120 St. James Ave
Fifth Floor
Boston, MA 02116
T +1.617.242.9222
www.jacobs.com

Maurice Moore
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203-2999

July 8, 2019

Subject: Essex Hope Site, Offsite Vapor Intrusion Investigation: Work Plan Addendum to Include Indoor and Outdoor Air Sampling at H&H Metal Specialty, Inc.

Mr. Moore,

Jacobs has prepared this letter work plan addendum on behalf of Essex Specialty Products Inc. to outline the additional investigation activities that will be performed to further evaluate the potential for vapor intrusion (VI) at H&H Metal Specialty Inc. (H&H Metals) based on elevated subslab soil gas results during the December 2018 investigation. H&H Metals is one of the offsite buildings above or adjacent to the chlorinated solvent groundwater plume at the Essex-Hope State Superfund site located at 125 Blackstone Avenue in Jamestown, New York (the Site; Figure 1). The Site is listed under the New York Superfund Program (Site Number 907015) and managed by the New York State Department of Environmental Conservation (NYSDEC). A Record of Decision (ROD) was issued in 1994 requiring the implementation of remedial actions at the Site (NYSDEC 1994).

This monitoring event is being conducted in response to the results of the December 2018 offsite vapor intrusion investigation, documented in the *Interim Offsite Vapor Intrusion Investigation Report* (CH2M HILL Engineers, Inc. [CH2M], 2019). Additional indoor and outdoor air monitoring is proposed for Summer 2019 to further evaluate a potential VI pathway is not present in H&H Metals based on the results of the subslab soil gas obtained from the initial sampling event. This property is currently unoccupied and for sale and therefore, there are currently no receptors; however, this allows for indoor air sampling to occur without manufacturing activities and less opportunity for interference from background indoor sources. This work plan outlines the sampling approach for the collection of additional of indoor and outdoor air samples at the H&H Metals property.

Background

An off-site VI investigation occurred November through December 2018 in accordance with the NYSDEC-approved *Offsite Vapor Intrusion Investigation Work Plan, Essex-Hope Site in Jamestown, New York* (2018) and in response to agency comments (New York State Department of Health [NYSDOH], 2017) on the *Vapor Intrusion Investigation Report, Essex-Hope Site in Jamestown, New York* (CH2M, 2016).

The investigation involved collecting data to determine if VI associated with the chlorinated volatile organic compound (CVOC) plume from the Site could impact downgradient receptors. Two businesses

were involved in the VI investigation due to their proximity to trichloroethene (TCE) in the groundwater plume and willingness to provide sampling access: Johnson Machine & Fibre Products (JMF) and H&H Metals.

External soil vapor and subslab vapor samples were used as initial investigation techniques. A preferential pathway assessment was also conducted in different access points of sanitary and storm sewers.

At JMF, cis-1,2-dichloroethene and/or TCE were detected at concentrations greater than the most conservative NYSDOH soil vapor screening criteria in all four samples collected within the facility. The other target compounds (vinyl chloride, 1,1-dichloroethene, trans-1,2-dichloroethene, and tetrachloroethene (PCE)) were not detected or were detected at concentrations lower than the screening levels. There were no sub-slab soil vapor sample results in exceedance of the 10^{-6} target risk EPA VISL.

At H&H Metals, cis-1,2-DCE, TCE, and PCE were detected at concentrations greater than NYSDOH and/or EPA soil vapor screening criteria in various samples. Two subslab soil vapor sample results exceeded both the NYSDOH and EPA soil vapor screening criteria for TCE. The other target compounds were not detected in any of the seven sample locations (vinyl chloride, 1,1-DCE, trans-1,2-DCE). Figure 2 shows results of the subslab soil vapor and soil vapor sampling, as well as the most recent groundwater concentrations in nearby monitoring wells.

Based on the EPA exceedances in the two subslab soil vapor samples at H&H Metals, this workplan discusses the approach to further evaluating the potential for a full VI pathway within the building. There were no exceedances of the EPA soil vapor screening levels in the subslab vapor results at JMF, and therefore, no indoor and outdoor air sampling is proposed for that building.

