (2012).

Thirteen indoor air VOC samples were collected from first floor apartments in Buildings 1 and 3 through 7.

- PCE was detected in indoor air in all 13 apartments sampled. PCE concentrations in 11 of 13 apartments ranged from 0.45 to 5.5 μg/m^3, below the IHSB Screening Level for indoor air of 8.3 μg/m^3 and generally consistent with the background indoor air concentration of 3.8 μg/m^3. In two samples collected from Building 4 and Building 6, PCE was detected at concentrations of 15 and 1,800 μg/m^3, respectively.

- TCE was only detected in indoor air in five of the 13 apartments sampled. TCE concentrations in these five apartments ranged from 0.29 to 0.91 μg/m^3, with three samples slightly exceeding the IHSB Screening Level of 0.42 μg/m^3 and two samples slightly exceeding the background indoor air concentration of 0.5 μg/m^3.

Three crawlspace VOC samples were collected from Building 1:

- PCE was detected in all three crawlspace samples. PCE concentrations ranged from 19 to 98 μg/m^3.

- TCE was also detected in all three crawlspace samples. TCE concentrations ranged from 2.5 to 7.8 μg/m^3.

Subslab VOC samples were collected from first floor apartments in Buildings 3 through 7. Two rounds of samples were collected on two consecutive days.

- During the first round of subslab sampling, conducted on July 18, 2012, PCE concentrations in eight of nine samples collected ranged from 3.4 to 47 μg/m^3, well below the *IHSB Residential Vapor Intrusion Screening Level for Soil Gas* (July 2012) (83.4 μg/m^3). In the remaining sample, collected from Building 3 Unit 1b, PCE was detected at a concentration of 380 μg/m^3.

- During the second round of subslab samples, conducted on July 19, 2012, PCE concentrations in eight of nine samples collected ranged from 3.2 to 37 μg/m^3, below the IHSB Screening Level of 83.4 μg/m^3. In the remaining sample, from Building 3 Unit 1b, PCE was detected at a concentration of 260 μg/m^3.

Table 3: Radon Results - Sub-Slab, Indoor Air, and Crawlspace
Alpha Mills, Charlotte, NC

				Subslab Round 1 (July 18, 2012)	Subslab Round 2 (July 19, 2012)	Crawlspace (July 13-19, 2012)	Indoor Air (July 13-19, 2012)
Address	Building Number	Unit	Indoor Air Location	Radon (pCi/l)	Radon (pCi/l)	Radon (pCi/l)	Radon (pCi/l)
210 Alpha Mill Ln	1	102	1st Floor	--	--	1.1	1.2
210 Alpha Mill Ln	1	111	1st Floor Kitchen	--	--	0.8	1.2
210 Alpha Mill Ln	1	119	1st Floor Kitchen	--	--	2.2	1.4
210 Alpha Mill Ln	1	119	1st Floor Kitchen (dup)	--	--	2.0	--
230 Alpha Mill Ln	3	1b	1st Floor Kitchen	76.2	90.3	--	0.9
230 Alpha Mill Ln	3	1i	1st Floor Kitchen	86	195	--	1.9
230 Alpha Mill Ln	3	1i	1st Floor Kitchen (dup)	--	165	--	--
316 Alpha Mill Ln	4	105	1st Floor Hallway	64	1.0*	--	0.8
320 Alpha Mill Ln	4	112	1st Floor Hallway	--	--	--	<0.3
910 Spindle St	5	101	1st Floor	596	1010	--	5.9
910 Spindle St	5	104	1st Floor Kitchen	40.5	103	--	2.0
920 Spindle St	6	102	1st Floor Kitchen	82.5	45.9	--	2.5
920 Spindle St	6	108	1st Floor Kitchen	303	275	--	3.5
206 Alpha Mill Ln	7	101	1st Floor Kitchen	662	540	--	1.4
Results shaded in yell	7	101	1st Floor Kitchen	637	--	--	1.2
206 Alpha Mill Ln	7	104	1st Floor Kitchen (dup)	779	777	--	1.6

Notes:

* Indoor Environmental indicated that these results may not be accurate due to a faulty seal

No subslab sample collected from Bldg. 4 Unit 112 due to faulty seal identified during failed helium leak test

Results shaded in yellow exceed exceeds the EPA action level (4.0 pCi/L)

Table 4: VOC Results - Subslab Soilgas, Indoor Air and Crawlspace
Alpha Mills, Charlotte, NC

				Subslab Soilgas Round 1 (July 18, 2012)			Subslab Soilgas Round 2 (July, 19, 2012)			Crawlspace (July 13-16, 2012)			Indoor Air (July 13-16, 2012)		
Address	**Building Number**	**Unit**	**Location**	**Sample ID**	**PCE (µg/m^3)**	**TCE (µg/m^3)**	**Sample ID**	**PCE (µg/m^3)**	**TCE (µg/m^3)**	**Sample ID**	**PCE (µg/m^3)**	**TCE (µg/m^3)**	**Sample ID**	**PCE (µg/m^3)**	**TCE (µg/m^3)**
210 Alpha Mill Ln	1	102	1st Floor	**--**	--	--	**--**	--	--	**B1-102-CS**	98	7.8	**B1-102-IA1**	3.6	ND>0.27
210 Alpha Mill Ln	1	111	1st Floor Kitchen	**--**	--	--	**--**	--	--	**B1-111-CS**	45	3.9	**B1-111-IA1**	4.1	0.29
210 Alpha Mill Ln	1	119	1st Floor Kitchen	**--**	--	--	**--**	--	--	**B1-119-CS1**	21	2.7	**B1-119-IA1**	3.4	0.44
										B1-119-CS2 (dup)	19	2.5			
230 Alpha Mill Ln	3	1b	1st Floor Kitchen	**B3-1B-SS1**	380	160	**B3-1B-SS2**	260	140	**--**	--	--	**B3-1b-IA1**	4.1	0.54
230 Alpha Mill Ln	3	1i	1st Floor Kitchen	**B3-1i-SS1**	8.3	ND>0.54	**B3-1i-SS2**	5.0	ND>0.27	**--**	--	--	**B3-1i-IA1**	5.5	ND>0.54
316 Alpha Mill Ln	4	105	1st Floor Hallway	**B4-105-SS1**	9.4	ND>0.54	**B4-105-SS2**	5.6	0.27	**--**	--	--	**B4-105-IA1**	15	ND>0.27
320 Alpha Mill Ln	4	112	1st Floor Hallway	**--**	--	--	**--**	--	--	**--**	--	--	**B4-112-IA1**	0.45	ND>0.27
910 Spindle St	5	101	1st Floor	**B5-101-SS1**	3.4	ND>0.54	**B5-101-SS2**	3.2	ND>0.27	**--**	--	--	**B5-101-IA1**	2.6	ND>0.27
910 Spindle St	5	104	1st Floor Kitchen	**B5-104-SS1**	7.3	ND>0.54	**B5-104-SS2**	7.4	ND>0.27	**--**	--	--	**B5-104-IA1**	1.4	ND>0.27
920 Spindle St	6	102	1st Floor Kitchen	**B6-102-SS1**	3.9	ND>0.54	**B6-102-SS2**	3.3	ND>0.27	**--**	--	--	**B6-102-IA1**	3.1	ND>0.54
920 Spindle St	6	108	1st Floor Kitchen	**B6-108-SS1**	47	0.74	**B6-108-SS2**	37	0.55	**--**	--	--	**B6-108-IA1**	1800	0.91
206 Alpha Mill Ln	7	104	1st Floor Kitchen	**B7-104-SS1**	22	ND>0.54	**B7-104-SS3**	25	0.34	**--**	--	--	**B7-104-IA1**	1.4	0.38
206 Alpha Mill Ln	7	104	1st Floor Kitchen	**B7-104-SS2 (dup)**	7.7	ND>0.54	**--**	--	--	**--**	--	--	**--**	--	--
206 Alpha Mill Ln	7	101	1st Floor Kitchen	**B7-101-SS1**	47	ND>0.54	**B7-101-SS2**	26	ND>0.27	**--**	--	--	**B7-101-IA1**	1.4	ND>0.27
206 Alpha Mill Ln	7	101	1st Floor Kitchen	**--**	--	--	**B7-101-SS3 (dup)**	13	ND>0.27	**--**	--	--	**B7-101-IA2 (dup)**	1.3	ND>0.27
													NCDENR Residential Vapor Intrusion Screening Level	8.3	0.42
													Background Indoor Air (USEPA 2011)	3.8	0.5

Notes:

PCE=tetrachloroethylene; TCE=trichloroethylene;NCDENR=North Carolina Department of Natural Resources

Results shaded in yellow exceed the NCDENR Residential Vapor Intrusion Screening Levels (July 2012), based on a Noncancer Hazard Quotient of 0.2.

No soilgas subslab samples collected from Bldg. 4 Unit 112 due to faulty seal identified during failed helium leak test

- During the first round of subslab sampling, TCE was not detected above the reporting limit in seven of nine samples. In one of the two remaining samples, TCE was detected at a concentration of 0.74 µg/m^3, which is below the *IHSB Residential Vapor Intrusion Screening Level for Soil Gas* for TCE of 4.2 µg/m^3. In the second remaining sample, TCE was detected at a concentration of 160 µg/m^3, above the IHSB Screening Level. This sample was from the same apartment where elevated concentrations of PCE were detected in the soil vapor (Building 3, Unit 1b).

- During the second round of subslab samples, TCE was not detected above the reporting limit in five of nine samples. In three of the four remaining samples, TCE concentrations ranged from 0.27 to 0.55 µg/m^3, below the IHSB Screening Level. In the one remaining sample, TCE was detected at a concentration of 140 µg/m^3, above the IHSB Screening Level. As in the first round, this sample was from the same apartment where elevated concentrations of PCE were detected in the soil vapor (Building 3, Unit 1b).

3.2 Attenuation Factors

Using the data summarized in Section 3.1, building-specific VI attenuation factors were calculated using both the radon and VOC data. The lower of the radon-based and VOC-based attenuation factors was used as the Final AF to estimate the VI contribution to indoor air VOC concentrations. Building-specific attenuation factors are presented in Table 5.

Table 5: Building-specific Attenuation Factors

Location	Type of AF	VOC-based AF_{VI}	Radon-based AF_{VI}	Final AF_{VI}
Building 1	Crawlspace to IA	0.096	1.086*	0.096
Building 3	Subslab to IA	0.281	0.013	0.013
Building 4	Subslab to IA	2.000*	0.013	0.013
Building 5	Subslab to IA	0.489	0.018	0.018
Building 6	Subslab to IA	15.043*	0.017	0.017
Building 7	Subslab to IA	0.071	0.002	0.002

Note: * It should be noted that calculated values of AF that exceed 1 indicate that indoor air concentrations cannot be due solely to vapor intrusion.

For all of the buildings without a crawlspace (i.e., Buildings 3-7), the radon-based AF_{VI} was used to estimate the VI contribution to indoor air VOC concentrations. Based on these AF_{VI} values, which range from 0.002 to 0.018, indoor air concentrations of these VOCs in the first floor of these buildings attributed to VI were less than 2% of the subslab concentrations. These attenuation factors are consistent with the Source Strength Screening multiplier of 50 (i.e., AF=0.02) that USEPA (2012) recommended as a screening criterion for minimizing the influence of background sources on subslab soil gas attenuation factors.

For Building 1, which has a crawlspace, the VOC data were used to develop an attenuation factor of 0.096, which indicates that the indoor air concentrations of these VOCs in the first floors of that building attributed to VI were less than 10% of the crawlspace concentrations.

Indoor air concentrations were calculated based on measured subslab/crawlspace concentrations and building-specific AF_{VI}. Measured and calculated indoor air concentrations for each apartment for PCE and TCE are presented in Figures 3a and 3b, respectively.

Measured indoor air PCE concentrations exceeded the IHSB HQ=0.2 risk level in two apartments and the IHSB HQ=1 risk level in one apartment. However, in both cases, the calculated indoor air concentrations using the building-specific AF_{VI} are well below the HQ=0.2 risk level. The relatively lower calculated indoor air concentrations suggests the elevated levels of PCE in these two apartments are likely attributed, at least in part, to indoor sources and not vapor intrusion.

Measured indoor air TCE concentration exceeded the IHSB HQ=0.2 risk level in three apartments; however, the measured TCE concentration is well below the HQ=1.0 risk level. In two of the units, calculated TCE concentrations in indoor air are lower than measured concentrations and below the HQ=0.2 risk level. This difference suggests that the measured levels of TCE in two of these apartments can likely be attributed, at least in part, to indoor sources. In the third apartment, the calculated indoor air TCE concentration was higher than the measured concentration.

Based on the lower of the measured or the calculated indoor air concentrations, the averaged results for each building are summarized below in Table 6. Based on these results, there does not appear to be a vapor intrusion issue at the site and no VI mitigation activities appear to be necessary.

Table 6: Building-averaged Calculated Indoor Air Concentrations

Location		PCE ($\mu g/m^3$)	TCE ($\mu g/m^3$)
Building 1		3.2	0.27
Building 3		2.0	0.54
Building 4		0.27	0.14
Building 5		0.09	0.007
Building 6		0.39	0.009
Building 7		0.06	0.001
NCDENR Acceptable Indoor Air Conc.	HQ=0.2	8.3	0.42
	HQ=1	41.5	2.1
USEPA Upper-End Background Indoor Air Conc.		3.8	0.5

4 References

ENVIRON International Corporation. 2012. Vapor Intrusion Workplan: Subslab Soil Vapor and Indoor Air Sampling, Alpha Mill Apartments, 220 Alpha Mill Lane, Charlotte, North Carolina. June 19.

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NCDENR. 2011. Supplemental Guidelines for the Evaluation of Structural Vapor Intrusion Potential for Site Assessments and Remedial Actions Under the Inactive Hazardous Sites Branch. June 21.

United States Environmental Protection Agency (USEPA). 2012. EPA's Vapor Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings. EPA 530-R-10-002. Office of Solid Waste and Emergency Response. March 16.

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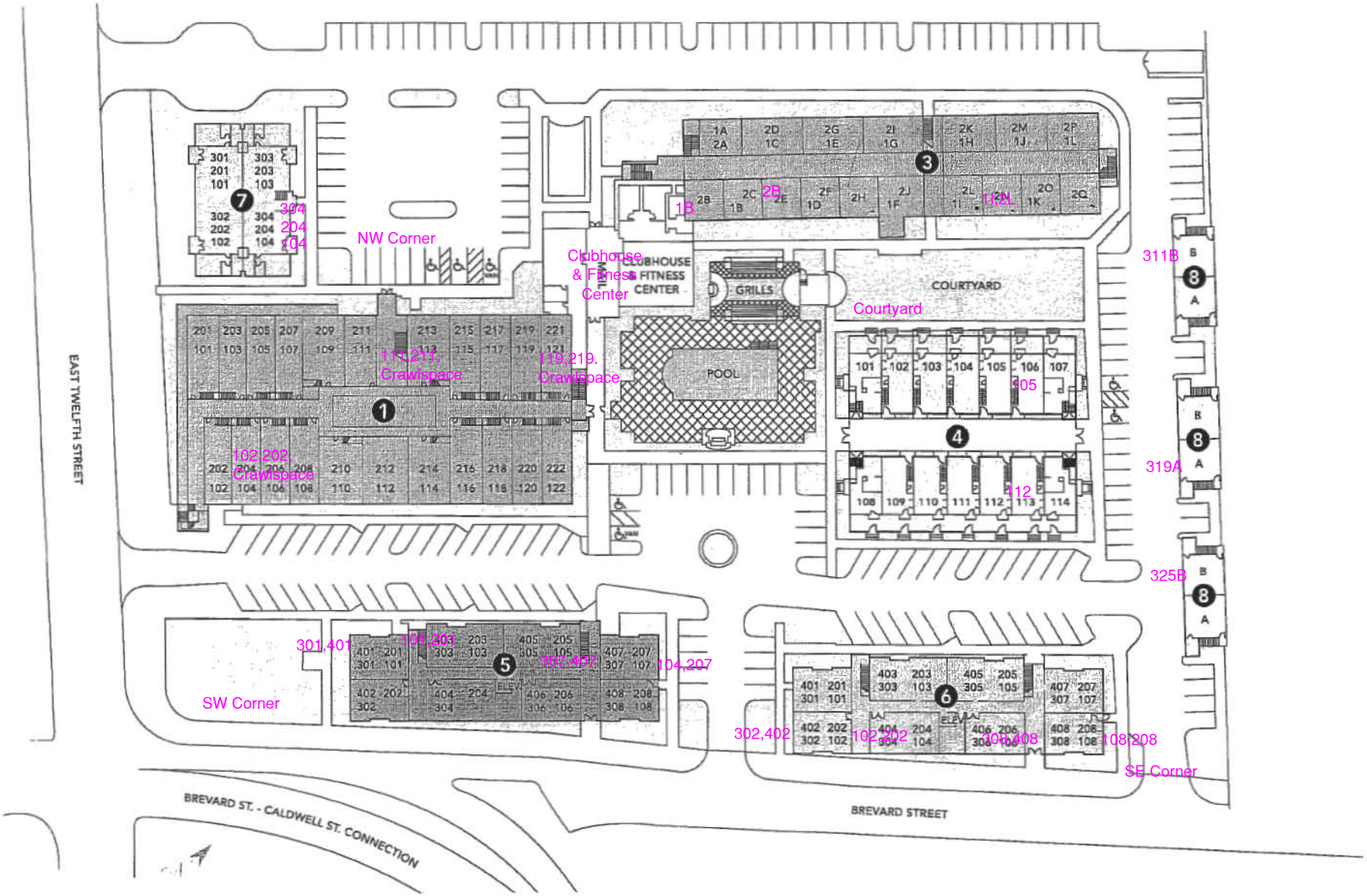
USEPA. 1999. Compendium Method TO-15. Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS). In Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air. EPA/625/R-96/010b. Center for Environmental Research Information, Office of Research and Development. January.

