NASSAU UNIFORM SERVICES

SUBSLAB DEPRESSURIZATION MONITOIRNG PROGRAM

SITE NO. 130063
NASSAU UNIFORM SERVICES
525 RAY STREET
FREEPORT, NEW YORK

MARCH 2010

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47750

Gannett Fleming

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APPENDICES

1.0 INTRODUCTION

Gannett Fleming Engineers, P.C. (GF), on behalf of Nassau Uniform Services, has prepared this Subslab Depressurization System (SSDS) Monitoring Program in support of the remediation system modifications approved by NYSDEC. The purpose of this monitoring program is to provide the guidance necessary for the collection of indoor, outdoor, and soil vapor samples necessary to assess potential exposure pathways to residence and tenants at the subject property and the adjacent sites.

This SSDS Monitoring Program has been prepared in accordance with New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion, October 2006.

This Sampling Plan includes:

- Objective of the Sampling Program;
- Sampling approach and methodology; and,
- Quality Assurance/Quality Control (QA/QC) protocol.

1.1 Objective of the Sampling Program

This SSDS Monitoring Program has been prepared to assess the potential exposure of soil gas vapors, if any, that have the potential to migrate from the subsurface soil/groundwater to the indoor and outdoor air of the building on the subject property and the adjacent properties. The sampling program will be performed in representative areas where exposures to soil gas vapors are likely to occur. The objectives of the Monitoring Program for the site are:

- to assess the presence of soil gas vapors in the indoor air and beneath the foundation slab;
- to assess potential influence of outdoor air on indoor air quality;
- to assess the effectiveness of the SSDS; and
- to assess potential soil gas entry points in the interior of the building structures.

The results of this air sampling program will also provide information necessary to plan and implement contingency/mitigation methods, as further discussed in Section 2.9.

1.2 Sub-Slab Depressurization System (SSDS) Description

A SSDS will be installed which consists of a fan or blower which draws air from the soil beneath a building and discharges it to the atmosphere through a collection and vent pipe. An in-line blower will be sized to provide an approximate 50 cubic feet per minute (cfm) air flow at a vacuum rating of approximately 1.50 inches water column. The SSDS will have a series of soil vapor collection laterals that will be spaced in a grid fashion every five (5) feet along the width of the recent excavation within the building. The vapor collection laterals will be 4-inch diameter No. 25 slotted polyvinyl chloride (PVC) Schedule 40 pipe with solvent welded PVC caps. The collection laterals will be terminated at least one (1) foot from the foundation wall and sloped to the spine of the building which will allow soil gas vapors to travel to the 4-inch diameter PVC Schedule 40 depressurization header. The depressurization header will be laid horizontally and sloped to the vent riser. The depressurization header will connect to the 4-inch diameter PVC Schedule 40 vent riser which will be placed inside the building along the exterior wall. There will be one vent header for the building. The vent riser will be placed vertically along the inside wall through the roof where it will terminate at a minimum of 12 inches above the roof line. The inline blower will be installed on the vent stack (discharge pipe). An 18-inch thick gravel or stone sub-base (maximum ¾ inch diameter) will be installed beneath the floor slab encompassing the vapor collection piping. Directly beneath the slab will be the vapor membrane system (as described below), four (4) inches of gravel/stone, the 4-inch vapor collection piping and then approximately 10 inches of gravel/stone beneath the vapor collection piping.

The sub-slab treatment will be applied prior to pouring the concrete foundation. The sub-slab treatment will include: 1) the placement of the Liquid Boot® base fabric on the stone sub-base; 2) applying 80 dry mils of Liquid Boot® above the base fabric; and, 3) placing Liquid Boot® ultra-shield (P-150) above the 80 dry mils of Liquid Boot®. Penetrations will also receive the same treatment as the sub-slab with 80 dry mils of Liquid Boot® applied three (3) inches along the penetration and three (3) inches on the substrate. The 80 dry mils of Liquid Boot® will be allowed to dry overnight before the application of the spray membrane.

The proposed SSDS is provided as Appendix A.

2.0 INDOOR, OUTDOOR, SUB-SLAB, AND SOIL VAPOR SAMPLING PLAN

The SSDS Monitoring Program will be performed by qualified environmental professionals. The environmental professionals will use their air sampling expertise to complete this sampling program in accordance with New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion, October 2006 on a quarterly basis for the 1st year and during the winter season (2nd and 3rd years) and in accordance with the following.