Regulatory Framework

This VI indoor air monitoring event will be performed in accordance with the approved Offsite Vapor Intrusion Investigation Work Plan (CH2M 2018b) and Quality Assurance Project Plan (QAPP). The work plan follows the *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (NYSDOH, 2006) in assessing the VI pathway. It is also consistent with VI provisions in NYSDEC Division of Environmental Remediation/*Technical Guidance for Site Investigation and Remediation* (DER-10) (NYSDEC 2010) and the U.S. Environmental Protection Agency (EPA) *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* (EPA, 2015). The *New Jersey Department of Environmental Protection (NJDEP) Vapor Intrusion Technical Guidance* (NJDEP 2018) was referenced to determine the quantity of samples required to sufficiently assess the indoor air of the building, as New York State regulations do not propose sample quantities.

Field Sampling Plan

A building survey at H&H Metals was previously conducted on April 27, 2018. H&H Metals was a metal fabrication facility that included welding, brazing and stamping. Operations in this building have ceased, and the building is currently unoccupied and for sale. Materials and equipment used in former operations are still present in the building. The building is a one-story slab on grade building. The building was constructed over several different phases and consists of five separately poured slabs ranging from 1920 through 1999. Indoor air in the building is recirculated by an HVAC system and blower in the manufacturing, welding and press room. There is potential substantial outdoor air infiltration from windows and doorways in the non-insulated areas. The roof leaks water during

episodes of rain in the welding room and the former chimney is currently capped. Several potential soil vapor entry points were identified during the survey. There were several cracks identified in the floor in the welding and press rooms, utility trenches in the press room, floor drains in the bathrooms and manufacturing area, and a trench pit for a press that was filled with gravel and is approximately 5 feet deep and 4 feet long by 5 feet wide.

Chlorinated solvents may have been used during past operations; however, no products containing target compounds were identified during the building survey.

The building survey will be updated during the indoor air sampling event.

The field sampling plan includes the collection of six (6) indoor air samples within the H&H Metals building and two (2) outdoor air samples in close proximity to the building which will be performed concurrently with the second round of soil gas sampling as detailed within the *Interim Offsite Vapor Intrusion Investigation Report* (CH2M, 2019). The proposed sampling locations at the building are shown on Figure 3. The H&H Metals building footprint is approximately 18,500 square feet. Based on Table 3-3 of the *NJDEP Vapor Intrusion Technical Guidance* (NJDEP, 2018), buildings with square footage ranging from 10,001 to 20,000 square feet suggest the collection of four indoor air samples. To be conservative and to account for the various sections of the building that were constructed at different times, six indoor air samples will be collected. Samples will be biased in the southern portion of the building where subslab soil gas concentrations exceeded the USEPA subslab vapor intrusion screening level for trichloroethene. Other samples will be placed in various portions of the building per date of construction in order to obtain representative data of the entire building space. Minor changes in the sampling locations, if required, will be documented in the final report.

Sampling at H&H Metals will be performed during the work week (Monday to Friday). This property is currently unoccupied and for sale. The heating, ventilation, and air conditioning (HVAC) system will be set to typical operating conditions, and the building's windows and doors will be kept shut during the sampling event at each building.

Information on weather conditions in Jamestown during the sampling event will be obtained from Weather Underground.[1]

Sampling Methods

Indoor air and outdoor air samples will be collected concurrently over an 8-hour period. The samples will be collected in 6-liter (L) evacuated canisters equipped with flow controllers. Each canister will be placed at the sampling location, turned on, and left undisturbed for 8 hours. The indoor and outdoor air samples will be placed at a height of approximately 3 to 5 feet above the ground (roughly breathing zone height). Sampling will be conducted in accordance with the *Field Operating Procedure for Indoor, Outdoor, and Crawlspace Air Sampling Using Canisters* (CH2M 2018a), located in Attachment 1.

Sample Analysis

The evacuated canisters will be shipped to Alpha Analytical (NYSDOH Environmental Laboratory Approval Program, New York Laboratory Identification Number 11627) in Westborough, Massachusetts, under chain-of-custody procedures. The indoor air and outdoor air samples will be analyzed by EPA Method TO-15 in selective ion monitoring (SIM) mode for the chemicals of concern for the VI pathway

[1] http://www.wunderground.com/weather-forecast/US/NJ/Edgewater.html.

previously identified at the site (trichloroethene (TCE), tetrachloroethene (PCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), 1,1-dichloroethene (1,1-DCE), and vinyl chloride).

Alpha Analytical will supply individual-certified clean evacuated stainless-steel SUMMA canisters with individual tracking numbers and calibrated flow regulators. Indoor and outdoor air samples will be analyzed in accordance with *Compendium Method TO-15: Determination of VOCs in Air Collected in Specially Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* (EPA 1999).