Figures



EXPLANATION

Approximate air sampling location

Samples collected November 10-11, 2011

0 80 160

Scale in Feet

Air Sampling Locations, November 2011

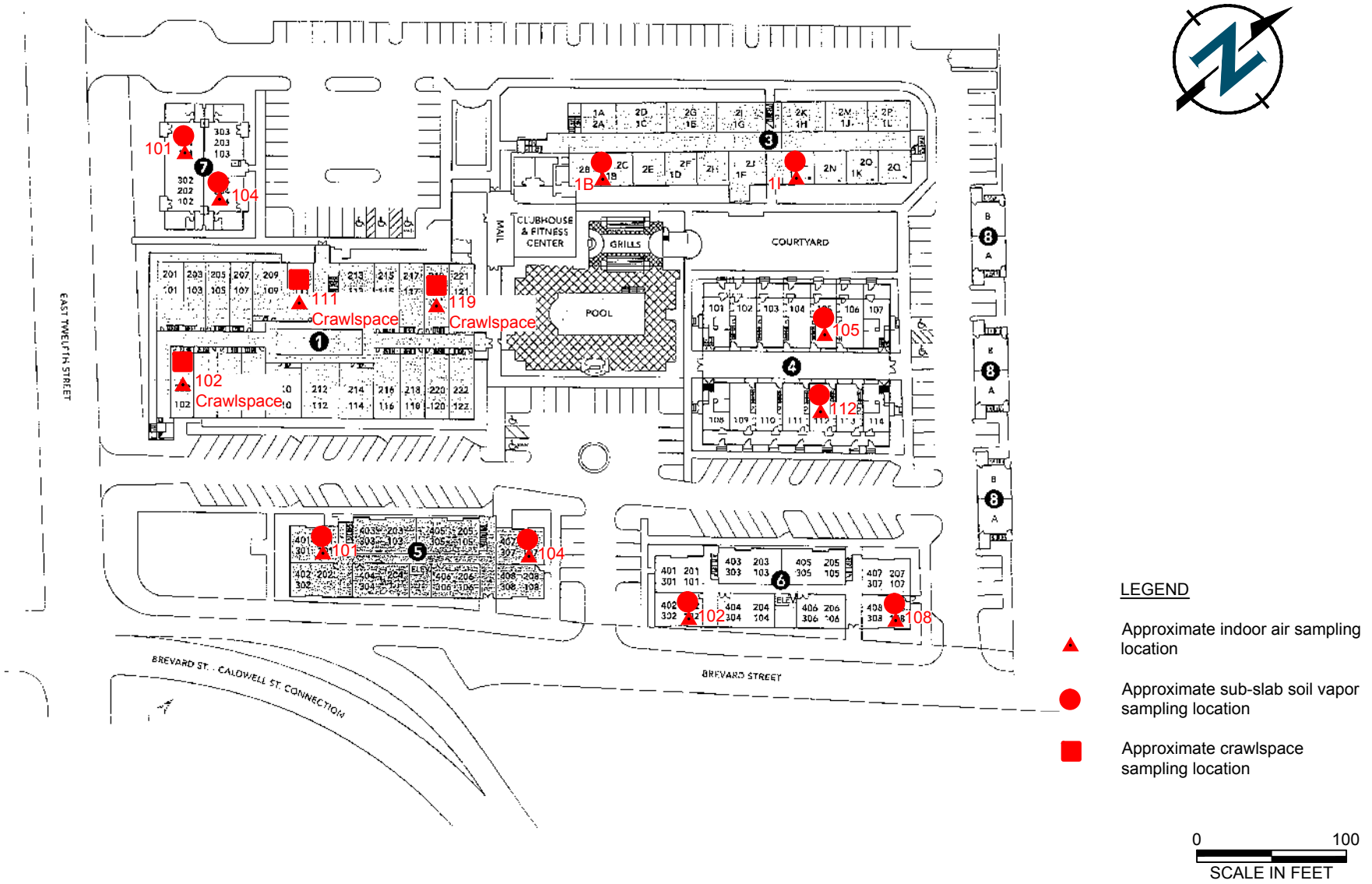
Alpha Mill Apartments

220 Alpha Mill Lane, Charlotte, NC

Figure 1

C:\PROJECTS\08-23878EA\AIR SAMPLING LOCATIONS 4 CHARLOTTE NC.DWG

DRAFTED BY: \ GMILES DATE: 12/19/2011



ENVIRON

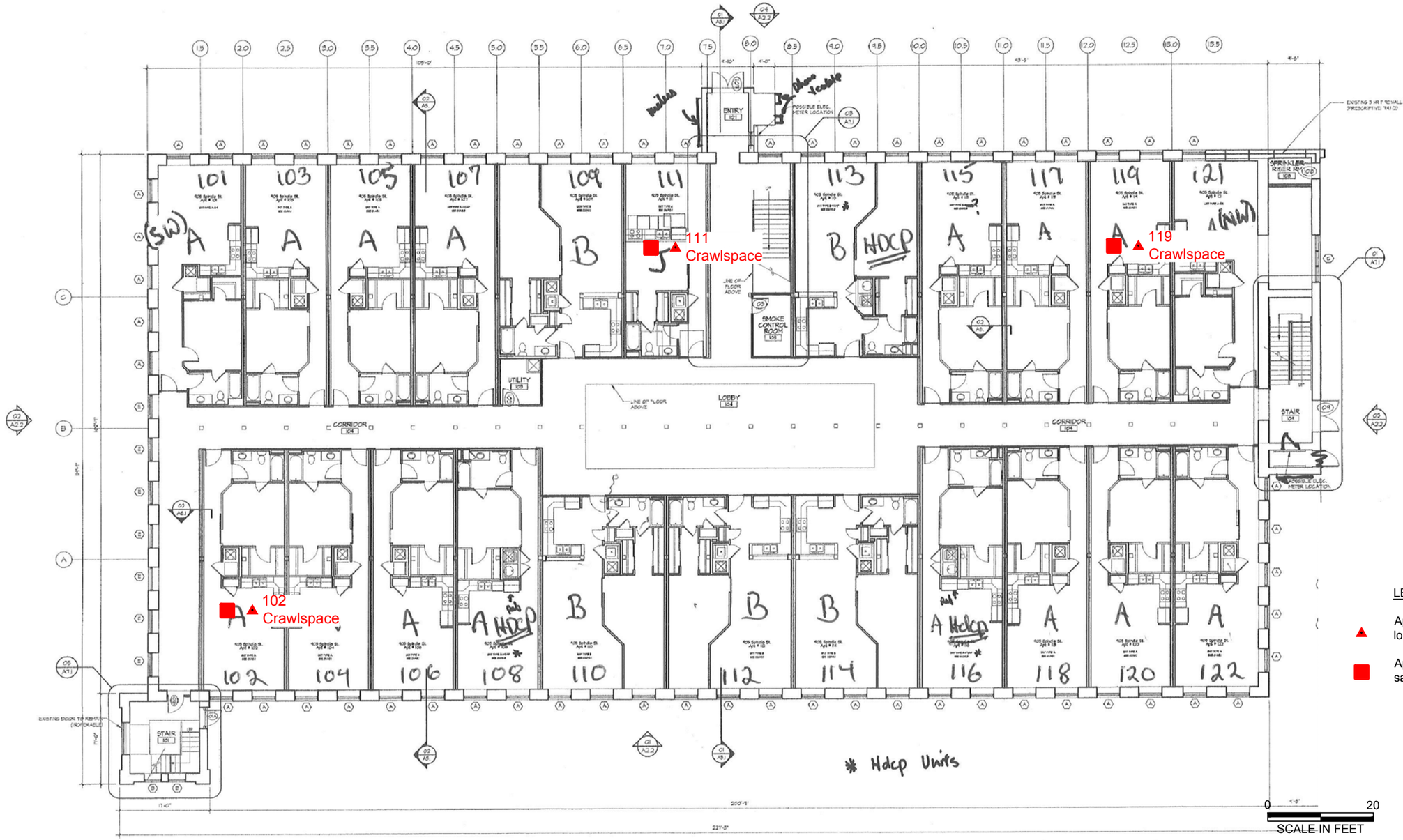
DRAFTED BY: J Drebaum | DATE: 08/03/2012

Sub-Slab and Indoor Air VOC and Radon Sampling Locations

Alpha Mill Apartments
220 Alpha Mill Lane, Charlotte, NC

FIGURE
2

08-23878E1



ENVIRON

DRAFTED BY: J DREBAUM | DATE: 08/03/12

Crawlspace and Indoor Air VOC and Radon Sampling Locations - Building 1

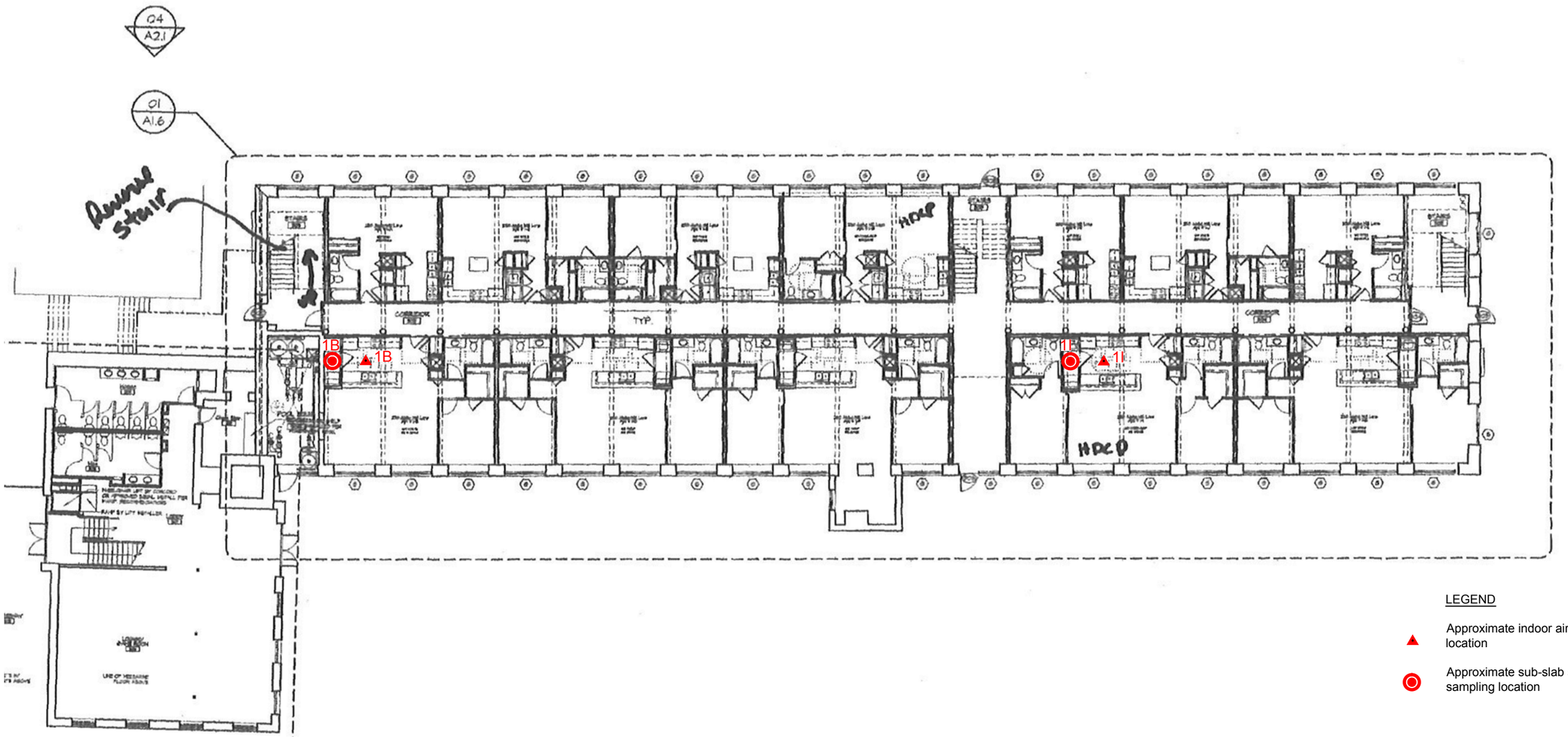
Alpha Mill Apartments

220 Alpha mill Lane, Charlotte, NC

FIGURE **2A**

08-23878E1

JDREBAUM 8/3/12 [FIGURE 4A]
C:\USERS\JDREBAUM\DESKTOP\NEW FOLDER



ENVIRON

DRAFTED BY: J Drebaum | DATE: 08/03/2012

Sub-Slab and Indoor Air VOC and Radon Sampling Locations - Building 3

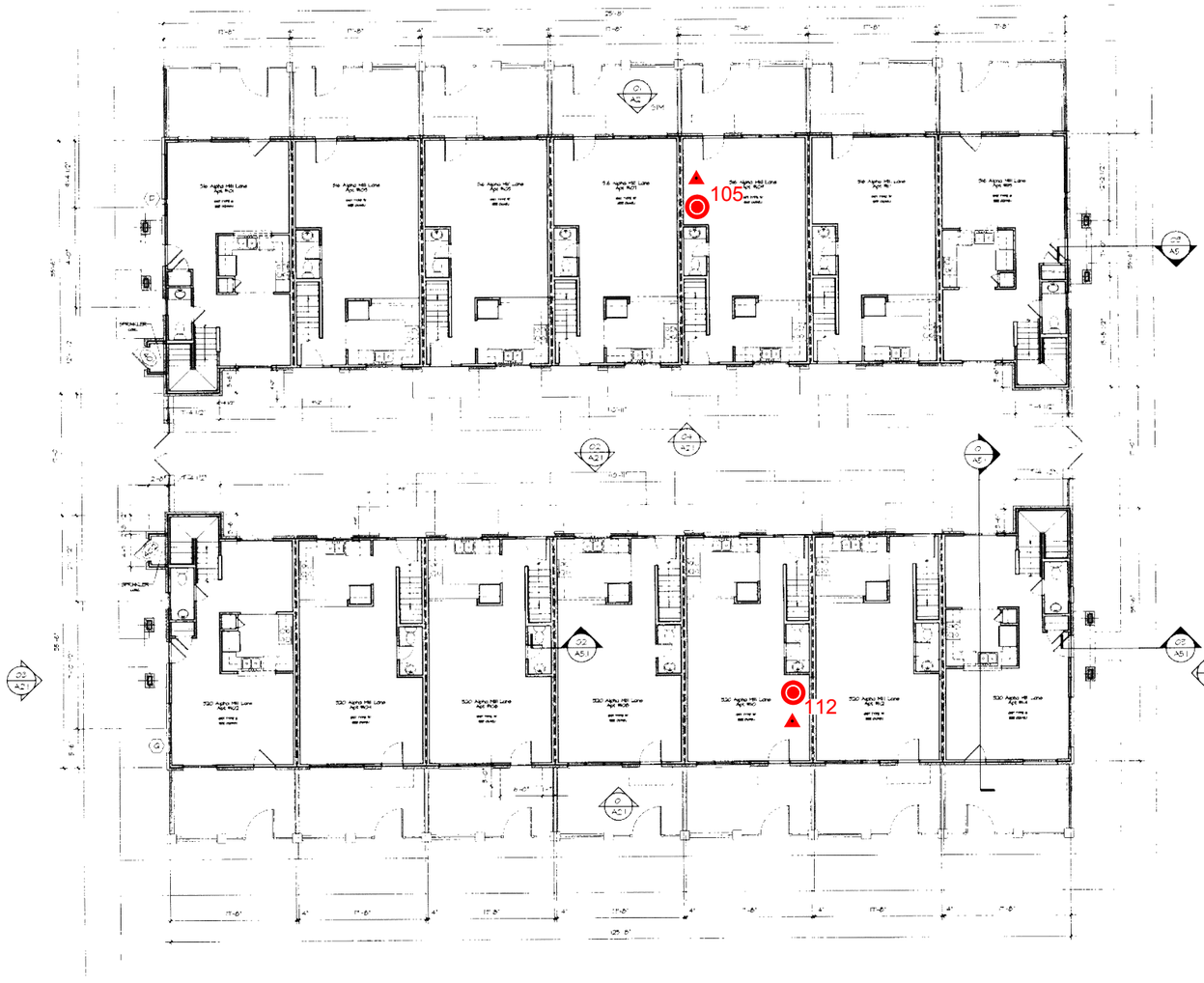
Alpha Mill Apartments

220 Alpha Mill Lane, Charlotte, NC

FIGURE **2B**

08-23878E1

JDREBAUM 8/3/12 [FIGURE 4B]
C:\USERS\JDREBAUM\DESKTOP\NEW FOLDER



LEGEND

- Approximate indoor air sampling location
- Approximate sub-slab soil vapor sampling location