2.1 Quarterly Air Sampling

The quarterly sampling programs will include a visual and olfactory inspection of the surrounding area to identify potential exposure pathways or sensitive receptors of soil vapors. Upon access to the buildings, air quality will be initially screened using a calibrated photoionization detector (PID). Indoor air will be screened immediately adjacent to any significant cracks or penetrations found in the perimeter walls, windows, doors, or any other possible entrance point for outdoor air to enter the building. Areas indicating readings above background values will be visibly marked with chalk to delineate possible vapor entrance points into the building. Given the potential for commercially available products, such as solvents, oils, etc. to contain volatile organic compounds (VOCs), careful attention will be given during the inspection for the presence of such products as potential sources of VOC.

A quarterly sampling program will be conducted in March, June, September, and December. Once the sample results are received, reviewed, validated, and recorded, a Quarterly Air Sampling Report will be prepared in accordance with Section 2.9 and submitted to the Nassau County Department of Health (NCDOH), NYS Department of Health (NYSDOH), and NYSDEC for review and comment. Quarterly sampling is proposed to terminate one (1) year after completion of site development activities. Annual winter season (December) sampling will occur for each of two (2) years thereafter. The sampling program may be subject to re-evaluation should there be any detections above NYSDOH guideline levels.

Indoor air quality sampling will occur during this event as outlined below in Section 2.2 should the groundwater elevation rise to levels that submerge the SSD system

2.2 Indoor Air Sampling

Indoor air sampling will follow the protocol outlined in Sections 2.6.3 and 2.7.3 of the NYSDOH Guidance document. During colder months, heating systems should be operating to maintain normal indoor air temperatures (i.e., 65 – 75 °F) for at least 24 hours prior to and during the scheduled sampling time. Prior to collecting indoor samples, a pre-sampling inspection will be performed to evaluate the physical layout and conditions of the building being investigated, to identify conditions that may affect or interfere with the proposed sampling, and to prepare the building for sampling.

Three (3) indoor air samples will be collected from each floor of the building: one (1) sample from each end of the building and one (1) sample from a centrally located position within the building.

Indoor air will be screened using a calibrated PID, areas indicating readings above background values will be visibly marked with chalk to delineate possible vapor entrance points into the building. The indoor air samples will be collected concurrently with outdoor ambient, subsurface, and vent stack air samples.

Sample collection and laboratory analysis protocol for this sampling program are provided in Section 2.7.

2.3 Outdoor Ambient Air Sampling

Outdoor air sampling will follow the protocols in Sections 2.6.4 and 2.7.4 of the NYSDOH Guidance document. Outdoor air samples will be collected to assess the potential influences that outdoor air may have on indoor air quality. One (1) outdoor air sample will be collected at an upwind location immediately adjacent to the building. Outdoor air samples will be collected

from a representative upwind location, away from wind obstructions (e.g., trees or bushes), and at a height above the ground to represent breathing zones (3 to 5 feet). The outdoor sample will not be biased toward obvious sources of volatile chemicals (e.g., automobiles, lawn mowers, oil storage tanks, gasoline stations, industrial facilities, etc.).

Outdoor air will be screened using a calibrated PID, areas indicating readings above background values will be visibly marked with chalk to delineate possible vapor entrance points into the building. The outdoor ambient air samples will be collected concurrently with indoor, subsurface,, and vent stack air samples.

Sample collection and laboratory analysis protocol for this sampling program are provided in Section 2.6.

2.4 Outdoor Subsurface Soil Vapor Sampling

The objective of the subsurface soil vapor sampling will be to characterize any potential vapor impacts from the subsurface soil and/or groundwater. Subsurface soil vapor sampling will follow the protocols outlines in Sections 2.6.1 and 2.7.1 of the NYSDOH Guidance document.

There are currently six permanent soil vapor sampling points installed along the northern and eastern borders of the building. Three additional permanent soil vapor points will be installed along the southern border of the building on the adjacent condominium property. The soil gas collection points will be installed to one (1) foot above the water table. A Geoprobe will install each soil gas collection point using direct push technology. Each soil gas collection point will be installed in the following manner:

- Depending on the condition of the ground surface, the Geoprobe will penetrate the surface to expose the soil.
- The Geoprobe will remove soil from grade to approximately 3.5 feet below grade.
- Each soil vapor point was constructed of six inches of one inch PVC screen and three feet of one inch PVC riser.