Standard turnaround time will be requested for all samples. The measurement quality objectives, reporting limits, and minimum detection limits for analyses using Method TO-15 SIM are described in the Quality Assurance Project Plan (QAPP; Appendix A of the *Site Characterization Investigation Work Plan, Essex-Hope Site in Jamestown, New York, Site Number 907015* [CH2M, 2016]).

A JACOBS project chemist will validate the data using the *National Functional Guidelines for Organic Data Review* (EPA 2017) as a guidance as indicated in the QAPP.

Sampling Schedule

The sampling event is planned to be concurrent with the additional round of sampling recommended in the *Essex-Hope Site Interim Offsite Vapor Intrusion Investigation Report* (CH2M, 2019), which includes another round of subslab vapor samples at H&H Metals and JMF, in addition to another round of sampling at all 16 soil vapor locations (shown on Figure 4). The sampling event outlined in this work plan and the *Offsite Vapor Intrusion Investigation Work Plan, Essex-Hope Site in Jamestown, New York* (CH2M 2018b) is tentatively scheduled for Summer 2019. Indoor air samples will be collected prior to collecting subslab soil vapor samples.

Data Evaluation and Reporting

The indoor and outdoor air sampling results will be evaluated and presented with the follow up offsite VI investigation results and will document the field activities and findings as well as provide conclusions and recommendations. This will include all indoor and outdoor air, subslab vapor and soil vapor results. Reporting is detailed in the *Offsite Vapor Intrusion Investigation Work Plan, Essex-Hope Site in Jamestown, New York* (CH2M 2018b).

References

CH2M HILL Engineers, Inc. (a wholly owned subsidiary of Jacobs Engineering Group Inc.). 2016. *Vapor Intrusion Investigation Report, Essex-Hope Site in Jamestown, New York, Site Number 907015*. June.

CH2M HILL Engineers, Inc. (a wholly owned subsidiary of Jacobs Engineering Group Inc.). 2018a. *Field Operating Procedure for Indoor, Outdoor, and Crawlspace Air Sampling Using Canisters.* January.

CH2M HILL Engineers, Inc. (a wholly owned subsidiary of Jacobs Engineering Group Inc.). 2018b. *Offsite Vapor Intrusion Investigation Work Plan, Essex-Hope Site in Jamestown, New York*. August.

CH2M HILL Engineers, Inc. (a wholly owned subsidiary of Jacobs Engineering Group Inc.). 2019. *Interim Offsite Vapor Intrusion Investigation Report, Essex-Hope Site in Jamestown, New York*. March.

New Jersey Department of Environmental Protection (NJDEP). 2018. *Vapor Intrusion Technical Guidance*. January.

New York State Department of Environmental Conservation (NYSDEC). 1994. *Record of Decision, Essex-Hope Site, City of Jamestown, Chautauqua County, ID Number 9-07-015*. March.

New York State Department of Health (NYSDOH). 2006. *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*. Final. October.

New York State Department of Environmental Conservation (NYSDEC). 2010. *DER-10/Technical Guidance for Site Investigation and Remediation*. NYSDEC Program Policy. May 3.

New York State Department of Health (NYSDOH). 2017. *Vapor Intrusion Investigation Comments Letter*. September 8.

U.S. Environmental Protection Agency (EPA). 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)* from the *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition*. January.

U.S. Environmental Protection Agency (EPA). 2015. *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air*. OSWER Publication 9200.2-154. June.