0 16
SCALE IN FEET

ENVIRON

DRAFTED BY: J Drebaum | DATE: 08/03/2012

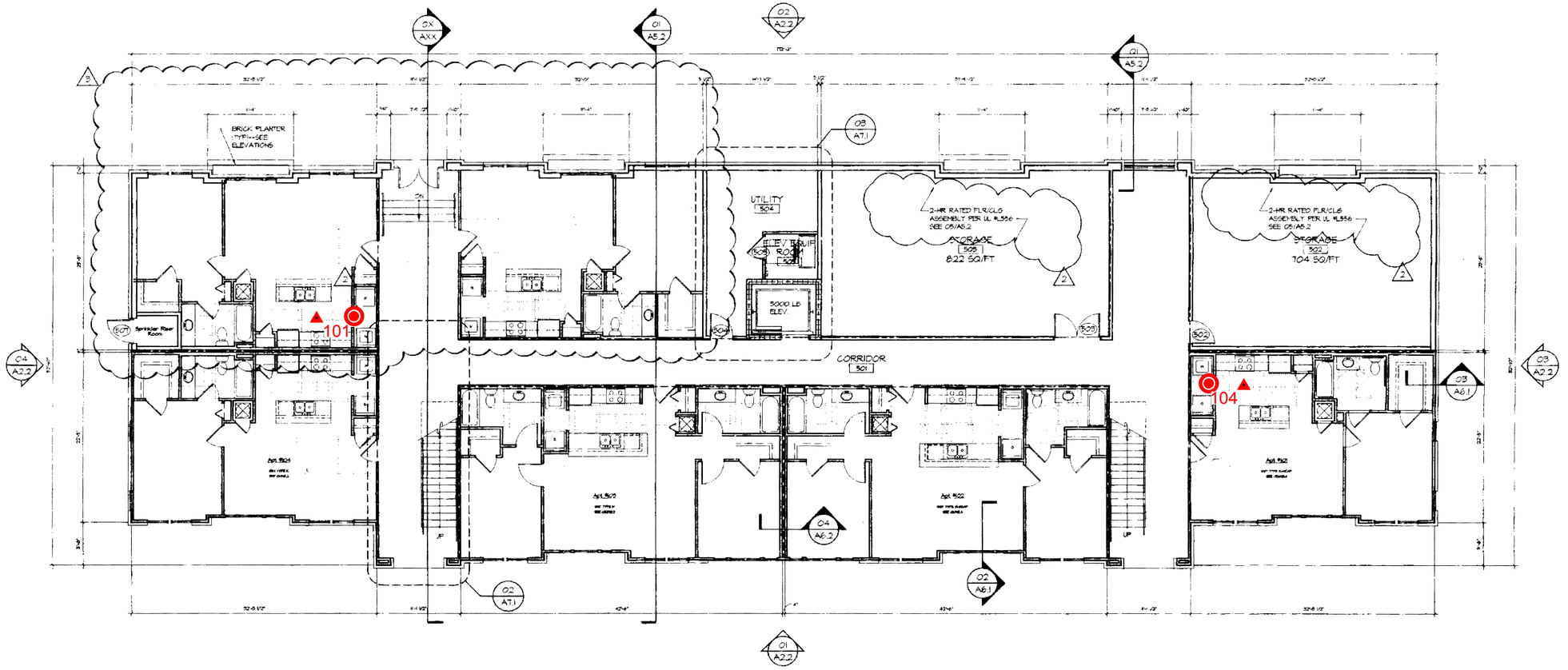
Sub-Slab and Indoor Air VOC and Radon Sampling Locations - Building 4

Alpha Mill Apartments
220 Alpha mill Lane, Charlotte, NC

FIGURE
2C

08-23878E1

JDREBAUM 8/3/12 [FIGURE 4C]
C:\USERS\JDREBAUM\DESKTOP\NEW FOLDER



LEGEND

- ▲ Approximate indoor air sampling location
- ◉ Approximate sub-slab soil vapor sampling location

0 16
SCALE IN FEET

ENVIRON

DRAFTED BY: J Drebaum | DATE: 08/03/2012

Sub-Slab and Indoor Air VOC and Radon Sampling Locations - Building 5

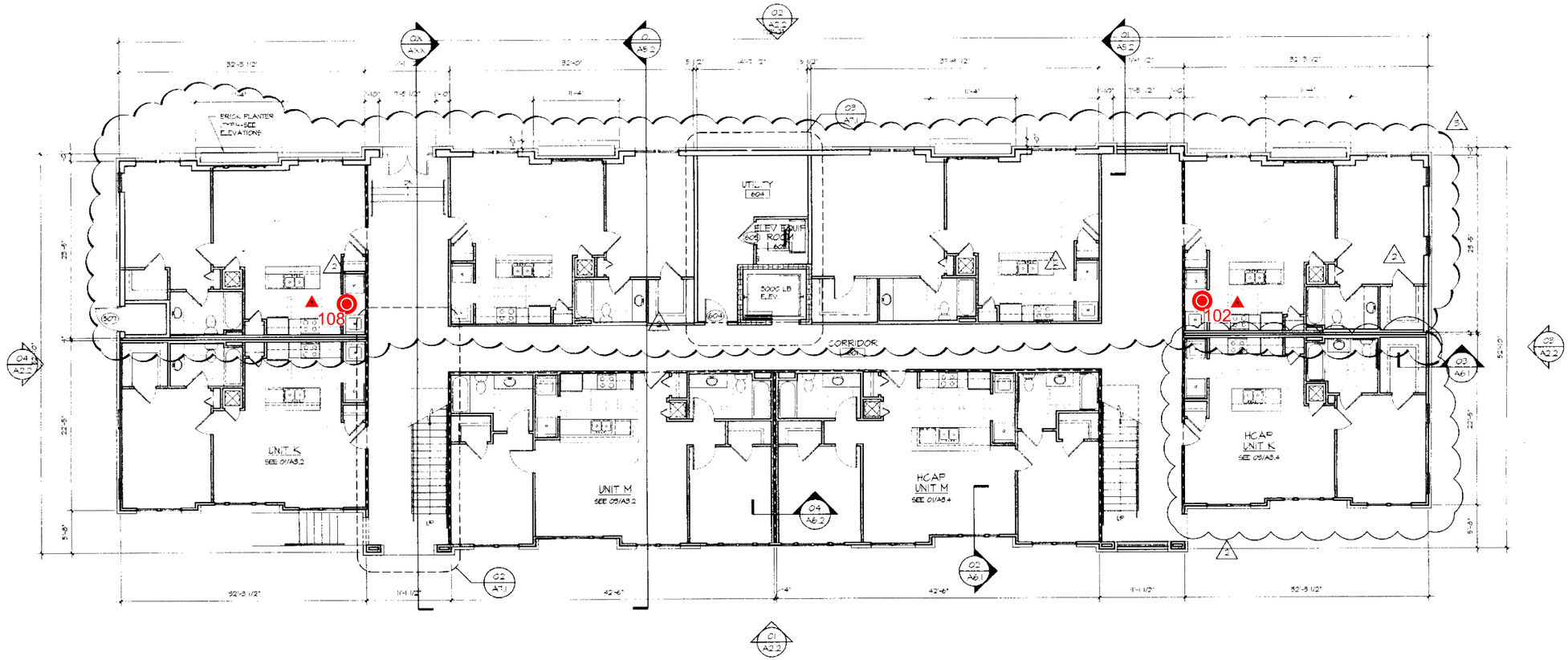
Alpha Mill Apartments

220 Alpha mill Lane, Charlotte, NC

FIGURE **2D**

08-23878E1

JDREBAUM 8/3/12 [FIGURE 4D]
C:\USERS\JDREBAUM\DESKTOP\NEW FOLDER



LEGEND

- Approximate indoor air sampling location
- Approximate sub-slab soil vapor sampling location

0 16

SCALE IN FEET
(APPROXIMATE)

ENVIRON

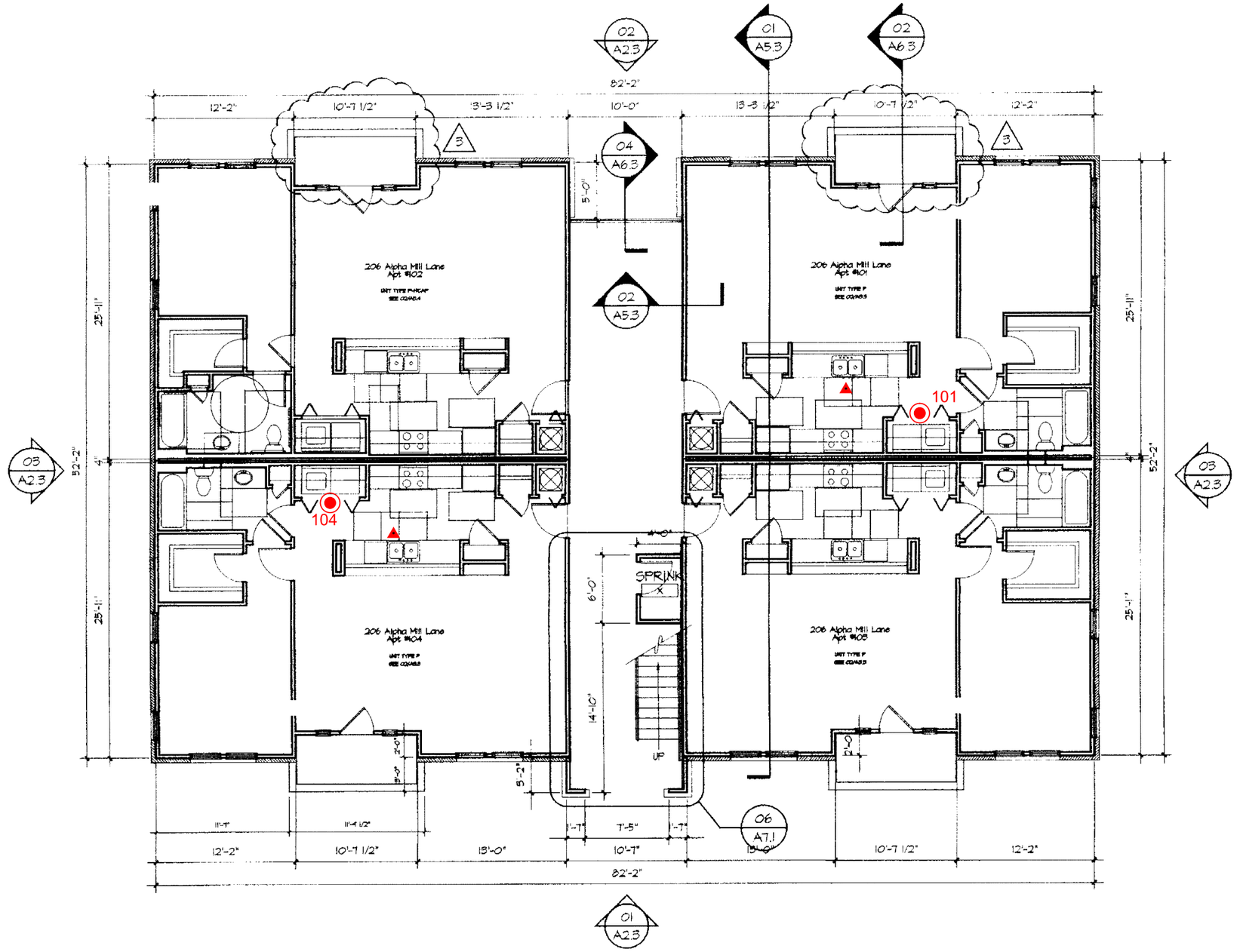
DRAFTED BY: J Drebaum | DATE: 08/03/2012

Sub-Slab and Indoor Air VOC and Radon Sampling locations - Building 6

Alpha Mill Apartments
220 Alpha Mill Lane, Charlotte, NC

FIGURE
2E

JDREBAUM 8/3/12 [FIGURE 4E]
C:\USERS\JDREBAUM\DESKTOP\NEW FOLDER



LEGEND

▲ Approximate indoor air sampling location

◉ Approximate sub-slab sampling location

0 10

SCALE IN FEET
(APPROXIMATE)

SOURCE: Sheet A1.8 "Building VII Floor + Roof Plans" from Design Plans "The Alpha Mill-The New Buildings (IV-VIII); prepared by Narmour Wright; revised 3/24/2006.

ENVIRON

DRAFTED BY: J Drebaum | DATE: 08/03/2012

Sub-Slab and Indoor Air VOC and Radon Sampling Locations - Building 7

Alpha Mill Apartments

220 Alpha Mill Lane, Charlotte, NC

FIGURE
2F

08-23878E1

JDREBAUM 8/9/12 [FIGURE 4F]
C:\USERS\JDREBAUM\DESKTOP\ALPHA MILLS

Figure 3. Measured and Calculated Indoor Air Concentrations - Tetrachloroethene

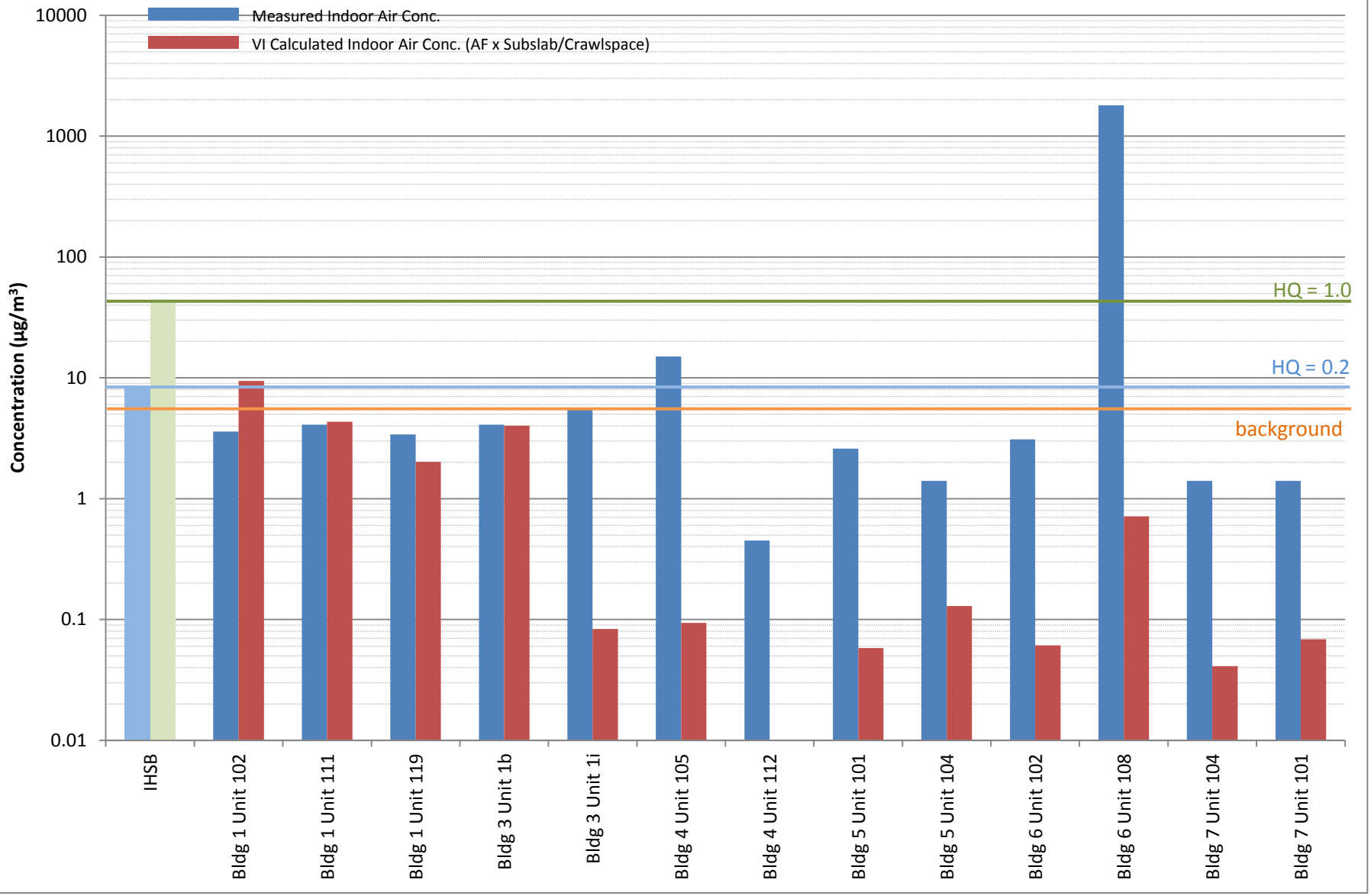
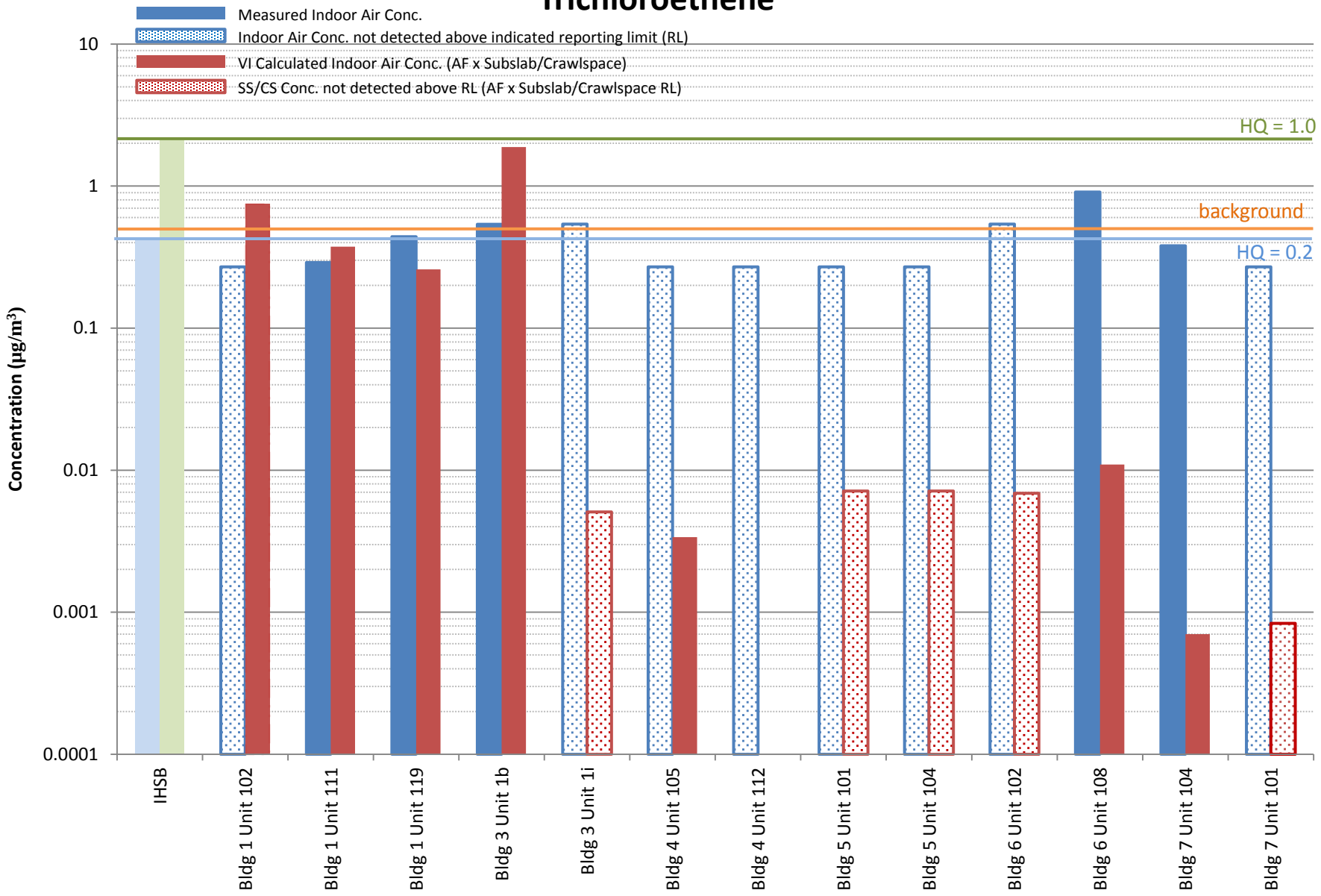