- A bentonite seal will be placed from six inches above the screened interval to grade surface sealing off ambient air from entering the borehole.
- A flushmount manhole cover will be installed to protect the soil vapor point.

After the installation of the soil vapor collection points, each sample point will be purged one (1) to three (3) volumes (the volume of the sample probe and tubing) will be purged of ambient air using a peristaltic pump prior to collecting the sample to ensure that the sample is representative of the sampling environment. Each point will be screened for VOCs using a PID. While purging the gas point, a helium test will be performed to ensure the integrity of the bentonite seal between the ground surface and the borehole. The helium test will be performed as follows:

- A small bucket or bag with a hole through the bottom will be placed upside down over the borehole. The tubing will be pulled through the hole in the bucket or bag.
- Bentonite will be placed along the edges of the bucket or bag to create a seal with the ground surface.
- Helium will be introduced into the bucket through a small tube inserted at the base of the bucket or bag.
- The helium detector will be placed at the sample port of the tubing to determine if the helium has penetrated into the borehole. If the helium detector had a reading of higher than 20% helium, the sample point will be resealed with bentonite and the helium test repeated.

Each sample point will be purged of ambient air using a peristaltic pump after the completion of the integrity test. The peristaltic pump will be removed from the sample port once the soil gas vapor point is determined to be adequately sealed using the helium test and the purge is complete. The flow rates for both purging and collecting will not exceed 0.2 liters per minute.

Once the soil gas point is determined to be adequately sealed using the helium test and the purge is complete, the peristaltic pump will be removed from the sample port. Once the sampling is complete, the borehole will be filled with sand and patched at the surface with material similar to the original material. The outdoor subsurface soil gas samples will be collected concurrently with indoor, outdoor ambient, subsurface, and vent stack air samples.

Sample collection and laboratory analysis protocol for this sampling program are provided in Section 2.6.

2.5 Vent Stack Sampling

A sampling port will be provided within the vent stack at a location downstream from the in-line blowers. Each sample point will be purged one (1) to three (3) volumes (the volume of the sample probe and tubing) will be purged of ambient air using a peristaltic pump prior to collecting the sample to ensure that the sample is representative of the sampling environment. The flow rates for both purging and collecting will not exceed 0.2 liters per minute.

The vent stack vapor samples will be collected concurrently with outdoor ambient, outdoor subsurface soil gas, and indoor air samples. Sample collection and laboratory analysis protocol for this sampling program are provided in Section 2.6.

2.6 Vapor and Air Sample Analytical Program

Indoor air, outdoor subsurface soil gas, outdoor ambient air, and vent stack air samples will be collected concurrently so that building indoor conditions (i.e., HVAC) and weather conditions are the same when air samples are collected.

Outdoor subsurface soil gas and vent stack air samples will be collected with a 6-liter Summa canister which will be fitted with a two (2) hour regulator and will be installed on the sample port to begin sampling. The flow rates for sample collection will not exceed 0.2 liters per minute. The sample will be collected over a period of approximately two (2) hours. The sample start time and vacuum (in inches of mercury) contained in the Summa canister will be documented. The sample will be deemed complete when the vacuum remaining in the Summa canister reaches between 4 and 8 inches of mercury.

Indoor and outdoor air samples will be collected with a 6-liter Summa canister which will be fitted with an 8-hour regulator. The sample will be collected over a period of approximately 8 hours. Airflow into the canisters will be controlled and monitored with in-line gauges and flow controllers. The sample start time and vacuum (in inches of mercury) contained in the Summa canister will be documented.

The Summa canisters will be submitted to an ELAP-certified laboratory to perform VOC analyses in accordance with USEPA Air Compendium Method TO-15. The analyses will be performed for the entire suite of VOCs according to USEPA Method TO-15. The laboratory will attempt to attain Method Reporting Limits (MRLs) of 1.0 microgram per cubic meter ($\mu g/m^3$), which is comparable to those achieved for indoor air samples. However, depending upon contaminant levels, MRL's may be higher. The data set will be reported in $\mu g/m^3$.

The data package provided by the laboratory will meet the specifications of a full Analytical Services Protocols (ASP) Category B deliverable package. The methods and data packages provided by the laboratory will be consistent with the specifications of the most current version of the ASP.