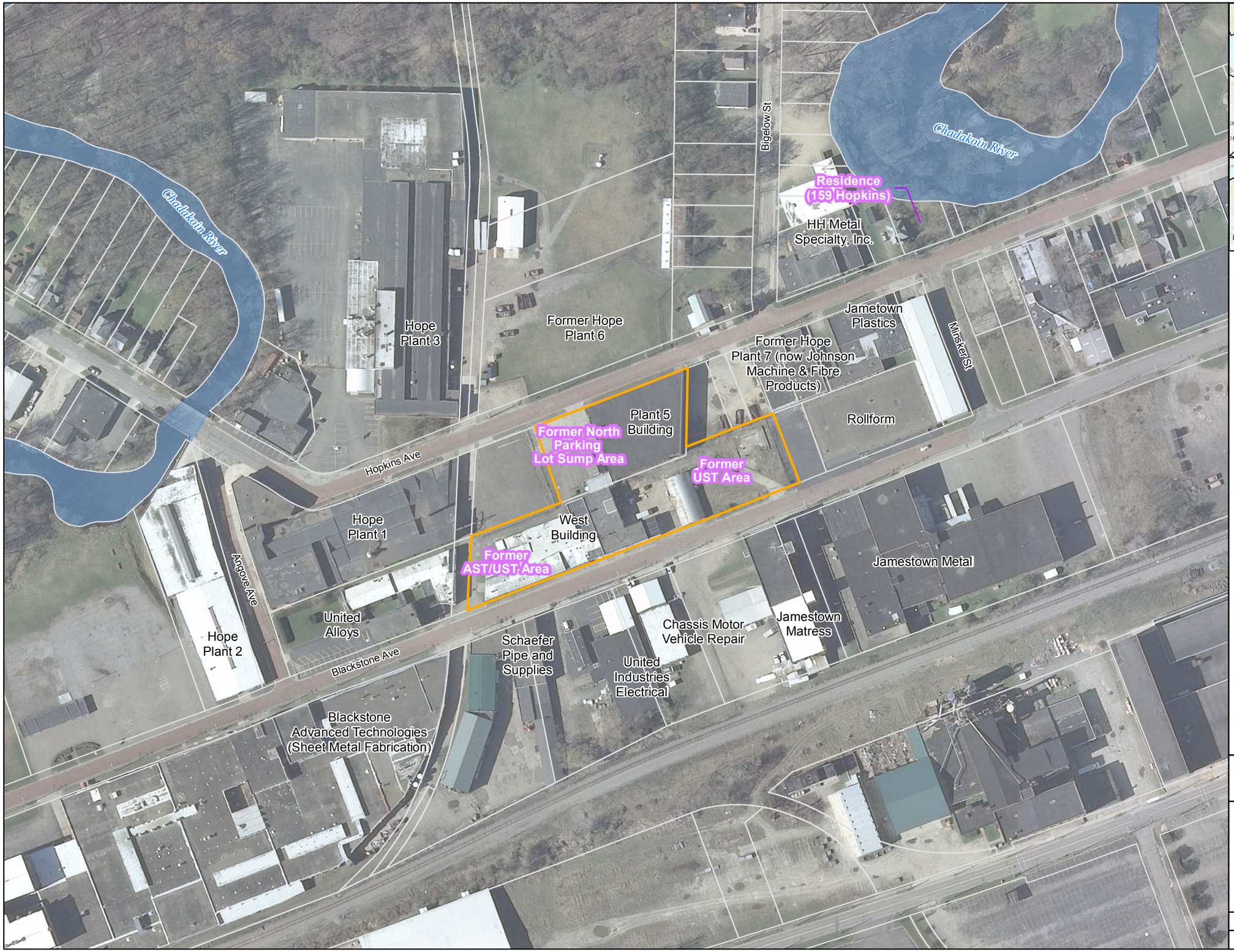
Please feel free to contact me at 617.626.7013 if you have any questions or comments regarding the Essex-Hope project.

Sincerely,

Kyle Block
Project Manager

cc: Barry Harris/H&H Metal Specialty Inc.

Figures



Site Boundary

Chautauqua County Tax Parcels

Chadakoin River

N

BASE MAP SOURCE:
Imagery: Statewide Digitial Orthoimagery 2012 of Chautauqua County, New York Stat Gov 2012;
Tax Parcel Source: Chautauqua County Department of Information Services. Last updated July 7th, 2017.

0 50 100 200

Scale in Feet

Essex Specialty Products, Inc	Essex/Hope Site, Jamestown, New York

FIGURE 1
Site Location and Layout Map
Off-site Vapour Intrusion Investigation Work Plan