Figure 4. Measured and Calculated Indoor Air Concentrations - Trichloroethene



Appendix A
VOC Laboratory Data

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

July 23, 2012

Alan Kao
Environ International Corp.
8 Hollis Street
Groton, MA 01450

Project Location: Charlotte, NC
Client Job Number:
Project Number: 20120625 Charlotte NC
Laboratory Work Order Number: 12G0520

Enclosed are results of analyses for samples received by the laboratory on July 16, 2012. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

James M. Georgantas
Project Manager

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

Environ International Corp.
8 Hollis Street
Groton, MA 01450
ATTN: Alan Kao

REPORT DATE: 7/23/2012

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 20120625 Charlotte NC

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 12G0520

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

PROJECT LOCATION: Charlotte, NC

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
B7-101-IA1	12G0520-01	Indoor air	Bldg 7 Unit 101	EPA TO-15	
B7-101-IA2	12G0520-02	Indoor air	Bldg 7 Unit 101	EPA TO-15	
B7-104-IA1	12G0520-03	Indoor air	Bldg 7 Unit 104	EPA TO-15	
B3-1I-IA1	12G0520-04	Indoor air	Bldg 3 Unit 1I	EPA TO-15	
B3-1B-IA1	12G0520-05	Indoor air	Bldg 3 Unit 1B	EPA TO-15	
B4-105-IA2	12G0520-06	Indoor air	Bldg 4 Unit 105	EPA TO-15	
B4-112-IA2	12G0520-07	Indoor air	Bldg 4 Unit 112	EPA TO-15	
B6-108-IA1	12G0520-08	Indoor air	Bldg 6 Unit 108	EPA TO-15	
B6-102-IA1	12G0520-09	Indoor air	Bldg 6 Unit 102	EPA TO-15	
B5-104-IA1	12G0520-10	Indoor air	Bldg 5 Unit 104	EPA TO-15	
B5-101-IA1	12G0520-11	Indoor air	Bldg 5 Unit 101	EPA TO-15	
B1-119-IA1	12G0520-12	Indoor air	Bldg 1 Unit 119	EPA TO-15	
B1-111-IA1	12G0520-13	Indoor air	Bldg 1 Unit 111	EPA TO-15	
B1-102-IA1	12G0520-14	Indoor air	Bldg 1 Unit 102	EPA TO-15	
B1-119-CS1	12G0520-15	Indoor air	Bldg 1 Unit 119	EPA TO-15	
B1-119-CS2	12G0520-16	Indoor air	Bldg 1 Unit 119	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.

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.

Michael A. Erickson
Laboratory Director

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

ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B7-101-IA1
Sample ID: 12G0520-01
Sample Matrix: Indoor air
Sampled: 7/16/2012 09:12

Sample Description/Location: Bldg 7 Unit 101
Sub Description/Location:
Canister ID: 1635
Canister Size: 6 liter
Flow Controller ID: 3058
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -29
Final Vacuum(in Hg): 0
Receipt Vacuum(in Hg): 0
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**
Tetrachloroethylene	0.20	0.050	0.015		1.4	0.34	1	7/19/12 9:55	WSD
Trichloroethylene	ND	0.050	0.014		ND	0.27	1	7/19/12 9:55	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	101	70-130	7/19/12 9:55

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B7-101-IA2
Sample ID: 12G0520-02
Sample Matrix: Indoor air
Sampled: 7/16/2012 09:12

Sample Description/Location: Bldg 7 Unit 101
Sub Description/Location:
Canister ID: 1649
Canister Size: 6 liter
Flow Controller ID: 3363
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -12
Receipt Vacuum(in Hg): -11
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**
Tetrachloroethylene	0.19	0.050	0.015		1.3	0.34	1	7/19/12 10:41	WSD
Trichloroethylene	ND	0.050	0.014		ND	0.27	1	7/19/12 10:41	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	100	70-130	7/19/12 10:41

con-test® ANALYTICAL LABORATORY
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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B7-104-IA1
Sample ID: 12G0520-03
Sample Matrix: Indoor air
Sampled: 7/16/2012 11:15

Sample Description/Location: Bldg 7 Unit 104
Sub Description/Location:
Canister ID: 1450
Canister Size: 6 liter
Flow Controller ID: 3268
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -27
Final Vacuum(in Hg): -11
Receipt Vacuum(in Hg): -12
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**
Tetrachloroethylene	0.20	0.050	0.015		1.4	0.34	1	7/19/12 11:32	WSD
Trichloroethylene	0.070	0.050	0.014		0.38	0.27	1	7/19/12 11:32	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	101	70-130	7/19/12 11:32

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B3-1I-IA1
Sample ID: 12G0520-04
Sample Matrix: Indoor air
Sampled: 7/16/2012 12:15

Sample Description/Location: Bldg 3 Unit 1I
Sub Description/Location:
Canister ID: 1697
Canister Size: 6 liter
Flow Controller ID: 3248
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -29
Final Vacuum(in Hg): -14
Receipt Vacuum(in Hg): -16
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**
Tetrachloroethylene	0.81	0.10	0.030		5.5	0.68	2	7/19/12 12:18	WSD
Trichloroethylene	ND	0.10	0.028		ND	0.54	2	7/19/12 12:18	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	103	70-130	7/19/12 12:18

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

ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B3-1B-IA1
Sample ID: 12G0520-05
Sample Matrix: Indoor air
Sampled: 7/16/2012 12:25

Sample Description/Location: Bldg 3 Unit 1B
Sub Description/Location:
Canister ID: 1319
Canister Size: 6 liter
Flow Controller ID: 3075
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -5
Receipt Vacuum(in Hg): -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**
Tetrachloroethylene	0.60	0.050	0.015		4.1	0.34	1	7/19/12 13:00	WSD
Trichloroethylene	0.10	0.050	0.014		0.54	0.27	1	7/19/12 13:00	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	104	70-130	7/19/12 13:00

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

ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B4-105-IA2
Sample ID: 12G0520-06
Sample Matrix: Indoor air
Sampled: 7/16/2012 13:45

Sample Description/Location: Bldg 4 Unit 105
Sub Description/Location:
Canister ID: 1750
Canister Size: 6 liter
Flow Controller ID: 3424
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -29
Final Vacuum(in Hg): -17
Receipt Vacuum(in Hg): -18
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**
Tetrachloroethylene	2.2	0.050	0.015		15	0.34	1	7/19/12 13:51	WSD
Trichloroethylene	ND	0.050	0.014		ND	0.27	1	7/19/12 13:51	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	103	70-130	7/19/12 13:51

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

ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B4-112-IA2
Sample ID: 12G0520-07
Sample Matrix: Indoor air
Sampled: 7/16/2012 14:00

Sample Description/Location: Bldg 4 Unit 112
Sub Description/Location:
Canister ID: 1784
Canister Size: 6 liter
Flow Controller ID: 3255
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -29
Final Vacuum(in Hg): -9.5
Receipt Vacuum(in Hg): -10
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**
Tetrachloroethylene	0.067	0.050	0.015		0.45	0.34	1	7/19/12 20:20	WSD
Trichloroethylene	ND	0.050	0.014		ND	0.27	1	7/19/12 20:20	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	103	70-130	7/19/12 20:20

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

ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B6-108-IA1
Sample ID: 12G0520-08
Sample Matrix: Indoor air
Sampled: 7/16/2012 14:18

Sample Description/Location: Bldg 6 Unit 108
Sub Description/Location:
Canister ID: 14733
Canister Size: 6 liter
Flow Controller ID: 3421
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -15
Receipt Vacuum(in Hg): -15
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**
Tetrachloroethylene	260	1.0	0.30		1800	6.8	20	7/18/12 23:05	WSD
Trichloroethylene	0.17	0.050	0.014		0.91	0.27	1	7/19/12 21:05	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	101	70-130	7/19/12 21:05
4-Bromofluorobenzene (1)	98.8	70-130	7/18/12 23:05

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

ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B6-102-IA1
Sample ID: 12G0520-09
Sample Matrix: Indoor air
Sampled: 7/16/2012 14:20

Sample Description/Location: Bldg 6 Unit 102
Sub Description/Location:
Canister ID: 1124
Canister Size: 6 liter
Flow Controller ID: 3432
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -23
Receipt Vacuum(in Hg): -23
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**
Tetrachloroethylene	0.46	0.10	0.030		3.1	0.68	2	7/19/12 21:51	WSD
Trichloroethylene	ND	0.10	0.028		ND	0.54	2	7/19/12 21:51	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	102	70-130	7/19/12 21:51

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

ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B5-104-IA1
Sample ID: 12G0520-10
Sample Matrix: Indoor air
Sampled: 7/16/2012 14:40

Sample Description/Location: Bldg 5 Unit 104
Sub Description/Location:
Canister ID: 1105
Canister Size: 6 liter
Flow Controller ID: 3224
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -29.5
Final Vacuum(in Hg): -7
Receipt Vacuum(in Hg): -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**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
Tetrachloroethylene	0.20	0.050	0.015		1.4	0.34	1	7/19/12 22:32	WSD
Trichloroethylene	ND	0.050	0.014		ND	0.27	1	7/19/12 22:32	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	103	70-130	7/19/12 22:32

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

ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B5-101-IA1
Sample ID: 12G0520-11
Sample Matrix: Indoor air
Sampled: 7/16/2012 14:50

Sample Description/Location: Bldg 5 Unit 101
Sub Description/Location:
Canister ID: 1112
Canister Size: 6 liter
Flow Controller ID: 3408
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -15.5
Receipt Vacuum(in Hg): -14
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**
Tetrachloroethylene	0.38	0.050	0.015		2.6	0.34	1	7/19/12 23:17	WSD
Trichloroethylene	ND	0.050	0.014		ND	0.27	1	7/19/12 23:17	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	102	70-130	7/19/12 23:17

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

ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B1-119-IA1
Sample ID: 12G0520-12
Sample Matrix: Indoor air
Sampled: 7/16/2012 15:15

Sample Description/Location: Bldg 1 Unit 119
Sub Description/Location:
Canister ID: 1153
Canister Size: 6 liter
Flow Controller ID: 3061
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): 0
Receipt Vacuum(in Hg): 0
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**
Tetrachloroethylene	0.49	0.050	0.015		3.4	0.34	1	7/19/12 23:56	WSD
Trichloroethylene	0.082	0.050	0.014		0.44	0.27	1	7/19/12 23:56	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	103	70-130	7/19/12 23:56

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

ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B1-111-IA1
Sample ID: 12G0520-13
Sample Matrix: Indoor air
Sampled: 7/16/2012 15:20

Sample Description/Location: Bldg 1 Unit 111
Sub Description/Location:
Canister ID: 1232
Canister Size: 6 liter
Flow Controller ID: 3361
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -12
Receipt Vacuum(in Hg): -10
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**
Tetrachloroethylene	0.60	0.050	0.015		4.1	0.34	1	7/20/12 0:39	WSD
Trichloroethylene	0.054	0.050	0.014		0.29	0.27	1	7/20/12 0:39	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	102	70-130	7/20/12 0:39

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B1-102-IA1
Sample ID: 12G0520-14
Sample Matrix: Indoor air
Sampled: 7/16/2012 15:30

Sample Description/Location: Bldg 1 Unit 102
Sub Description/Location:
Canister ID: 1128
Canister Size: 6 liter
Flow Controller ID: 3007
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -10
Receipt Vacuum(in Hg): -9
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**
Tetrachloroethylene	0.53	0.050	0.015		3.6	0.34	1	7/20/12 1:22	WSD
Trichloroethylene	ND	0.050	0.014		ND	0.27	1	7/20/12 1:22	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	103	70-130	7/20/12 1:22

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B1-119-CS1
Sample ID: 12G0520-15
Sample Matrix: Indoor air
Sampled: 7/16/2012 15:45

Sample Description/Location: Bldg 1 Unit 119
Sub Description/Location:
Canister ID: 1830
Canister Size: 6 liter
Flow Controller ID: 3409
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -29.5
Final Vacuum(in Hg): -11.5
Receipt Vacuum(in Hg): -12
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**
Tetrachloroethylene	3.0	0.050	0.015		21	0.34	1	7/20/12 2:06	WSD
Trichloroethylene	0.50	0.050	0.014		2.7	0.27	1	7/20/12 2:06	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	103	70-130	7/20/12 2:06

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/16/2012
Field Sample #: B1-119-CS2
Sample ID: 12G0520-16
Sample Matrix: Indoor air
Sampled: 7/16/2012 15:45

Sample Description/Location: Bldg 1 Unit 119
Sub Description/Location:
Canister ID: 1821
Canister Size: 6 liter
Flow Controller ID: 3305
Sample Type: 72 hr

Work Order: 12G0520
Initial Vacuum(in Hg): -29
Final Vacuum(in Hg): -14
Receipt Vacuum(in Hg): -14
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**
Tetrachloroethylene	2.8	0.050	0.015		19	0.34	1	7/20/12 3:28	WSD
Trichloroethylene	0.46	0.050	0.014		2.5	0.27	1	7/20/12 3:28	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	104	70-130	7/20/12 3:28

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
12G0520-01 [B7-101-IA1]	B055533	1	1	N/A	1000	400	400	07/18/12
12G0520-02 [B7-101-IA2]	B055533	1.5	1	N/A	1000	400	600	07/18/12
12G0520-03 [B7-104-IA1]	B055533	1.5	1	N/A	1000	400	600	07/18/12
12G0520-04 [B3-1I-IA1]	B055533	2	1	N/A	1000	400	400	07/18/12
12G0520-05 [B3-1B-IA1]	B055533	1	1	N/A	1000	400	400	07/18/12
12G0520-06 [B4-105-IA2]	B055533	2	1	N/A	1000	400	800	07/18/12
12G0520-08RE1 [B6-108-IA1]	B055533	2	1	N/A	1000	400	40	07/18/12

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
12G0520-07 [B4-112-IA2]	B055535	1.5	1	N/A	1000	400	600	07/19/12
12G0520-08 [B6-108-IA1]	B055535	2	1	N/A	1000	400	800	07/19/12
12G0520-09 [B6-102-IA1]	B055535	4	1	N/A	1000	400	800	07/19/12
12G0520-10 [B5-104-IA1]	B055535	1.5	1	N/A	1000	400	600	07/19/12
12G0520-11 [B5-101-IA1]	B055535	2	1	N/A	1000	400	800	07/19/12
12G0520-12 [B1-119-IA1]	B055535	1	1	N/A	1000	400	400	07/19/12
12G0520-13 [B1-111-IA1]	B055535	1.5	1	N/A	1000	400	600	07/19/12
12G0520-14 [B1-102-IA1]	B055535	1.5	1	N/A	1000	400	600	07/19/12
12G0520-15 [B1-119-CS1]	B055535	1.5	1	N/A	1000	400	600	07/19/12
12G0520-16 [B1-119-CS2]	B055535	2	1	N/A	1000	400	800	07/19/12

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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 B055533 - TO-15 Prep											
Blank (B055533-BLK1)					Prepared & Analyzed: 07/18/12						
Tetrachloroethylene	ND	0.025									
Trichloroethylene	ND	0.025									
Surrogate: 4-Bromofluorobenzene (1)	*8.06*				*8.00*		*101*	*70-130*			
LCS (B055533-BS1)					Prepared & Analyzed: 07/18/12						
Tetrachloroethylene	4.90				5.00		97.9	70-130			
Trichloroethylene	4.64				5.00		92.8	70-130			
Surrogate: 4-Bromofluorobenzene (1)	*8.27*				*8.00*		*103*	*70-130*			
Duplicate (B055533-DUP1)		**Source: 12G0520-06**			Prepared: 07/18/12 Analyzed: 07/19/12						
Tetrachloroethylene	2.1	0.070	15	0.47		2.2			0.0465	25	
Trichloroethylene	ND	0.070	ND	0.38		ND				25	
Surrogate: 4-Bromofluorobenzene (1)	*8.36*				*8.00*		*104*	*70-130*			
Batch B055535 - TO-15 Prep											
Blank (B055535-BLK1)					Prepared & Analyzed: 07/19/12						
Tetrachloroethylene	ND	0.025									
Trichloroethylene	ND	0.025									
Surrogate: 4-Bromofluorobenzene (1)	*8.31*				*8.00*		*104*	*70-130*			
LCS (B055535-BS1)					Prepared & Analyzed: 07/19/12						
Tetrachloroethylene	4.62				5.00		92.4	70-130			
Trichloroethylene	4.41				5.00		88.3	70-130			
Surrogate: 4-Bromofluorobenzene (1)	*8.35*				*8.00*		*104*	*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.