QA/QC samples will include one field duplicate, one trip blank, a laboratory blank, and laboratory quality control samples as required by the analytical method.

2.7 Quarterly and Winter Season Sampling Report Preparation

Following receipt of the laboratory data, the quarterly and winter sampling report will be prepared. The quarterly and winter season sampling report will be prepared summarizing the investigative findings and presenting recommendations, if necessary. The quarterly and winter season sampling report will describe the field observations recorded at the time of sampling, the sampling procedures followed, the analytical results, and a site drawing(s) showing the sampling locations. Copies of the quarterly and winter season sampling report will be submitted approximately one (1) month after the field sampling program is complete to the NYSDEC, NYSDOH, and NCDOH.

2.8 Guideline Levels

NYSDOH has established guideline levels for specific VOCs that can cause exposure issues to humans. Previous environmental investigations at the site indicated the presence of PCE and its breakdown components in the soil and groundwater. NYSDOH has developed guideline levels for PCE which is presented in Appendix H of the NYSDOH Guidance for Evaluating Soil Vapor Intrusion, October 2006.

The NYSDOH guideline level for PCE is 100 $\mu g/m^3$, 0.1 milligrams per cubic meter (0.1 mg/m^3), or 15 parts per billion (ppb). NYSDOH recommends taking immediate action to reduce exposure when an air level is ten (10) times greater than the guideline, when the air concentration is 1,000 $\mu g/m^3$, 1 mg/m^3, or 150 ppb (or 0.15 parts per million [ppm]). Reasonable and practical actions should be taken to reduce PCE exposure, as well as other VOCs (including PCE daughter products), when indoor air levels are above background concentrations, even when they are below the guideline level of 100 $\mu g/m^3$.

The NYSDOH guidelines do not provide for a correlation between soil vapor or sub-slab vapor concentrations and the potential for indoor air quality impacts.

2.9 Contingency/Mitigation Measures

The SSDS is a proven means for intercepting subsurface gas vapors that would otherwise infiltrate into the proposed buildings. The type or combination of types, of mitigation is determined on a building-specific basis, taking into account building construction and operating conditions. Mitigation is an interim measure implemented to address exposures related to soil gas vapor intrusion until contaminated environmental media are remediated. However, it may be necessary to implement contingency/mitigation measures if soil gas vapors are detected above the guideline levels presented in Section 2.8 and have the potential to impact the health and safety of individuals occupying the building.

In the unlikely event indoor air quality sampling indicates elevated VOC concentrations that exceed the PCE guideline levels, further evaluation would be necessary to determine if (1) the SSDS is functioning properly, but background air concentrations in the building exceed allowable guidelines, or (2) the SSDS requires modification or expansion. It will also be necessary to evaluate the air sample results especially if VOC concentrations are higher in the 2nd floor than in the 1st floor where the likely source is not from the subsurface soil gas vapors. This evaluation would also include assessing building conditions, SSDS parameters, and soil gas data. Other problem areas could include a disruption of the negative pressure field caused by cracks, holes, sumps, or annulus spaces in the building slab foundation.

If air concentrations continue to exceed guideline levels, it may be necessary to provide indoor ventilation to abate the elevated concentrations on a short term basis until the "new" source or pathway is identified and the necessary mitigation measures are implemented.

The NYSDOH provides a decision matrix in their Guidance document in Appendix B which describes recommended actions depending on the concentration of indoor and SSDS vent sample concentrations. These recommended actions are based on the relationship between sub-slab soil gas vapor concentrations and corresponding indoor air concentrations for PCE and are provided in Appendix B in this sampling plan.

3.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PROCEDURES

In general, appropriate QA/QC procedures should be followed during all aspects of sample collection and analysis to ensure that sampling error is minimized and high quality data are obtained. Sampling team members should avoid actions (e.g., fueling vehicles, using permanent marking pens, wearing freshly dry-cleaned clothing or personal fragrances, etc.) which can cause sample interference in the field. Portable air monitoring equipment or field instrumentation should be properly maintained, calibrated and tested to ensure validity of measurements. Air sampling equipment should be stored, transported and between samples decontaminated in a manner consistent with the best environmental consulting practices to minimize problems such as field contamination and cross-contamination.