CREATED BY: LA	ch2m.
REVIEWED BY: MV	

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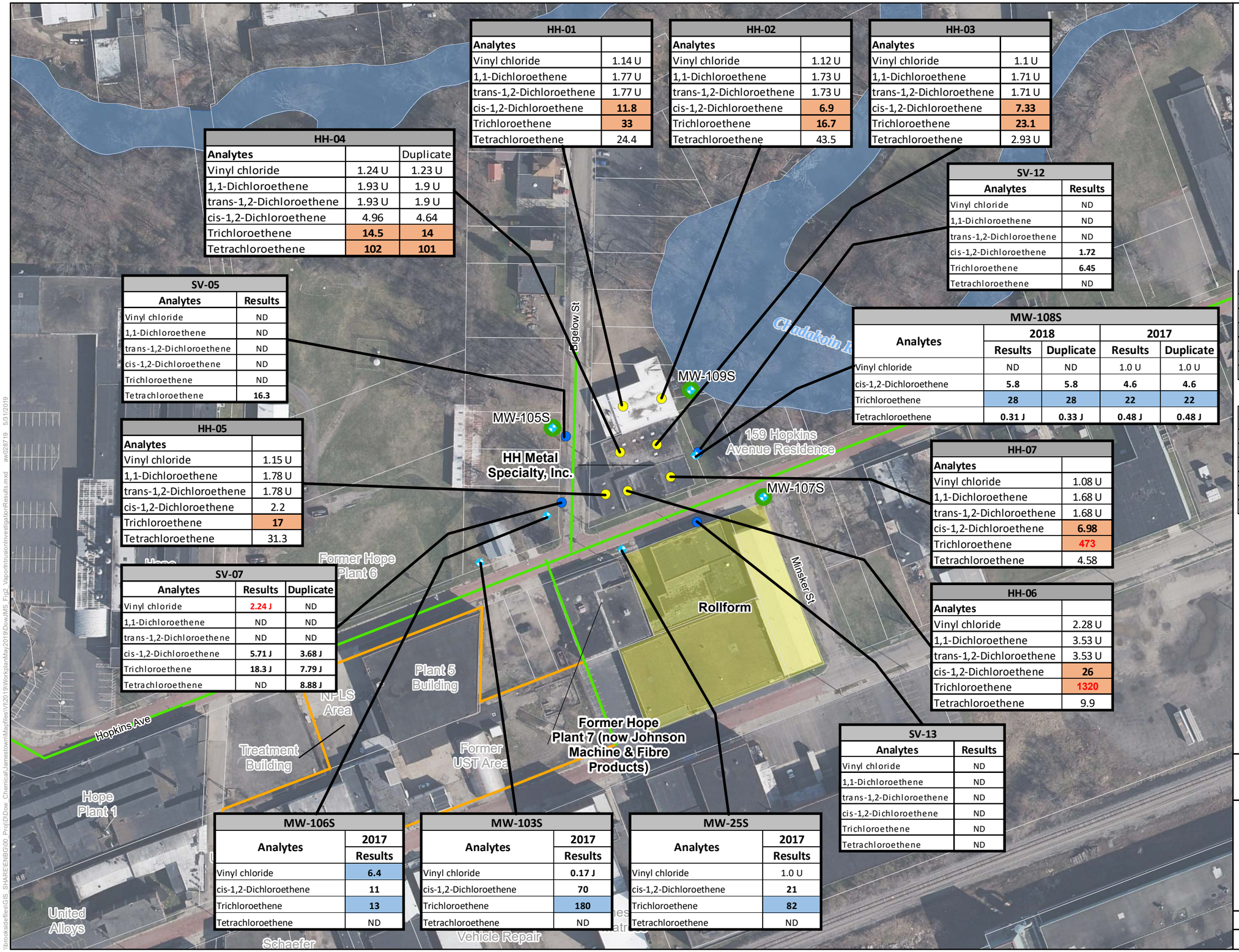

HH-01	
Analytes	
Vinyl chloride	1.14 U
1,1-Dichloroethene	1.77 U
trans-1,2-Dichloroethene	1.77 U
cis-1,2-Dichloroethene	**11.8**
Trichloroethene	**33**
Tetrachloroethene	24.4

HH-02	
Analytes	
Vinyl chloride	1.12 U
1,1-Dichloroethene	1.73 U
trans-1,2-Dichloroethene	1.73 U
cis-1,2-Dichloroethene	**6.9**
Trichloroethene	**16.7**
Tetrachloroethene	43.5

HH-03	
Analytes	
Vinyl chloride	1.1 U
1,1-Dichloroethene	1.71 U
trans-1,2-Dichloroethene	1.71 U
cis-1,2-Dichloroethene	**7.33**
Trichloroethene	**23.1**
Tetrachloroethene	2.93 U

HH-04		
Analytes		Duplicate
Vinyl chloride	1.24 U	1.23 U
1,1-Dichloroethene	1.93 U	1.9 U
trans-1,2-Dichloroethene	1.93 U	1.9 U
cis-1,2-Dichloroethene	4.96	4.64
Trichloroethene	**14.5**	**14**
Tetrachloroethene	**102**	**101**

SV-12	
Analytes	**Results**
Vinyl chloride	ND
1,1-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	**1.72**
Trichloroethene	**6.45**
Tetrachloroethene	ND