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

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA TO-15 in Air	
Tetrachloroethylene	AIHA,FL,NJ,NY
Trichloroethylene	AIHA,FL,NJ,NY

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

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC	100033	02/1/2014
MA	Massachusetts DEP	M-MA100	06/30/2013
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2013
NY	New York State Department of Health	10899 NELAP	04/1/2013
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2013
RI	Rhode Island Department of Health	LAO00112	12/30/2012
NC	North Carolina Div. of Water Quality	652	12/31/2012
NJ	New Jersey DEP	MA007 NELAP	06/30/2013
FL	Florida Department of Health	E871027 NELAP	06/30/2013
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2013
WA	State of Washington Department of Ecology	C2065	02/23/2013
ME	State of Maine	2011028	06/9/2013
VA	Commonwealth of Virginia	1381	12/14/2012

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

AIR SAMPLE CHAIN OF CUSTODY RECORD 12G0520

39 SPRUCE ST
EAST LONGMEADOW, MA 01028

Company Name: ENVIRON
Address: 8 Hollis St, Groton, MA
Telephone: 978 449-0324
Project # 08-23787.07
Client PO #
Attention: Alan Kao
Project Location: Charlotte, NC
Sampled By: V. Turner

DATA DELIVERY (check one):
☐FAX ☒EMAIL ☐WEBSITE CLIENT
Fax # :
Email: akao@environcorp.com
Format: ☒ EXCEL ☒ PDF ☐ GIS KEY ☐ OTHER

Proposal Provided? (For Billing purposes)
☐ yes _____ proposal date

Field ID	Sample Description	Media	Lab #	Start Date Time	Stop Date Time	Total Minutes Sampled	Flow Rate M³/Min. or L / Min.	Volume Liters or M³	Matrix Code*	ANALYSIS REQUESTED	" Hg Initial pressure	" Hg Final pressure	Lab Receipt Pressure	Summa Canister ID	Flow Controller ID
B7-101-IA1	Bldg 7 Unit 101	~~Air~~ Summa	-01	07-13-12 1145	07-16-12 0912				IA	TO-15 VOC	-29	0	0	1635	3050
B7-109-IA2	Bldg 7 Unit 101		02	07-13-12 1150	07-16-12 0912						-30	-12	-11	1649	3363
B7-104-IA1	Bldg 7 Unit 104		03	07-13-12 1235	07-16-12 1115						-24	-11	-12	1450	3268
B3-11-IA1	Bldg 3 Unit 11		04	07-13-12 1250	07-16-12 1215						-29	-14	-16	1697	3248
B3-12-IA1	Bldg 3 Unit 12		05	07-13-12 1325	07-16-12 1225						-30	-5	-5	1319	3075
B4-105-IA2	Bldg 4 Unit 105		06	07-13-12 1400	07-16-12 1145						-29	-17	-18	1700	3424
B4-112-IA2	Bldg 4 Unit 112		07	07-13-12 1415	07-16-12 1400						-29	-9.5	-10	1784	3255
B6-108-IA2	Bldg 6 Unit 108	↓	08	07-13-12 1430	07-16-12 1418				↓		-30	-15	-15	1733	3421

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

Summa canisters and flow controllers must be returned within 14 days of receipt or rental fees will apply.

Summa canisters will be retained for a minimum of 14 days after sampling date prior to cleaning.

Laboratory Comments:
*PCE & TCE only per Julie Rupp 7/18 JMG

CLIENT COMMENTS:

Relinquished by: (signature)	Date/Time: 07/16/12 1015
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time: 7/17/12 09:26

Turnaround **
☐ 7-Day
☐ 10-Day
☒ Other per client
RUSH * ☐ *24-Hr ☐ *48-Hr ☐ *72-Hr ☐ *4-Day
*Approval Required

Special Requirements
Regulations:
Data Enhancement/RCP? ☐ Y ☐ N
Enhanced Data Package ☐ Y ☐ N
(Surchage Applies)
Required Detection Limits:
Other:

***Matrix Code:**
SG= SOIL GAS
IA= INDOOR AIR
AMB=AMBIENT
SS = SUB SLAB
D = DUP
BL = BLANK
O = other

****Media Codes:**
S=summa can
TB=tedlar bag
P=PUF
T=tube
F= filter
C=cassette
O = Other

** TURNAROUND TIME STARTS AT 9:00 A.M. THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON YOUR CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME WILL NOT START UNTIL ALL QUESTIONS ARE ANSWERED BY OUR CLIENT.

AIHA, NELAC & WBE/DBE Certified

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

AIR SAMPLE CHAIN OF CUSTODY RECORD

1260520

39 SPRUCE ST
EAST LONGMEADOW, MA 01028

Company Name: ENVIRON
Address: 8 Holly St
GROTON, MA
Attention: ALAN KAO
Project Location: Charlotte, NC
Sampled By: V. Turner

Telephone:( )
Project #
Client PO #

DATA DELIVERY (check one):
☐FAX ☑EMAIL ☐WEBSITE CLIENT
Fax # :
Email: akao@environcorp.com
Format: ☐ EXCEL ☐ PDF ☐ GIS KEY ☐ OTHER

Proposal Provided? (For Billing purposes)
☐ yes proposal date

Field ID	Sample Description	Media	Lab #	Date Sampled Start Date Time	Date Sampled Stop Date Time	ONLY USE WHEN USING PUMPS Total Minutes Sampled	Flow Rate M^3/Min. or L / Min.	Volume Liters or M^3	Matrix Code*	ANALYSIS REQUESTED TO-15 VOCs	" Hg Initial pressure	" Hg Final pressure	" Hg Lab Receipt pressure	Summa Canister ID	Flow Controller ID
B1-102-SA1	Bldg 6 Unit 102	S	-09	07-13-12 1440	07-16-12 1420				IA	✓	-30	-23	-23	1124	3432
B5-104-SA2	Bldg 5 Unit 104		10	07-13-12 1455	07-16-12 1440					✓	-29.5	-7	-7	1105	3024
B5-101-SA2	Bldg 5 Unit 101		11	07-13-12 1505	07-16-12 1450					✓	-30	-15.5	-14	1112	3480
B1-119-SA1	Bldg 1 Unit 119		12	07-13-12 1525	07-16-12 1515					✓	-30	0	0	1153	3361
B1-111-SA1	Bldg 1 Unit 111		13	07-13-12 1535	07-16-12 1520					✓	-30	-12	-10	1232	3361
B1-102-SA1	Bldg 1 Unit 102		14	07-13-12 1545	07-16-12 1530				V	✓	-30	-10	-9	1128	3007
B1-119-CS2	Bldg 1 Unit 119		15	07-13-12 1600	07-16-12 1545				O	✓	-29.5	-11.5	-12	1830	3429
B1-119-CS2	Bldg 1 Unit 119	↓	16	07-13-12 1600	07-16-12 1545				O	✓	-29	-14	-14	1824	3305

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

Summa canisters and flow controllers must be returned within 14 days of receipt or rental fees will apply.

Summa canisters will be retained for a minimum of 14 days after sampling date prior to cleaning.

Laboratory Comments:

CLIENT COMMENTS:

Relinquished by: (signature)	Date/Time: 07/16/12 1815	
Received by: (signature)	Date/Time:	
Relinquished by: (signature)	Date/Time:	
Received by: (signature)	Date/Time: 7/17/12 09:26	

Turnaround **
☐ 7-Day
☐ 10-Day
☑ Other 5d
RUSH * (surcharge)
☐ *24-Hr ☐ *48-Hr
☐ *72-Hr ☐ *4-Day
*Approval Required

Special Requirements
Regulations:
Data Enhancement/RCP? ☐ Y ☐ N
Enhanced Data Package ☐ Y ☐ N
(Surchage Applies)
Required Detection Limits:
Other:

*Matrix Code:
SG= SOIL GAS
IA= INDOOR AIR
AMB=AMBIENT
SS = SUB SLAB
D = DUP
BL = BLANK
O = other Crawlspace

**Media Codes:
S=summa can
TB=tedlar bag
P=PUF
T=tube
F= filter
C=cassette
O = Other

** TURNAROUND TIME STARTS AT 9:00 A.M. THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON YOUR CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME WILL NOT START UNTIL ALL QUESTIONS ARE ANSWERED BY OUR CLIENT.

AIHA, NELAC & WBE/DBE Certified

Track Associated Shipments

Printer-Friendly Help

Detailed Results 800117474735 | Notifications 800117474735 | Associated Shipments

Select time format 12H | 24H

Master tracking no.	800117474735	Destination	
Service type	Priority Overnight	Total pieces	5
		Total shipment weight	175.0 lbs/79.4 kg

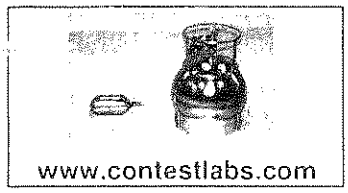
All Shipments Associated with the Master Tracking Number

Delivered

Tracking no.	Status	Delivery date	Signature Proof Image
800117474735	Delivered	Jul 17, 2012 9:26 AM	Yes
795764403992	Delivered	Jul 17, 2012 9:26 AM	Yes
795764404006	Delivered	Jul 17, 2012 9:26 AM	Yes
795764404017	Delivered	Jul 17, 2012 9:26 AM	Yes
795764404028	Delivered	Jul 17, 2012 9:26 AM	Yes

○ View/print Signature Proof of Delivery letter
○ E-mail Signature Proof of Delivery letter

Account no.
(Required for detailed Signature Proof of Delivery)
Click here if you have more than one account number for these shipments.



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con-test ANALYTICAL LABORATORY

AIR Only Receipt Checklist

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

CLIENT NAME: Environ RECEIVED BY: AR DATE: 7/17/12

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:

Air Media received at Con-Test

			# of Containers	Types (Size, Duration)
Air Sampling Media	Summa Cans		20	6L
	Tedlar Bags			
	Tubes			
Flow Controllers	Regulators		20	72hr
	Restrictors			
Extras	Tubing			
	Other			

Unused Summas: 1201 1635 1809 1697 1128 1649 1820 1705 1733 1256 1319 1821 1112 1784 1232 1450 1830 1124 1752 1153

Unused Regulators: 3248 3224 3045 3193 3430 3421 3340 3268 3007 3083 3424 3408 3058 3061 3305 3255 3432 3363 3361 3409

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

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

Laboratory Comments:

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

July 26, 2012

Alan Kao
Environ International Corp.
8 Hollis Street
Groton, MA 01450

Project Location: Charlotte, NC
Client Job Number:
Project Number: 08-23878EI
Laboratory Work Order Number: 12G0600

Enclosed are results of analyses for samples received by the laboratory on July 19, 2012. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

James M. Georgantas
Project Manager

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

Environ International Corp.
8 Hollis Street
Groton, MA 01450
ATTN: Alan Kao

REPORT DATE: 7/26/2012

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 08-23878EI

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 12G0600

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

PROJECT LOCATION: Charlotte, NC

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
B7-101-SS1	12G0600-01	Sub Slab	Bldg 7 Unit 101	EPA TO-15	
B7-104-SS2	12G0600-02	Sub Slab	Bldg 7 Unit 104	EPA TO-15	
B7-104-SS2	12G0600-03	Sub Slab	Bldg 7 Unit 104	EPA TO-15	
B3-1B-SS1	12G0600-04	Sub Slab	Bldg 3 Unit 1B	EPA TO-15	
B3-1I-SS1	12G0600-05	Sub Slab	Bldg 3 Unit 2I	EPA TO-15	
B4-105-SS1	12G0600-06	Sub Slab	Bldg 4 Unit 105	EPA TO-15	
B6-108-SS1	12G0600-07	Sub Slab	Bldg 6 Unit 108	EPA TO-15	
B6-102-SS1	12G0600-08	Sub Slab	Bldg 6 Unit 102	EPA TO-15	
B5-104-SS1	12G0600-09	Sub Slab	Bldg 5 Unit 104	EPA TO-15	
B5-101-SS1	12G0600-10	Sub Slab	Bldg 5 Unit 101	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.

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.

Michael A. Erickson
Laboratory Director

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B7-101-SS1
Sample ID: 12G0600-01
Sample Matrix: Sub Slab
Sampled: 7/18/2012 08:30

Sample Description/Location: Bldg 7 Unit 101
Sub Description/Location:
Canister ID: 1549
Canister Size: 1 liter
Flow Controller ID: 4173
Sample Type: Grab

Work Order: 12G0600
Initial Vacuum(in Hg): -27.5
Final Vacuum(in Hg): -2
Receipt Vacuum(in Hg): -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**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
Tetrachloroethylene	7.0	0.10	0.030		47	0.68	2	7/23/12 18:57	TPH
Trichloroethylene	ND	0.10	0.028		ND	0.54	2	7/23/12 18:57	TPH

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	108	70-130	7/23/12 18:57

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B7-104-SS2
Sample ID: 12G0600-02
Sample Matrix: Sub Slab
Sampled: 7/18/2012 10:24

Sample Description/Location: Bldg 7 Unit 104
Sub Description/Location:
Canister ID: 1555
Canister Size: 1 liter
Flow Controller ID: 4064
Sample Type: Grab

Work Order: 12G0600
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -2
Receipt Vacuum(in Hg): -2.8
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**
Tetrachloroethylene	3.2	0.10	0.030		22	0.68	2	7/23/12 19:36	TPH
Trichloroethylene	ND	0.10	0.028		ND	0.54	2	7/23/12 19:36	TPH

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	106	70-130	7/23/12 19:36

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B7-104-SS2
Sample ID: 12G0600-03
Sample Matrix: Sub Slab
Sampled: 7/18/2012 10:24

Sample Description/Location: Bldg 7 Unit 104
Sub Description/Location:
Canister ID: 1541
Canister Size: 1 liter
Flow Controller ID: 4064
Sample Type: Grab

Work Order: 12G0600
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -2
Receipt Vacuum(in Hg): -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**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
Tetrachloroethylene	1.1	0.10	0.030		7.7	0.68	2	7/23/12 20:16	TPH
Trichloroethylene	ND	0.10	0.028		ND	0.54	2	7/23/12 20:16	TPH

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	109	70-130	7/23/12 20:16

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B3-1B-SS1
Sample ID: 12G0600-04
Sample Matrix: Sub Slab
Sampled: 7/18/2012 11:16

Sample Description/Location: Bldg 3 Unit 1B
Sub Description/Location:
Canister ID: 1891
Canister Size: 1 liter
Flow Controller ID: 4172
Sample Type: Grab

Work Order: 12G0600
Initial Vacuum(in Hg): -28.5
Final Vacuum(in Hg): -2
Receipt Vacuum(in Hg): -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**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
Tetrachloroethylene	56	0.10	0.030		380	0.68	2	7/23/12 20:55	TPH
Trichloroethylene	29	0.10	0.028		160	0.54	2	7/23/12 20:55	TPH

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	109	70-130	7/23/12 20:55

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B3-1I-SS1
Sample ID: 12G0600-05
Sample Matrix: Sub Slab
Sampled: 7/18/2012 11:49

Sample Description/Location: Bldg 3 Unit 2I
Sub Description/Location:
Canister ID: 1892
Canister Size: 1 liter
Flow Controller ID: 4171
Sample Type: Grab

Work Order: 12G0600
Initial Vacuum(in Hg): -29
Final Vacuum(in Hg): -2
Receipt Vacuum(in Hg): -3.5
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**
Tetrachloroethylene	1.2	0.10	0.030		8.3	0.68	2	7/23/12 21:35	TPH
Trichloroethylene	ND	0.10	0.028		ND	0.54	2	7/23/12 21:35	TPH

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	108	70-130	7/23/12 21:35

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B4-105-SS1
Sample ID: 12G0600-06
Sample Matrix: Sub Slab
Sampled: 7/18/2012 12:50

Sample Description/Location: Bldg 4 Unit 105
Sub Description/Location:
Canister ID: 1599
Canister Size: 1 liter
Flow Controller ID: 4170
Sample Type: Grab

Work Order: 12G0600
Initial Vacuum(in Hg): -26.5
Final Vacuum(in Hg): -2
Receipt Vacuum(in Hg): -4.2
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**
Tetrachloroethylene	1.4	0.10	0.030		9.4	0.68	2	7/23/12 22:12	TPH
Trichloroethylene	ND	0.10	0.028		ND	0.54	2	7/23/12 22:12	TPH

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	108	70-130	7/23/12 22:12

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B6-108-SS1
Sample ID: 12G0600-07
Sample Matrix: Sub Slab
Sampled: 7/18/2012 14:48

Sample Description/Location: Bldg 6 Unit 108
Sub Description/Location:
Canister ID: 1560
Canister Size: 1 liter
Flow Controller ID: 4187
Sample Type: Grab

Work Order: 12G0600
Initial Vacuum(in Hg): -28.5
Final Vacuum(in Hg): -2
Receipt Vacuum(in Hg): -3.3
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**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
Tetrachloroethylene	7.0	0.10	0.030		47	0.68	2	7/23/12 22:51	TPH
Trichloroethylene	0.14	0.10	0.028		0.74	0.54	2	7/23/12 22:51	TPH

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	108	70-130	7/23/12 22:51

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B6-102-SS1
Sample ID: 12G0600-08
Sample Matrix: Sub Slab
Sampled: 7/18/2012 15:31

Sample Description/Location: Bldg 6 Unit 102
Sub Description/Location:
Canister ID: 1762
Canister Size: 1 liter
Flow Controller ID: 4186
Sample Type: Grab