SV-05	
Analytes	**Results**
Vinyl chloride	ND
1,1-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	**16.3**

MW-108S				
Analytes	**2018**		**2017**	
	Results	**Duplicate**	**Results**	**Duplicate**
Vinyl chloride	ND	ND	1.0 U	1.0 U
cis-1,2-Dichloroethene	**5.8**	**5.8**	**4.6**	**4.6**
Trichloroethene	**28**	**28**	**22**	**22**
Tetrachloroethene	**0.31 J**	**0.33 J**	**0.48 J**	**0.48 J**

HH-05	
Analytes	
Vinyl chloride	1.15 U
1,1-Dichloroethene	1.78 U
trans-1,2-Dichloroethene	1.78 U
cis-1,2-Dichloroethene	2.2
Trichloroethene	**17**
Tetrachloroethene	31.3

HH-07	
Analytes	
Vinyl chloride	1.08 U
1,1-Dichloroethene	1.68 U
trans-1,2-Dichloroethene	1.68 U
cis-1,2-Dichloroethene	**6.98**
Trichloroethene	**473**
Tetrachloroethene	4.58

SV-07		
Analytes	**Results**	**Duplicate**
Vinyl chloride	**2.24 J**	ND
1,1-Dichloroethene	ND	ND
trans-1,2-Dichloroethene	ND	ND
cis-1,2-Dichloroethene	**5.71 J**	**3.68 J**
Trichloroethene	**18.3 J**	**7.79 J**
Tetrachloroethene	ND	**8.88 J**

HH-06	
Analytes	
Vinyl chloride	2.28 U
1,1-Dichloroethene	3.53 U
trans-1,2-Dichloroethene	3.53 U
cis-1,2-Dichloroethene	**26**
Trichloroethene	**1320**
Tetrachloroethene	9.9

SV-13	
Analytes	**Results**
Vinyl chloride	ND
1,1-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	ND

MW-106S	
Analytes	**2017**
	Results
Vinyl chloride	**6.4**
cis-1,2-Dichloroethene	**11**
Trichloroethene	**13**
Tetrachloroethene	ND

MW-103S	
Analytes	**2017**
	Results
Vinyl chloride	**0.17 J**
cis-1,2-Dichloroethene	**70**
Trichloroethene	**180**
Tetrachloroethene	ND

MW-25S	
Analytes	**2017**
	Results
Vinyl chloride	1.0 U
cis-1,2-Dichloroethene	**21**
Trichloroethene	**82**
Tetrachloroethene	ND

Soil Vapor Sample Location

Subslab Vapor Sample Location

Shallow Sampling Points

Monitoring Well

No exceedances of compounds

Sanitary/Storm Sewer

Approximate Site Boundary

Parcels

Access to Rollform was Denied and therefore sampling has not been proposed at this time

Chadakoin River

Parameter Name	Subslab Soil Gas		
	NY-SSC-A	NY-SSC-B	NYSSC-C
Vinyl chloride			6
cis-1,2-Dichloroethene	6		
Trichloroethene	6		
Tetrachloroethene		100	
1,1 -Dichloroethene	6		
trans-1,2-Dichloroethene			

Parameter Name	Groundwater	Soil Vapor/Subslab
	USEPA GW VISL (ug/L)	EPA Soil Vapor VISL (µg/m3)
Vinyl chloride	2.5	0.93
cis-1,2-Dichloroethene	NA	NA
Trichloroethene	7.4	100
Tetrachloroethene	65	1,600
1,1 -Dichloroethene	--	29,000
trans-1,2-Dichloroethene	--	NA

Notes (Soil Gas and Soil Vapor):
1. Orange highlighted cells: Exceeds NY-SSC, but indoor air data is required to determine if any further action is needed per the matrix.
2. Red text within cells: Exceeds USEPA Sub-slab Vapor Intrusion Screening Level
3. Bold results indicate detection of chemical above detection limit.

Notes (Monitoring Well):
1.Blue highlighted cells: Exceeds the USEPA Groundwater Vapor Intrusion Screening Levels (VISLs).
2. Bold results indicate detection of chemical above the detection limit.
3. Measurements in ug/L.
4. Most recent 2018 and 2017 results depicted (March, Aug, Sept, and Oct 2017, and Nov 2018).

Acronyms and Abbreviations:
µg = Microgram(s)
L = Liter
J = Estimated Value
U = Not Detected

N

0 50 100 200

Scale in Feet

Essex Specialty Products, Inc

Essex/Hope Site, Jamestown, New York

FIGURE 2
H&H Metals Specialty Inc.
Vapor Intrusion Investigation Results

CREATED BY: AW

REVIEWED BY: AS

JACOBS

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OA-01
IA-02
IA-01
IA-03
IA-06
IA-05
IA-04
OA-02
Bigelow St
Chadakoin River
159 Hopkins Avenue Residence
HH Metal Specialty, Inc.
Rollform
Minsker St

Proposed Outdoor Air Sample
Proposed Indoor Air Sample
Sanitary/Storm Sewer
Approximate Site Boundary
Parcels
Access to Rollform was Denied and therefore sampling has not been proposed at this time
Chadakoin River

N

0 25 50 100
Scale in Feet

Essex Specialty Products, Inc	Essex/Hope Site, Jamestown, New York

FIGURE 3
H&H Metals Specialty Inc.
Proposed Indoor and Outdoor Air Sample Locations

CREATED BY: AW	JACOBS
REVIEWED BY: AS	

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Soil Vapor Sample Location

Subslab Vapor Sample Location

Sanitary/Storm Sewer

Approximate Site Boundary

Parcels

Access to Rollform was Denied and therefore sampling has not been proposed at this time

Chadakoin River

N

BASE MAP SOURCE:
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 50 100 200

Scale in Feet

Essex Specialty Products, Inc	Essex/Hope Site, Jamestown, New York

FIGURE 4
Vapor Intrusion Investigation Locations
Off-Site Vapor Intrusion Work Plan

CREATED BY: LA	JACOBS
REVIEWED BY: AS	

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Attachment 1

FIELD OPERATING PROCEDURE

Indoor, Outdoor, and Crawlspace Air Sampling Using Canisters

Purpose

This field operating procedure (FOP) presents general guidelines for collecting indoor, outdoor, and crawlspace air samples using evacuated canisters. The type, number, location, and sample duration of indoor, outdoor, and/or crawlspace air samples should be determined on a project-specific basis. A building survey should be performed before air sampling to obtain building characteristic information and identify potential confounding indoor sources of volatile organic compounds.

Scope

This is a general description of how to collect indoor air, outdoor air, and crawlspace air samples using evacuated canisters.

Equipment and Materials

- Stainless-steel sampling canister(s), certified clean and evacuated (canisters are cleaned, evacuated, and provided by the laboratory). Note that separate canisters of the same size may be designated by the laboratory for use in collecting subslab soil vapor samples versus indoor air, outdoor air, and crawlspace air samples and may been certified in different manners. It is important to make sure that canisters are used for their designated sample type.
- Flow controller(s), certified clean, and set at desired sampling rate (flow controllers are cleaned, set, and provided by the laboratory).
- Analog pressure gauge dedicated to the canister may be permanently attached to either the canister or flow controller. This pressure gauge will be used to monitor the canister pressure during sampling.
- Digital pressure gauge with a -30 to 0 inch mercury (Hg) range, and 0.50 inch Hg accuracy, which should be verified annually. This pressure gauge should have a Swagelok 1/4-inch female connection because it will be used to measure the initial and final canister pressure. Digital gauges should not be shared between air samples (indoor, outdoor, or crawlspace) and soil vapor samples to prevent cross-contamination.
- Wrenches and screwdriver, various sizes as needed for connecting fittings. A 9/16-inch wrench fits the 0.25-inch Swagelok fittings, which most canisters and flow controllers have.
- For crawlspace air sampling:
  - Sampling probe, new Teflon tubing, fitted with compression fittings (for crawlspace air samples).
  - Swagelok nut and ferrule set (part #SS-400-NFSET) to connect tubing to the canister.
  - Rod for placing the crawlspace air sampling tubing or the canister at the desired location in the crawlspace. These can be metal, plastic, or wooden rods.