Work Order: 12G0600
Initial Vacuum(in Hg): -26.5
Final Vacuum(in Hg): -2
Receipt Vacuum(in Hg): -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**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
Tetrachloroethylene	0.57	0.10	0.030		3.9	0.68	2	7/23/12 23:31	TPH
Trichloroethylene	ND	0.10	0.028		ND	0.54	2	7/23/12 23:31	TPH

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	107	70-130	7/23/12 23:31

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B5-104-SS1
Sample ID: 12G0600-09
Sample Matrix: Sub Slab
Sampled: 7/18/2012 16:06

Sample Description/Location: Bldg 5 Unit 104
Sub Description/Location:
Canister ID: 1542
Canister Size: 1 liter
Flow Controller ID: 4181
Sample Type: Grab

Work Order: 12G0600
Initial Vacuum(in Hg): -7
Final Vacuum(in Hg): -7
Receipt Vacuum(in Hg): -2.5
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**
Tetrachloroethylene	1.1	0.10	0.030		7.3	0.68	2	7/24/12 0:10	TPH
Trichloroethylene	ND	0.10	0.028		ND	0.54	2	7/24/12 0:10	TPH

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	109	70-130	7/24/12 0:10

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B5-101-SS1
Sample ID: 12G0600-10
Sample Matrix: Sub Slab
Sampled: 7/18/2012 16:34

Sample Description/Location: Bldg 5 Unit 101
Sub Description/Location:
Canister ID: 1602
Canister Size: 1 liter
Flow Controller ID: 4180
Sample Type: Grab

Work Order: 12G0600
Initial Vacuum(in Hg): -2
Final Vacuum(in Hg): -2
Receipt Vacuum(in Hg): -3.1
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**
Tetrachloroethylene	0.50	0.10	0.030		3.4	0.68	2	7/24/12 0:48	TPH
Trichloroethylene	ND	0.10	0.028		ND	0.54	2	7/24/12 0:48	TPH

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	108	70-130	7/24/12 0:48

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
12G0600-01 [B7-101-SS1]	B055819	1.5	1	N/A	1000	400	300	07/23/12
12G0600-02 [B7-104-SS2]	B055819	1.5	1	N/A	1000	400	300	07/23/12
12G0600-03 [B7-104-SS2]	B055819	1.5	1	N/A	1000	400	300	07/23/12
12G0600-04 [B3-1B-SS1]	B055819	1.5	1	N/A	1000	400	300	07/23/12
12G0600-05 [B3-1I-SS1]	B055819	1.5	1	N/A	1000	400	300	07/23/12
12G0600-06 [B4-105-SS1]	B055819	1.5	1	N/A	1000	400	300	07/23/12
12G0600-07 [B6-108-SS1]	B055819	1.5	1	N/A	1000	400	300	07/23/12
12G0600-08 [B6-102-SS1]	B055819	2.25	1	N/A	1000	400	450	07/23/12
12G0600-09 [B5-104-SS1]	B055819	1.5	1	N/A	1000	400	300	07/23/12
12G0600-10 [B5-101-SS1]	B055819	1.5	1	N/A	1000	400	300	07/23/12

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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 B055819 - TO-15 Prep											
Blank (B055819-BLK1)					Prepared & Analyzed: 07/23/12						
Tetrachloroethylene	ND	0.025									
Trichloroethylene	ND	0.025									
Surrogate: 4-Bromofluorobenzene (1)	*8.30*				*8.00*		*104*	*70-130*			
LCS (B055819-BS1)					Prepared & Analyzed: 07/23/12						
Tetrachloroethylene	5.06				5.00		101	70-130			
Trichloroethylene	4.53				5.00		90.5	70-130			
Surrogate: 4-Bromofluorobenzene (1)	*8.58*				*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.

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

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA TO-15 in Air	
Tetrachloroethylene	AIHA,FL,NJ,NY
Trichloroethylene	AIHA,FL,NJ,NY

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

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC	100033	02/1/2014
MA	Massachusetts DEP	M-MA100	06/30/2013
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2013
NY	New York State Department of Health	10899 NELAP	04/1/2013
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2013
RI	Rhode Island Department of Health	LAO00112	12/30/2012
NC	North Carolina Div. of Water Quality	652	12/31/2012
NJ	New Jersey DEP	MA007 NELAP	06/30/2013
FL	Florida Department of Health	E871027 NELAP	06/30/2013
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2013
WA	State of Washington Department of Ecology	C2065	02/23/2013
ME	State of Maine	2011028	06/9/2013
VA	Commonwealth of Virginia	1381	12/14/2012

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

AIR SAMPLE CHAIN OF CUSTODY RECORD

39 SPRUCE ST
EAST LONGMEADOW, MA 01028

Page 1 of 2

12G0600

Company Name: ENVIRON
Address: 8 Hollis St, Groton, MA
Attention: ALAN KAO
Project Location: Charlotte, NC
Sampled By: Valerie Turner / Jive Rupp

Telephone: (978) 449-0324
Project # 08-23878E1
Client PO #

DATA DELIVERY (check one):
☐ FAX ☒ EMAIL ☐ WEBSITE CLIENT
Fax # :
Email: akao@environcorp.com
Format: ☑ EXCEL ☒ PDF ☐ GIS KEY ☐ OTHER

Proposal Provided? (For Billing purposes)
☒ yes _____ proposal date

Field ID	Sample Description	Media	Lab #	Date Sampled Start Date Time	Date Sampled Stop Date Time	ONLY USE WHEN USING PUMPS Total Minutes Sampled	Flow Rate M^3/Min. or L / Min.	Volume Liters or M^3	Matrix Code*	ANALYSIS REQUESTED TO-15 TCE, PCE				" Hg Initial pressure	" Hg Final Pressure	" Hg Lab Receipt Pressure	Summa Canister ID	Flow Controller ID
B7-101-SS1	Bldg 7 Unit 101	S	01	07-18-12 0825	07-18-12 0830				SS	X				-27.5	-2	3	1549	4173
B7-104-SS1	Bldg 7 Unit 104		09	07-18-12 1019	07-18-12 1024					X				-30	-2	2.8	1555	4064
B7-104-SS2	Bldg 7 Unit 104		03	07-18-12 1019	07-18-12 1024					X				-30	-2	3	1541	4041
B3-1B-SS2	Bldg 3 Unit 1B		04	07-18-12 1111	07-18-12 1116					X				-28.5	-2	3	1891	4172
B3-1I-SS1	Bldg 3 Unit 1I		05	07-18-12 1143	07-18-12 1149					X				-29	-2	2.5	1892	4171
B4-105-SS1	Bldg 4 Unit 105		06	07-18-12 1244	07-18-12 1250					X				-26.5	-2	4.2	1599	4170
B6-106-SS1	Bldg 6 Unit 106		07	07-18-12 1442	07-18-12 1448					X				-26.5	-2	3.3	1560	4187
B6-102-SS1	Bldg 6 Unit 102	↓	08	07-18-12 1525	07-18-12 1531				↓	X				-26.5	-2	3	1762	4186

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

Summa canisters and flow controllers must be returned within 14 days of receipt or rental fees will apply.

Summa canisters will be retained for a minimum of 14 days after sampling date prior to cleaning.

Laboratory Comments:

CLIENT COMMENTS:

Relinquished by: (signature)	Date/Time:
	07-18-12 1820
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
	7.19.12 09:37

Turnaround **
☐ 7-Day
☐ 10-Day
☒ Other per contract
RUSH
☐ *24-Hr ☐ *48-Hr
☐ *72-Hr ☐ *4-Day
*Approval Required

Special Requirements
Regulations:
Data Enhancement/RCP? ☐ Y ☐ N
Enhanced Data Package ☐ Y ☐ N
(Surchage Applies)
Required Detection Limits:
Other:

***Matrix Code:**
SG= SOIL GAS
IA= INDOOR AIR
AMB=AMBIENT
SS = SUB SLAB
D = DUP
BL = BLANK
O = other

****Media Codes:**
S=summa can
TB=tedlar bag
P=PUF
T=tube
F= filter
C=cassette
O = Other

** TURNAROUND TIME STARTS AT 9:00 A.M. THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON YOUR CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME WILL NOT START UNTIL ALL QUESTIONS ARE ANSWERED BY OUR CLIENT.

AIHA, NELAC & WBE/DBE Certified

con-test® ANALYTICAL LABORATORY
Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com
www.contestlabs.com
39 SPRUCE ST
EAST LONGMEADOW, MA 01028

AIR SAMPLE CHAIN OF CUSTODY RECORD

Page 2 of 2

12G0600

Company Name: ENVIRON
Address: 8 Hollis St, Groton, MA
Attention: ALAN KAD
Project Location: Charlotte, NC
Sampled By: Valeria Turner / Julie Rupp
Telephone: (978) 449-6324
Project # 08-23878E1
Client PO #

DATA DELIVERY (check one):
☐ FAX ☒ EMAIL ☐ WEBSITE CLIENT
Fax # :
Email: akad@environcorp.com
Format: ☒ EXCEL ☒ PDF ☐ GIS KEY ☐ OTHER___

Proposal Provided? (For Billing purposes)
☐ yes _____ proposal date

ANALYSIS REQUESTED

TO-15 TCE, PCE

" Hg

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

Summa canisters and flow controllers must be returned within 14 days of receipt or rental fees will apply.

Summa canisters will be retained for a minimum of 14 days after sampling date prior to cleaning.

Field ID	Sample Description	Media	Lab #	Date Sampled Start Date Time	Date Sampled Stop Date Time	ONLY USE WHEN USING PUMPS: Total Minutes Sampled	Flow Rate M^3/Min. or L / Min.	Volume Liters or M^3	Matrix Code*	Initial pressure	Final Pressure	Lab Receipt pressure	Summa Canister ID	Flow Controller ID
BS-104-SS2	Bldg 5 - Unit 104	S	09	07-18-18 1558	07-18-18 1606				SS	-27.5	-7.2	-2.5	1542	4181
BS-101-SS2	Bldg 5 Unit 14	S	10	07-18-18 1629	07-18-18 1634				SS	-29	-2	-3.1	1602	4180

Laboratory Comments:

CLIENT COMMENTS:

Relinquished by: (signature)	Date/Time: 07-18-18 1820
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature) Paula R	Date/Time: 7.19.18 09:37

Turnaround **
☐ 7-Day
☐ 10-Day
☒ Other 5 DAY
RUSH (Check)
☐ *24-Hr ☐ *48-Hr
☐ *72-Hr ☐ *4-Day
*Approval Required

Special Requirements
Regulations:
Data Enhancement/RCP? ☐ Y ☐ N
Enhanced Data Package ☐ Y ☐ N
(Surchage Applies)
Required Detection Limits:
Other:

***Matrix Code:**
SG= SOIL GAS
IA= INDOOR AIR
AMB=AMBIENT
SS = SUB SLAB
D = DUP
BL = BLANK
O = other_____

****Media Codes:**
S=summa can
TB=tedlar bag
P=PUF
T=tube
F= filter
C=cassette
O = Other_____

** TURNAROUND TIME STARTS AT 9:00 A.M. THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON YOUR CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME WILL NOT START UNTIL ALL QUESTIONS ARE ANSWERED BY OUR CLIENT.

AIHA, NELAC & WBE/DBE Certified

Print page | Close

FedEx

Detailed Results

Tracking no.: 800547382057 Select time format: **12H**

Delivered

Delivered
Signed for by: P.BLAKE

Shipment Dates	Destination
Ship date Jul 18, 2012	Signature Proof of Delivery
Delivery date Jul 19, 2012 9:37 AM	

Shipment Options

Hold at FedEx Location
Hold at FedEx Location service is not available for this shipment.

Shipment Facts

Service type	Priority Overnight - Direct Signature Required	Delivered to	Shipping/Receiving
Weight	29.0 lbs/13.2 kg	Reference	082387881

Shipment Travel History

Select time zone: Local Scan Time

All shipment travel activity is displayed in local time for the location

Date/Time	Activity	Location	Details
Jul 19, 2012 9:37 AM	**Delivered**		
Jul 19, 2012 7:50 AM	On FedEx vehicle for delivery	WINDSOR LOCKS, CT	
Jul 19, 2012 7:08 AM	At local FedEx facility	WINDSOR LOCKS, CT	
Jul 19, 2012 6:05 AM	At destination sort facility	EAST GRANBY, CT	
Jul 19, 2012 4:27 AM	Departed FedEx location	INDIANAPOLIS, IN	
Jul 19, 2012 12:25 AM	Arrived at FedEx location	INDIANAPOLIS, IN	
Jul 18, 2012 9:38 PM	Left FedEx origin facility	CHARLOTTE, NC	
Jul 18, 2012 6:24 PM	Picked up	CHARLOTTE, NC	

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AIR Only Receipt Checklist

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

CLIENT NAME: Environ RECEIVED BY: PB DATE: 7.19.12

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:

Air Media received at Con-Test

			# of Containers	Types (Size, Duration)
Air Sampling Media	Summa Cans		10	1 Lit
	Tedlar Bags			
	Tubes			
Flow Controllers	Regulators		6	5 min
	Restrictors			
Extras	Tubing			
	Other			

Unused Summas: 1549 1892 1542 1555 1599 1602 1641 1560 1891 1762

Unused Regulators: 4172 4170 4173 4171 4180 4181

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

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

Laboratory Comments:

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

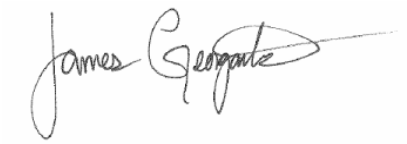
July 27, 2012

Alan Kao
Environ International Corp.
8 Hollis Street
Groton, MA 01450

Project Location: Charlotte, NC
Client Job Number:
Project Number: 20120625 Charlotte NC
Laboratory Work Order Number: 12G0661

Enclosed are results of analyses for samples received by the laboratory on July 19, 2012. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



James M. Georgantas
Project Manager

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

Environ International Corp.
8 Hollis Street
Groton, MA 01450
ATTN: Alan Kao

REPORT DATE: 7/27/2012

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 20120625 Charlotte NC

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 12G0661

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

PROJECT LOCATION: Charlotte, NC

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
B7-101-SS2	12G0661-01	Sub Slab	Bldg 7 Unit 101	EPA TO-15	
B7-101-SS3	12G0661-02	Sub Slab	Bldg 7 Unit 101	EPA TO-15	
B3-1B-SS2	12G0661-03	Sub Slab	Bldg 3 Unit 1B	EPA TO-15	
B3-1I-SS2	12G0661-04	Sub Slab	Bldg 3 Unit 1I	EPA TO-15	
B7-104-SS3	12G0661-05	Sub Slab	Bldg 7 Unit 104	EPA TO-15	
B1-111-CS1	12G0661-06	Air	Bldg 1 Unit 111	EPA TO-15	
B1-102-CS1	12G0661-07	Air	Bldg 1 Unit 102	EPA TO-15	
B4-105-SS2	12G0661-08	Sub Slab	Bldg 4 Unit 105	EPA TO-15	
B6-108-SS2	12G0661-09	Sub Slab	Bldg 6 Unit 108	EPA TO-15	
B5-104-SS2	12G0661-10	Sub Slab	Bldg 5 Unit 104	EPA TO-15	
B5-101-SS2	12G0661-11	Sub Slab	Bldg 5 Unit 101	EPA TO-15	
B6-102-SS2	12G0661-12	Sub Slab	Bldg 6 Unit 102	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.

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.

Daren J. Damboragian
Laboratory Manager

con-test® ANALYTICAL LABORATORY
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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B7-101-SS2
Sample ID: 12G0661-01
Sample Matrix: Sub Slab
Sampled: 7/19/2012 08:39

Sample Description/Location: Bldg 7 Unit 101
Sub Description/Location:
Canister ID: 1420
Canister Size: 1 liter
Flow Controller ID: 4031
Sample Type: Grab

Work Order: 12G0661
Initial Vacuum(in Hg): -28
Final Vacuum(in Hg): -2
Receipt Vacuum(in Hg): -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**
Tetrachloroethylene	3.8	0.050	0.015		26	0.34	1	7/25/12 18:03	WSD
Trichloroethylene	ND	0.050	0.014		ND	0.27	1	7/25/12 18:03	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	106	70-130	7/25/12 18:03

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B7-101-SS3
Sample ID: 12G0661-02
Sample Matrix: Sub Slab
Sampled: 7/19/2012 08:39

Sample Description/Location: Bldg 7 Unit 101
Sub Description/Location:
Canister ID: 1406
Canister Size: 1 liter
Flow Controller ID: 4031
Sample Type: Grab

Work Order: 12G0661
Initial Vacuum(in Hg): -28
Final Vacuum(in Hg): -2
Receipt Vacuum(in Hg): -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**
Tetrachloroethylene	1.9	0.050	0.015		13	0.34	1	7/25/12 18:47	WSD
Trichloroethylene	ND	0.050	0.014		ND	0.27	1	7/25/12 18:47	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	106	70-130	7/25/12 18:47

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B3-1B-SS2
Sample ID: 12G0661-03
Sample Matrix: Sub Slab
Sampled: 7/19/2012 09:17

Sample Description/Location: Bldg 3 Unit 1B
Sub Description/Location:
Canister ID: 1412
Canister Size: 1 liter
Flow Controller ID: 4175
Sample Type: Grab

Work Order: 12G0661
Initial Vacuum(in Hg): -29
Final Vacuum(in Hg): -3
Receipt Vacuum(in Hg): -4/0
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**
Tetrachloroethylene	39	0.050	0.015		260	0.34	1	7/25/12 19:30	WSD
Trichloroethylene	27	0.050	0.014		140	0.27	1	7/25/12 19:30	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	105	70-130	7/25/12 19:30

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B3-1I-SS2
Sample ID: 12G0661-04
Sample Matrix: Sub Slab
Sampled: 7/19/2012 09:49

Sample Description/Location: Bldg 3 Unit 1I
Sub Description/Location:
Canister ID: 1407
Canister Size: 1 liter
Flow Controller ID: 4174
Sample Type: Grab

Work Order: 12G0661
Initial Vacuum(in Hg): -29
Final Vacuum(in Hg): -3
Receipt Vacuum(in Hg): -4
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**
Tetrachloroethylene	0.74	0.050	0.015		5.0	0.34	1	7/25/12 20:15	WSD
Trichloroethylene	ND	0.050	0.014		ND	0.27	1	7/25/12 20:15	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	105	70-130	7/25/12 20:15

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B7-104-SS3
Sample ID: 12G0661-05
Sample Matrix: Sub Slab
Sampled: 7/19/2012 10:20

Sample Description/Location: Bldg 7 Unit 104
Sub Description/Location:
Canister ID: 1419
Canister Size: 1 liter
Flow Controller ID: 4185
Sample Type: Grab

Work Order: 12G0661
Initial Vacuum(in Hg): -27.5
Final Vacuum(in Hg): -2.5
Receipt Vacuum(in Hg): -4
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**
Tetrachloroethylene	3.7	0.050	0.015		25	0.34	1	7/25/12 20:59	WSD
Trichloroethylene	0.064	0.050	0.014		0.34	0.27	1	7/25/12 20:59	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	106	70-130	7/25/12 20:59

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B1-111-CS1
Sample ID: 12G0661-06
Sample Matrix: Air
Sampled: 7/19/2012 10:40

Sample Description/Location: Bldg 1 Unit 111
Sub Description/Location:
Canister ID: 1087
Canister Size: 6 liter
Flow Controller ID: 3344
Sample Type: 72 hr

Work Order: 12G0661
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -13
Receipt Vacuum(in Hg): -11
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**
Tetrachloroethylene	6.6	0.050	0.015		45	0.34	1	7/24/12 17:44	WSD
Trichloroethylene	0.72	0.050	0.014		3.9	0.27	1	7/24/12 17:44	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	104	70-130	7/24/12 17:44

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B1-102-CS1
Sample ID: 12G0661-07
Sample Matrix: Air
Sampled: 7/19/2012 10:45

Sample Description/Location: Bldg 1 Unit 102
Sub Description/Location:
Canister ID: 1126
Canister Size: 6 liter
Flow Controller ID: 3257
Sample Type: 72 hr

Work Order: 12G0661
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -12.5
Receipt Vacuum(in Hg): -13
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**
Tetrachloroethylene	14	0.050	0.015		98	0.34	1	7/24/12 19:04	WSD
Trichloroethylene	1.4	0.050	0.014		7.8	0.27	1	7/24/12 19:04	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	105	70-130	7/24/12 19:04

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B4-105-SS2
Sample ID: 12G0661-08
Sample Matrix: Sub Slab
Sampled: 7/19/2012 12:07

Sample Description/Location: Bldg 4 Unit 105
Sub Description/Location:
Canister ID: 1889
Canister Size: 1 liter
Flow Controller ID: 4184
Sample Type: Grab

Work Order: 12G0661
Initial Vacuum(in Hg): -28
Final Vacuum(in Hg): -5
Receipt Vacuum(in Hg): -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**
Tetrachloroethylene	0.83	0.050	0.015		5.6	0.34	1	7/25/12 21:46	WSD
Trichloroethylene	0.051	0.050	0.014		0.27	0.27	1	7/25/12 21:46	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	105	70-130	7/25/12 21:46

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B6-108-SS2
Sample ID: 12G0661-09
Sample Matrix: Sub Slab
Sampled: 7/19/2012 12:52

Sample Description/Location: Bldg 6 Unit 108
Sub Description/Location:
Canister ID: 1429
Canister Size: 1 liter
Flow Controller ID: 4183
Sample Type: Grab

Work Order: 12G0661
Initial Vacuum(in Hg): -26
Final Vacuum(in Hg): -2
Receipt Vacuum(in Hg): -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**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
Tetrachloroethylene	5.5	0.050	0.015		37	0.34	1	7/25/12 22:30	WSD
Trichloroethylene	0.10	0.050	0.014		0.55	0.27	1	7/25/12 22:30	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	106	70-130	7/25/12 22:30

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B5-104-SS2
Sample ID: 12G0661-10
Sample Matrix: Sub Slab
Sampled: 7/19/2012 13:28

Sample Description/Location: Bldg 5 Unit 104
Sub Description/Location:
Canister ID: 1431
Canister Size: 1 liter
Flow Controller ID: 4182
Sample Type: Grab

Work Order: 12G0661
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -5
Receipt Vacuum(in Hg): -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**
Tetrachloroethylene	1.1	0.050	0.015		7.4	0.34	1	7/25/12 23:17	WSD
Trichloroethylene	ND	0.050	0.014		ND	0.27	1	7/25/12 23:17	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	106	70-130	7/25/12 23:17

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B5-101-SS2
Sample ID: 12G0661-11
Sample Matrix: Sub Slab
Sampled: 7/19/2012 13:56

Sample Description/Location: Bldg 5 Unit 101
Sub Description/Location:
Canister ID: 1425
Canister Size: 1 liter
Flow Controller ID: 4191
Sample Type: Grab

Work Order: 12G0661
Initial Vacuum(in Hg): -28
Final Vacuum(in Hg): -2
Receipt Vacuum(in Hg): -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**	**Results**	**RL**	**Dilution**	**Analyzed**	**Analyst**
Tetrachloroethylene	0.48	0.050	0.015		3.2	0.34	1	7/26/12 0:01	WSD
Trichloroethylene	ND	0.050	0.014		ND	0.27	1	7/26/12 0:01	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	105	70-130	7/26/12 0:01

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ANALYTICAL RESULTS

Project Location: Charlotte, NC
Date Received: 7/19/2012
Field Sample #: B6-102-SS2
Sample ID: 12G0661-12
Sample Matrix: Sub Slab
Sampled: 7/19/2012 14:51

Sample Description/Location: Bldg 6 Unit 102
Sub Description/Location:
Canister ID: 1422
Canister Size: 1 liter
Flow Controller ID: 4190
Sample Type: Grab

Work Order: 12G0661
Initial Vacuum(in Hg): -28
Final Vacuum(in Hg): -3
Receipt Vacuum(in Hg): -4
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**
Tetrachloroethylene	0.49	0.050	0.015		3.3	0.34	1	7/26/12 0:45	WSD
Trichloroethylene	ND	0.050	0.014		ND	0.27	1	7/26/12 0:45	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	106	70-130	7/26/12 0:45

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
12G0661-01 [B7-101-SS2]	B055890	2	1	N/A	1000	400	800	07/25/12
12G0661-02 [B7-101-SS3]	B055890	2	1	N/A	1000	400	800	07/25/12
12G0661-03 [B3-1B-SS2]	B055890	2	1	N/A	1000	400	800	07/25/12
12G0661-04 [B3-1I-SS2]	B055890	2	1	N/A	1000	400	800	07/25/12
12G0661-05 [B7-104-SS3]	B055890	2	1	N/A	1000	400	800	07/25/12
12G0661-08 [B4-105-SS2]	B055890	2	1	N/A	1000	400	800	07/25/12
12G0661-09 [B6-108-SS2]	B055890	2	1	N/A	1000	400	800	07/25/12
12G0661-10 [B5-104-SS2]	B055890	2	1	N/A	1000	400	800	07/25/12
12G0661-11 [B5-101-SS2]	B055890	2	1	N/A	1000	400	800	07/25/12
12G0661-12 [B6-102-SS2]	B055890	2	1	N/A	1000	400	800	07/25/12

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
12G0661-06 [B1-111-CS1]	B055894	2	1	N/A	1000	400	800	07/24/12
12G0661-07 [B1-102-CS1]	B055894	2	1	N/A	1000	400	800	07/24/12

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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 B055890 - TO-15 Prep											
Blank (B055890-BLK1)					Prepared & Analyzed: 07/25/12						
Tetrachloroethylene	ND	0.025									
Trichloroethylene	ND	0.025									
Surrogate: 4-Bromofluorobenzene (1)	*8.48*				*8.00*		*106*	*70-130*			
LCS (B055890-BS1)					Prepared & Analyzed: 07/25/12						
Tetrachloroethylene	4.71				5.00		94.1	70-130			
Trichloroethylene	4.54				5.00		90.9	70-130			
Surrogate: 4-Bromofluorobenzene (1)	*8.44*				*8.00*		*105*	*70-130*			
Batch B055894 - TO-15 Prep											
Blank (B055894-BLK1)					Prepared & Analyzed: 07/24/12						
Tetrachloroethylene	ND	0.025									
Trichloroethylene	ND	0.025									
Surrogate: 4-Bromofluorobenzene (1)	*8.35*				*8.00*		*104*	*70-130*			
LCS (B055894-BS1)					Prepared & Analyzed: 07/24/12						
Tetrachloroethylene	4.95				5.00		98.9	70-130			
Trichloroethylene	4.68				5.00		93.6	70-130			
Surrogate: 4-Bromofluorobenzene (1)	*8.33*				*8.00*		*104*	*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.

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

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA TO-15 in Air	
Tetrachloroethylene	AIHA,FL,NJ,NY
Trichloroethylene	AIHA,FL,NJ,NY

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

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC	100033	02/1/2014
MA	Massachusetts DEP	M-MA100	06/30/2013
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2013
NY	New York State Department of Health	10899 NELAP	04/1/2013
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2013
RI	Rhode Island Department of Health	LAO00112	12/30/2012
NC	North Carolina Div. of Water Quality	652	12/31/2012
NJ	New Jersey DEP	MA007 NELAP	06/30/2013
FL	Florida Department of Health	E871027 NELAP	06/30/2013
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2013
WA	State of Washington Department of Ecology	C2065	02/23/2013
ME	State of Maine	2011028	06/9/2013
VA	Commonwealth of Virginia	1381	12/14/2012

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

AIR SAMPLE CHAIN OF CUSTODY RECORD

39 SPRUCE ST
EAST LONGMEADOW, MA 01028

Page 1 of 2

12G06661

Company Name: ENVIRON
Address: 8 Hollis St, Groton, MA
Attention: ALAN KAO
Project Location: Charlotte, NC
Sampled By: Valerie Turner

Telephone: (978) 449 0324
Project # 08-23878E1
Client PO #

DATA DELIVERY (check one):
☐FAX ☒EMAIL ☐WEBSITE CLIENT
Fax # :
Email: akao@environcorp.com
Format: ☒EXCEL ☒PDF ☐ GIS KEY ☐ OTHER___

Proposal Provided? (For Billing purposes)
☐ yes _____ proposal date

ANALYSIS REQUESTED

TO-15 PLUS TICS

Field ID	Sample Description	Media	Lab #	Date Sampled Start Date Time	Date Sampled Stop Date Time	ONLY USE WHEN USING PUMPS Total Minutes Sampled	Flow Rate M^3/Min. or L / Min.	Volume Liters or M^3	Matrix Code*				" Hg Initial pressure	" Hg Final Pressure	" Hg Lab Receipt Pressure	Summa Canister ID	Flow Controller ID
B7-101-SS2	Bldg 7 Unit 101	S	01	07-19-12 0934	07-19-12 0839				SS	X			-28	-2	-1	1420	4031
B7-101-SS3	Bldg 7 Unit 101		02	07-19-12 0834	07-19-12 0839					X			-28	-2	-1	1406	4031
B3-1B-SS2	Bldg 3 Unit 1B		03	07-19-12 0912	07-19-12 0917					X			-29	-3	-4/0*	1412	4175
B3-1I-SS2	Bldg 3 Unit 1I		04	07-19-12 6944	07-19-12 0949					X			-29	-3	-4	1407	4174
B7-104-SS3	Bldg 7 Unit 104		05	07-19-12 1015	07-19-12 1020					X			-27.5	-2.5	-4	1419	4185
B1-111-SS1	Bldg 1 Unit 111		06	07-16-12 1045	07-19-12 1040				O	X			-30	-13	-11	1087	3344
B1-102-SS1	Bldg 1 Unit 102		07	07-16-12 1050	07-19-12 1045				O	X			-30	-12.5	-13	1126	3257
B4-105-SS2	Bldg 4 Unit 105	↓	08	07-19-12 1146	07-19-12 1207				SS	X			-28	-5	-6	1899	4184

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

Summa canisters and flow controllers must be returned within 14 days of receipt or rental fees will apply.

Summa canisters will be retained for a minimum of 14 days after sampling date prior to cleaning.

Laboratory Comments:
(*) Pressures for B3-1B SS2 received at -4, however valve was not closed prior to closing off sampling nut. Ambient air entered and pressure went to 0. ?? Question on comprimised sample?? AF 7/20/12

CLIENT COMMENTS:

Relinquished by: (signature)	Date/Time:
	07-19-12 1700
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
	7/20/12 09:56

Turnaround **
☐ 7-Day
☐ 10-Day
☒ Other 2x
RUSH * Contact
☐ *24-Hr ☐ *48-Hr
☐ *72-Hr ☐ *4-Day
*Approval Required

Special Requirements
Regulations:
Data Enhancement/RCP? ☐ Y ☐ N
Enhanced Data Package ☐ Y ☐ N
(Surchage Applies)
Required Detection Limits:
Other:

***Matrix Code:**
SG= SOIL GAS
IA= INDOOR AIR
AMB=AMBIENT
SS = SUB SLAB
D = DUP
BL = BLANK
O = other crawl space

****Media Codes:**
S=summa can
TB=tedlar bag
P=PUF
T=tube
F= filter
C=cassette
O = Other_____

** TURNAROUND TIME STARTS AT 9:00 A.M. THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON YOUR CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME WILL NOT START UNTIL ALL QUESTIONS ARE ANSWERED BY OUR CLIENT.

AIHA, NELAC & WBE/DBE Certified

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

AIR SAMPLE CHAIN OF CUSTODY RECORD

39 SPRUCE ST
EAST LONGMEADOW, MA 01028

Page 2 of 2

12G06061

Company Name: ENVIRON
Address: 8 Hollis St, Groton, MA
Attention: ALAN KAO
Project Location: Charlotte NC
Sampled By: Valerie Tarter

Telephone: (978) 449 0324
Project # 08-23878E1
Client PO #

DATA DELIVERY (check one):
☐FAX ☒EMAIL ☐WEBSITE CLIENT
Fax # :
Email: akao@environcorp.com
Format: ☒EXCEL ☒PDF ☐ GIS KEY ☐ OTHER

Proposal Provided? (For Billing purposes)
☐ yes _____ proposal date

Field ID	Sample Description	Media	Lab #	Date Sampled Start Date Time	Date Sampled Stop Date Time	ONLY USE WHEN USING PUMPS: Total Minutes Sampled	Flow Rate M^3/Min. or L / Min.	Volume Liters or M^3	Matrix Code*	ANALYSIS REQUESTED: TO-15 PCE, TCE	" Hg Initial pressure	" Hg Final Pressure	" Hg Lab Receipt Pressure	Summa Canister ID	Flow Controller ID
B6-106-552	Bldg 106 Unit 6	S	09	07-19-12 1247	07-19-12 1452				SS	X	-26	-2	-3	1429	4183
BS-104-552	Bldg S Unit 104		10	07-19-12 1320	07-19-12 1380					X	-30	-5	-6	1431	4182
BS-101-552	Bldg S Unit 101		11	07-19-12 1351	07-19-12 1556					X	-28	-2	-3	1425	4191
B6-102-552	Bldg 6 Unit 102		12	07-19-12 1446	07-19-12 1451					X	-28	-3	-4	1422	4190

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

Summa canisters and flow controllers must be returned within 14 days of receipt or rental fees will apply.

Summa canisters will be retained for a minimum of 14 days after sampling date prior to cleaning.

Laboratory Comments:

CLIENT COMMENTS:

Relinquished by: (signature)	Date/Time: 07-19-12	
Received by: (signature)	Date/Time:	
Relinquished by: (signature)	Date/Time:	
Received by: (signature)	Date/Time: 7/20/12 09:56	

Turnaround **
☐ 7-Day
☐ 10-Day
☒ Other 5 BD
RUSH
☐ *24-Hr ☐ *48-Hr
☐ *72-Hr ☐ *4-Day
*Approval Required

Special Requirements
Regulations:
Data Enhancement/RCP? ☐ Y ☐ N
Enhanced Data Package ☐ Y ☐ N
(Surchage Applies)
Required Detection Limits:
Other:

***Matrix Code:**
SG= SOIL GAS
IA= INDOOR AIR
AMB=AMBIENT
SS = SUB SLAB
D = DUP
BL = BLANK
O = other

****Media Codes:**
S=summa can
TB=tedlar bag
P=PUF
T=tube
F= filter
C=cassette
O = Other

** TURNAROUND TIME STARTS AT 9:00 A.M. THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON YOUR CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME WILL NOT START UNTIL ALL QUESTIONS ARE ANSWERED BY OUR CLIENT.

AIHA, NELAC & WBE/DBE Certified

Track Associated Shipments

Printer-Friendly Help

Detailed Results 800547381874 | Notifications 800547381874 | **Associated Shipments**

Select time format 12H | 24H

Master tracking no.	800547381874	Destination	
Service type	Priority Overnight	Total pieces	3

All Shipments Associated with the Master Tracking Number

Delivered

Tracking no.	Status	Delivery date	Signature Proof Image
800547381874	Delivered	Jul 20, 2012 9:56 AM	Yes
795764470452	Delivered	Jul 20, 2012 9:56 AM	Yes
795764470463	Delivered	Jul 20, 2012 9:56 AM	Yes

○ View/print Signature Proof of Delivery letter
○ E-mail Signature Proof of Delivery letter

Account no.
(Required for detailed Signature Proof of Delivery)
Click here if you have more than one account number for these shipments.