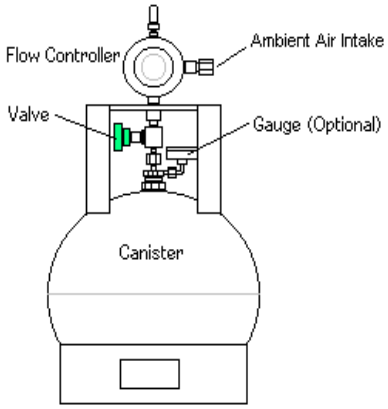
- T-connector (provided by the laboratory) for collecting simultaneous duplicate samples. This is optional for indoor and outdoor air samples, but may be necessary for crawlspace air samples if the canisters are not being placed into the crawlspace.
- For outdoor air samples:
  - Sampling cane or aluminum foil tent to prevent water from entering canister during sampling.
  - Bike lock or chain and lock to secure the canister and prevent theft.
- Shipping container, suitable for protection of canister(s) during shipping. Typically, strong cardboard boxes are used for canister shipment. The canisters should be shipped to the laboratory in the same shipping container(s) in which they were received.
- Recommended – field instrument such as a MultiRAE photoionization detector (PID) to measure total volatile organic compound (VOC) and carbon monoxide concentrations in the breathing zone for health and safety monitoring
- Optional – signs identifying the canisters as an air sample, saying "Do Not Disturb" and providing contact information. The sign should be laminated and attached to the canister with a zip tie. (These signs are for extended duration samples only because grab samples will not be left unattended.)

Procedures and Guidelines

This FOP describes the general guidelines for collecting indoor, outdoor, and crawl space air samples using evacuated canisters. Sampling information should be recorded in the field logbook and on the attached form "Indoor, Outdoor, and Crawlspace Air Sampling Log—Canister Method".

- Measure the initial canister pressure with the digital pressure gauge. The initial pressure should be between -28 to -30 inches Hg. If it is less than -26 inches Hg, do not use the canister for sampling. If it is between -28 to -26 inches Hg, then only use the canister if there are no other spare canisters available. In the field log, record the canister identification (ID), flow controller ID, initial vacuum, desired flow rate, sample location information, and all other information pertinent to the sampling effort.
- Connect the flow controller and analog pressure gauge to the canister (**Figure 1**). When the flow controller and pressure gauge are attached correctly, they will not move separately from the canister (they will not spin around).

Figure 1. Assembled Canister Sampler for Integrated Sample Collection



- For outdoor samples, be sure that the inlet to the flow controller is protected from precipitation. Either place the canister and flow controller under a shelter/enclosure, use a sampling cane provided by the laboratory, or use a clean piece of aluminum foil to build a tent over the flow controller inlet. Secure the canister to an immovable structure with the bike lock or chain and lock to prevent theft.
- For sampling crawlspace air through Teflon tubing, adjust the length of the sample tubing to be able to reach the desired sampling location, attach it to the rod with tape or zip ties, and place the sampling probe into the crawlspace using the rod. Make sure the sample tubing influent is several inches above the ground level. Now connect the sample tubing to the inlet of the flow controller.
- For sampling crawlspace air by placing the canister in the crawlspace, use a rod to position the canister in the correct location.
- For indoor air samples, place the canister in the desired sampling location. Indoor air samples are typically collected at breathing zone height (3 to 5 feet above the floor).
- Attach the sign (identifying the canisters as an air sample, saying “Do Not Disturb” and providing contact information) to the canister.
- To begin sampling, open the canister valve one full turn and record the sample start time.
- Monitor the canister pressure several times during the sample period to ensure the canister is filling at the desired rate and the final canister pressure does not fall to 0 inch Hg.
- At the end of the sample period, close the canister valve and record the sample end time.
- Measure the final canister pressure with the digital pressure gauge. The final pressure should be between -10 to -2 inches Hg. If it is 0 inch Hg, do not submit the sample for analysis. If it is between -2 and 0 inch Hg, redeploy the sample if possible; if not, submit it to the laboratory for analysis but make sure it is received with some residual negative pressure.
- Replace the protective cap on the canister.
- Fill out the appropriate documentation (chain of custody, sample tags) and return canisters and equipment to the laboratory in the same shipping container in which they were received.
- The samples should not be cooled during shipment. DO NOT put ice in the shipping container.

- Do not place sticky labels or tape on any surface of the canister.

Quality Control and Quality Assurance

- Canisters supplied by the laboratory must follow the performance criteria and quality assurance prescribed in U.S. Environmental Protection Agency (EPA) Method TO-14/15 for canister cleaning, certification of cleanliness, and leak checking.
- Flow controllers supplied by the laboratory must follow the performance criteria and quality assurance prescribed in EPA Method TO-14/15 for flow controller cleaning and adjustment.

Attachments

- Indoor, Outdoor, and Crawlspace Air Sampling Log—Canister Method
- Sign identifying the canisters as an air sample, saying “Do Not Disturb” and providing contact information.

References

U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. 2015. *Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air.* June.