Submit

www.contestlabs.com

con-test® ANALYTICAL LABORATORY

AIR Only Receipt Checklist

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

CLIENT NAME: Environ RECEIVED BY: AP/KKM DATE: 7-20-12

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: _____

Air Media received at Con-Test

			# of Containers	Types (Size, Duration)
Air Sampling Media	Summa Cans		18	2-6L, 16-1L
	Tedlar Bags			
	Tubes			
Flow Controllers	Regulators		#'s 22	5min (20), 72hr(2)
	Restrictors			
Extras	Tubing			
	Other		nuts, ferrules, 2 Ts	

~~Unused~~ Summas:
1420 1407 1126* 1431 | 1434 1538
1406 1419 1889 1425 | 1443 1535
1412 *1087 1429 1422 | 1536 1423
*6L

Unused Regulators:
4178 4185 4182 *3257 4192 4064 4174
4179 4176 4183 4186 4193 4188 4175
4184 4177 *3344 4187 4031 4189 4190
4191
* 72 hr

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

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

Laboratory Comments:

Appendix B
Radon Data

Attention: P6438 / VALERIE TURNER / ENVIRON INTERNATIONAL CORPORATION

Kit #: 4476222 Result: 1.4 ± 0.2 pCi/l
Location: 1st Floor Kit
Alpha Mill
206 Alpha Mill Ln Building 7 Unit 1 Ia1
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 12:00 pm
Ended : 2012−07−16 at 9:00 am
Hours/MST% : 69 hours 7.5% 70°F

Kit #: 4476223 Result: 0.8 ± 0.2 pCi/l
Location: 1st Floor Hallway
Alpha Mill
316 Aplha Mill Ln Building 4 Unit 105
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 2:00 pm
Ended : 2012−07−16 at 2:00 pm
Hours/MST% : 72 hours 8.8% 70°F

Kit #: 4476224 Result: < 0.3 pCi/l
Location: 1st Floor Hallway
Alpha Mill
320 Aplha Mill Ln Building 4 Unit 112
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 2:00 pm
Ended : 2012−07−16 at 2:00 pm
Hours/MST% : 72 hours 8.8% 70°F

Kit #: 4476225 Result: 1.2 ± 0.2 pCi/l
Location: 1st Floor Kit
Alpha Mill
206 Aplha Mill Ln Building 7 Unit 101
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 12:00 pm
Ended : 2012−07−16 at 9:00 am
Hours/MST% : 69 hours 6.8% 70°F

Kit #: 4476226 Result: 1.6 ± 0.2 pCi/l
Location: 1st Floor Kit
Alpha Mill
206 Aplha Mill Ln Building 7 Unit 104
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 1:00 pm
Ended : 2012−07−16 at 11:00 am
Hours/MST% : 70 hours 9.4% 70°F

Kit #: 4476227 Result: 3.5 ± 0.3 pCi/l
Location: 1st Floor Kit
Alpha Mill
920 Spindle St Unit 108 Building 6
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 3:00 pm
Ended : 2012−07−16 at 2:00 pm
Hours/MST% : 71 hours 9.4% 70°F

Attention: P6438 / VALERIE TURNER / ENVIRON INTERNATIONAL CORPORATION

Kit #: 4476228 Result: 2.5 ± 0.2 pCi/l
Location: 1st Floor Kit
Alpha Mill
920 Spindle St Unit 102 Building 6
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 3:00 pm
Ended : 2012−07−16 at 2:00 pm
Hours/MST% : 71 hours 7.6% 70°F

Kit #: 4476229 Result: 1.9 ± 0.2 pCi/l
Location: 1st Floor Kit
Alpha Mill
230 Alpha Mill Ln Building 3 Unit 1i
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 1:00 pm
Ended : 2012−07−16 at 12:00 pm
Hours/MST% : 71 hours 8.2% 70°F

Kit #: 4476230 Result: 0.9 ± 0.2 pCi/l
Location: 1st Floor Kit
Alpha Mill
230 Alpha Mill Ln Building 3 Unit 1b
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 1:00 pm
Ended : 2012−07−16 at 12:00 pm
Hours/MST% : 71 hours 6.9% 70°F

Kit #: 4476231 Result: 5.9 ± 0.3 pCi/l
Location: 1st Floor
Alpha Mill
910 Spindle St U1nit 101 Building 25
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 3:00 pm
Ended : 2012−07−16 at 3:00 pm
Hours/MST% : 72 hours 8.8% 70°F

Kit #: 4476232 Result: 1.2 ± 0.2 pCi/l
Location: 1st Floor
Alpha Mill
210 Alpha Mill Ln Unit 102 Building 1
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 4:00 pm
Ended : 2012−07−16 at 4:00 pm
Hours/MST% : 72 hours 9.5% 70°F

Kit #: 4476233 Result: 2.0 ± 0.2 pCi/l
Location: 1st Floor Kit
Alpha Mill
910 Spindle St Unit 104 Building 25
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 3:00 pm
Ended : 2012−07−16 at 3:00 pm
Hours/MST% : 72 hours 8.8% 70°F

Attention: P6438 / VALERIE TURNER / ENVIRON INTERNATIONAL CORPORATION

Kit #: 4476234 Result: 2.2 ± 0.4 pCi/l
Location: Basement Cs
Alpha Mill
210 Alpha Mill Ln Unit 119 Building 1
Charlotte, NC 28286

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 4:00 pm
Ended : 2012−07−16 at 4:00 pm
Hours/MST% : 72 hours 17.6% 80°F

Kit #: 4476236 Result: 1.4 ± 0.2 pCi/l
Location: 1st Floor Kit
Alpha Mill
210 Alpha Mill Ln Unit 119 Building 1
Charlotte, NC 28286

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 3:00 pm
Ended : 2012−07−16 at 3:00 pm
Hours/MST% : 72 hours 7.6% 70°F

Kit #: 4476237 Result: 2.0 ± 0.3 pCi/l
Location: Basement Cs
Alpha Mill
210 Alpha Mill Ln Unit 119 Building 1
Charlotte, NC 28286

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 4:00 pm
Ended : 2012−07−16 at 4:00 pm
Hours/MST% : 72 hours 17.2% 80°F

Kit #: 4476239 Result: 1.2 ± 0.2 pCi/l
Location: 1st Floor Kit
Alpha Mill
210 Alpha Mill Ln Unit 111 Building 1
Charlotte, NC 28286

Analysis Note :
Analyzed : 2012−07−18 at 11:00 am
Started : 2012−07−13 at 4:00 pm
Ended : 2012−07−16 at 3:00 pm
Hours/MST% : 71 hours 8.9% 70°F

Attention: P6438 / VALERIE TURNER / ENVIRON INTERNATIONAL CORPORATION

Kit #: 4476238 Result: 1.1 ± 0.3 pCi/l
Location:
Alpha Mill
210 Alpha Mill Lane Unit 102 Bldg 2
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−20 at 11:00 am
Started : 2012−07−16 at 11:00 am
Ended : 2012−07−19 at 11:00 am
Hours/MST% : 72 hours 16.6% 80°F

Kit #: 4476241 Result: 0.8 ± 0.2 pCi/l
Location:
Alpha Mih
210 Alpha Mill Lane Unit 111 Bldg1
Charlotte, NC 28206

Analysis Note :
Analyzed : 2012−07−20 at 11:00 am
Started : 2012−07−16 at 11:00 am
Ended : 2012−07−19 at 11:00 am
Hours/MST% : 72 hours 15.9% 80°F

Air Chek, Inc. 1936 Butler Bridge Rd, Mills River, NC 28759−3892 Phone: (828) 684−0893 Fax: (828) 684−8498

INDOOR ENVIRONMENTAL
P.O. Box 404, Newell, NC 28126
704-537-8503 • 800-273-5266

July 20, 2012

Ms. Jennifer Archacki
ENVIRON International Corp.
20 Custom House St.
Boston, MA 02110

Dear Ms. Archacki:

On July 18 and 19, 2012, Indoor Environmental conducted subslab radon level testing at Alpha Mill Apartments in Charlotte, NC. ENVIRON employees took VOC samples from the same subslab ports immediately preceeding these radon measurements. Four Niton or Durridge Rad 7 radon monitors were used. Soon after the VOC samples were finished, a Rad 7 was connected to the same tubing and purged for about 12 minutes to allow the Polonium 218 counts to approach equilibrium, It was then reset and allowed to run for 30 or 60 minutes depending on the number of counts per minute observed initially. The tubing was then removed, the floor port capped by ENVIRON employees, and the Rad 7 purged with fresh air.

Following are the results of the subslab radon tests:

7-18-12	Unit #	Rad 7 #	sampling time	Results (pCi/L)
	7-101	1455	8:59 - 9:29	662.
	"	306	9:35 - 10:05	637.
	7-104	2263	10:37 - 11:07	779.
	3-1B	299	11:29 - 12:29	76.2
	3-1I	2263	12:03 - 1:03	86.0
	4-105	306	1:09 - 2:09	64 ? *
	6-108	299	3:05 - 4:05	303.
	6-102	306	3:47 - 4:48	82.5
	5-104	2263	4:22 - 5:22	40.5
	5-101	1455	4:44 - 5:44	596.
7-19-12	7-101	299	8:53 - 9:24	540.
	3-1B	1455	9:32 - 10:32	90.3
	3-1I	2263	10:04 - 11:04	195.
	7-104	299	10:59 - 11:29	777.
	3-1I	306	11:08 - 12:08	165.
	4-105	1455	12:42 - 1:12	1.0 *
	6-108	2263	1:09 - 2:09	275.
	5-104	299	1:37 - 2:37	103.
	5-101	306	2:42 - 3:12	1010.
	6-102	1455	3:09 - 4:09	45.9

* The asterisk indicates that I believe that this result is not accurate. We had a very high resistance to air flow both on these radon samples and the VOC canisters. There is a good likelihood that above slab air was sucked in around the fittings diluting the subslab sample.

This range of subslab radon levels is in the range of subslab radon levels we typically see in this area for basement homes. It is not unusual to see great changes from day to day. What is slightly unusual is that some levels were significantly higher on the second day, while some were lower. Barometric pressure was dropping slowly on July 19; more stable on 7-18. It is possible that some fittings might not have been as tight as we thought, though all of us checked them carefully.

Sincerely,

Eric Roberts

Eric Roberts

0301 779±22.5 p Sniff
WED 18-JUL-12 11:07
80.8°F RH: 7% B:7.03V

0401 77.8±7.36 p Sniff
WED 18-JUL-12 12:33
80.8°F RH: 7% B:7.12V

0402 94.0±7.94 p Sniff
WED 18-JUL-12 13:03
80.8°F RH: 8% B:7.12V

0501 0.61±1.56 p Sniff
WED 18-JUL-12 15:08
82.4°F RH: 7% B:7.12V

0601 39.9±5.31 p Sniff
WED 18-JUL-12 16:52
79.0°F RH:12% B:7.00V

0602 40.5±5.37 p Sniff
WED 18-JUL-12 17:22
79.0°F RH:12% B:7.00V

0701 195±7.88 p Sniff
THU 19-JUL-12 11:04
81.9°F RH: 6% B:6.52V

0801 275±9.34 p Sniff
THU 19-JUL-12 14:08
77.4°F RH:10% B:7.03V

0301 662±20.6 p Sniff
WED 18-JUL-12 09:29
69.8°F RH: 9% B:7.03V

0401 583±19.3 p Sniff
WED 18-JUL-12 17:14
83.5°F RH: 9% B:7.03V

0402 596±19.6 p Sniff
WED 18-JUL-12 17:44
80.8°F RH: 8% B:7.03V

0701 90.9±7.67 p Sniff
THU 19-JUL-12 10:02
80.8°F RH: 8% B:7.03V

0702 90.3±7.66 p Sniff
THU 19-JUL-12 10:32
80.8°F RH: 6% B:6.94V

0801 1.03±1.27 p Sniff
THU 19-JUL-12 13:12
77.9°F RH:10% B:6.94V

0901 0.88±1.22 p Sniff
THU 19-JUL-12 13:48
76.8°F RH: 6% B:6.97V

0902 1.47±1.47 p Sniff
THU 19-JUL-12 14:18
76.3°F RH: 5% B:6.97V

1001 45.9±5.57 p Sniff
THU 19-JUL-12 15:39
73.0°F RH: 5% B:7.06V

1002 45.8±5.56 p Sniff
THU 19-JUL-12 16:09
70.9°F RH: 6% B:7.06V

0301 637±20.0 p Sniff
WED 18-JUL-12 10:10
73.0°F RH: 9% B:7.06V

0401 64.2±6.48 p Sniff
WED 18-JUL-12 13:39
80.2°F RH:14% B:7.06V

0402 35.3±4.93 p Sniff
WED 18-JUL-12 14:09
79.0°F RH:15% B:7.06V

0501 0.20±1.11 p Sniff
WED 18-JUL-12 15:02
82.9°F RH: 7% B:7.06V

0601 77.0±7.07 p Sniff
WED 18-JUL-12 16:17
71.4°F RH: 6% B:7.06V

0602 82.5±7.37 p Sniff
WED 18-JUL-12 16:47
70.3°F RH: 8% B:7.09V

0701 155±9.86 p Sniff
THU 19-JUL-12 11:38
80.8°F RH: 8% B:7.06V

0702 176±10.6 p Sniff
THU 19-JUL-12 12:08
81.3°F RH: 9% B:7.06V

0801 1010±25.4 p Sniff
THU 19-JUL-12 15:12
79.0°F RH: 6% B:7.06V

0801 777±22.0 p Sniff
THU 19-JUL-12 11:28
80.2°F RH: 7% B:6.85V
Total Counts: 7493.
LiveTime: 26.5min
R: 193±5.46 cpm 68.4%
B: 8.09±1.18 cpm 2.9%
C: 67.4±3.26 cpm 23.9%
D: 0.34±0.31 cpm 0.1%
O: 13.3±1.49 cpm 4.7%

0901 9.04±2.93 p Sniff
THU 19-JUL-12 12:13
78.4°F RH:12% B:6.88V
Total Counts: 3060.
LiveTime: 27.2min
R: 2.68±0.71 cpm 2.4%
B: 1.99±0.62 cpm 1.8%
C: 106±4.02 cpm 94.1%
D: 0.88±0.44 cpm 0.8%
O: 1.07±0.48 cpm 1.0%

1001 87.4±7.48 p Sniff
THU 19-JUL-12 14:07
75.2°F RH: 8% B:6.88V
Total Counts: 1075.
LiveTime: 27.8min
R: 22.0±1.85 cpm 56.9%
B: 0.39±0.32 cpm 1.0%
C: 14.6±1.52 cpm 37.8%
D: 0.54±0.36 cpm 1.4%
O: 1.11±0.48 cpm 2.9%

1002 119±8.73 p Sniff
THU 19-JUL-12 14:37
74.7°F RH: 7% B:6.88V
Total Counts: 1372.
LiveTime: 27.4min
R: 29.8±2.16 cpm 59.7%
B: 0.44±0.34 cpm 0.9%
C: 17.4±1.67 cpm 34.9%
D: 0.62±0.38 cpm 1.3%
O: 1.68±0.57 cpm 3.3%

0301 76.2±4.87 p Sniff
WED 18-JUL-12 12:29
79.0°F RH: 6% B:6.85V
Total Counts: 1498.
Livetime: 55.2min
A: 18.9±1.21 cpm 69.8%
B: 0.67±0.26 cpm 2.5%
C: 6.22±0.71 cpm 23.0%
D: 0.05±0.11 cpm 0.2%
O: 1.23±0.34 cpm 4.5%

0401 3.31±1.16 p Sniff
WED 18-JUL-12 13:36
97.2°F RH: 6% B:6.30V
Total Counts: 712.
Livetime: 55.9min
A: 0.86±0.29 cpm 6.8%
B: 0.34±0.20 cpm 2.7%
C: 11.3±0.93 cpm 88.5%
D: 0.09±0.12 cpm 0.7%
O: 0.18±0.15 cpm 1.4%

0501 311±13.8 p Sniff
WED 18-JUL-12 15:36
81.3°F RH: 6% B:6.85V
Total Counts: 2659.
Livetime: 27.5min
A: 77.1±3.42 cpm 80.0%
B: 1.20±0.50 cpm 1.3%
C: 14.0±1.50 cpm 14.6%
D: 0.00±0.15 cpm 0.0%
O: 4.10±0.85 cpm 4.3%

0502 294±13.4 p Sniff
WED 18-JUL-12 16:06
77.9°F RH: 5% B:6.88V
Total Counts: 3275.
Livetime: 27.4min
A: 73.0±3.33 cpm 61.2%
B: 1.24±0.50 cpm 1.1%
C: 40.2±2.49 cpm 33.7%
D: 0.18±0.25 cpm 0.2%
O: 4.66±0.90 cpm 3.9%

0601 540±18.3 p Sniff
THU 19-JUL-12 09:23
66.9°F RH: 8% B:6.91V
Total Counts: 4546.
Livetime: 26.9min
A: 134±4.53 cpm 79.4%
B: 4.41±0.89 cpm 2.6%
C: 20.4±1.82 cpm 12.1%
D: 0.04±0.18 cpm 0.0%
O: 9.82±1.28 cpm 5.8%

0701 128±8.97 p Sniff
THU 19-JUL-12 09:55
80.8°F RH: 8% B:6.21V
Total Counts: 2670.
Livetime: 27.5min
A: 31.8±2.22 cpm 32.9%
B: 1.74±0.58 cpm 1.8%
C: 60.5±3.08 cpm 62.4%
D: 0.29±0.29 cpm 0.3%
O: 2.54±0.68 cpm 2.6%

0702 1.75±1.49 p Sniff
THU 19-JUL-12 10:25
85.6°F RH:10% B:6.85V
Total Counts: 1658.
Livetime: 27.6min
A: 0.54±0.36 cpm 0.9%
B: 0.69±0.40 cpm 1.2%
C: 58.0±2.97 cpm 96.8%
D: 0.22±0.26 cpm 0.4%
O: 0.47±0.34 cpm 0.8%

Alpha Mills - Charlotte, NC
Radon Monitors