Samples should be collected using certified clean sample Summa canisters. Where applicable, steps should be taken to ensure that the gas used by the laboratory to clean the sample device is different from the gas used as a tracer during sampling (e.g., helium). Samples should meet sample holding times and temperatures, and should be delivered to the analytical laboratory as soon as possible after collection. In addition, laboratory accession procedures should be followed, including field documentation (sample collection information and locations), chain of custody, field blanks, field sample and laboratory duplicates, as appropriate.

3.1 Data Quality Objectives

The data obtained from the samples collected at the site will be used to provide information to satisfy the data quality objective (DQO) of investigating and delineating the potentially impacted soil and groundwater.

DQOs are based on the concept that different data uses may require different levels of data quality. DQOs are defined with respect to the types, number, and locations of samples that will be collected, and the QA levels associated with the analysis. Air samples will be analyzed for VOCs.

The overall QA objective is to develop and implement procedures for field measurements, sampling, and analytical testing that will provide data of known quality that is consistent with the intended use of the information. This section defines the objectives by (1) describing the use of the data (2) specifying the applicable QC effort (field checks and analytical support levels), and (3) defining the QC objectives (data quality acceptance criteria).

3.2 Data Usage and Requirements

The laboratory analyses will be used to support the investigation process. The intended uses of the data from the sample collection are to assess soil gas vapor conditions indoors, outdoors, and beneath the building floor slabs. The data will be quantitative laboratory analyses.

The air and vapor samples will be collected using a Summa canister. These samples will be sent to the laboratory for VOC analyses.

Quantification limits for the laboratory analyses will be in conformance with the appropriate USEPA methodology for the specified analyses unless interference effects make it necessary to raise them. The laboratory will make every effort to achieve quantification limits as low as practicable and will report estimated concentration values at less than the detection limit by flagging the value with a "J".

3.3 Quality Control Objective

The QC objective for the investigation is to provide data of known and acceptable quality. Several different types of QC check samples will be analyzed and the results will be compared to data quality acceptance criteria and/or QC control limits that are specified for each method. The laboratory will routinely run these QC samples in accordance with the protocols and frequencies specified in the analytical methods. The QC check samples may include the following:

- Blank samples
- Initial and continuing calibrations
- Surrogate spikes

- Matrix spikes/analytical spikes
- Duplicate samples
- Control samples

The specific types and frequencies of QC checks which will be performed in support of each test method, the calibration procedures for each instrument, and the QC control limits and/or data quality acceptance criteria for each of the types of QC check samples, are specified in the laboratory's Quality Assurance Project Plan (QAPP) and shall be in accordance with ELAP protocol.

3.4 Sampling Methodology

Sampling Methodology: Samples will be collected in accordance with the Sampling Plan. The protocols for sampling methodology are described in Section 2 of the sampling plan.

Decontamination of Sampling Equipment: All non-dedicated sampling equipment will be decontaminated prior to and following sample collection.

Sample Packaging and Shipment. Samples will be shipped to the laboratory at the completion of each day of sampling. Custody of the samples must be maintained through the shipment of samples to the laboratory. Samples will be in the custody of the sampling crew until relinquished directly to the laboratory in person or shipped via overnight courier using the following procedures:

- Place the sample containers in the shipment boxes;
- Place suitable cushioning material around the sample containers;
- Sign and retain a copy of the Chain-of-Custody form; place the form into a reusable plastic bag and pack in the cooler;
- Apply signed custody seals to the top and bottom of the shipment container; and,
- Attach the completed shipping label to the top of the shipment container; retain the shipment tracking number on the copy of the Chain-of Custody form, and ship the cooler via overnight to the laboratory.

3.5 Sample Labeling

Sample labels are required to include the following information:

- Site name,
- Sample number,
- Sample matrix,
- Parameters to be analyzed,
- Date of collection,
- Time of collection,
- Type of preservative, and
- Sampler's name.

3.6 Sample Numbering

A unique sample number will be used to identify a location, sample matrix, a sequential number for each sample type, a sample depth, and the date and time the sample was collected. The typical format for designating the sample number will be X/XX/XX-XX/MMDDYY, where:

X = Sample Location

XX = a two-digit sequential number for each sample

XX-XX = sample depth interval (in feet) from which the sample was collected

MMDDYY = month, day, and year of the sample collection

3.7 Chain-of-Custody Record

The Chain-of-Custody provides an accurate written record that can be used to trace the possession and handling of the sample from the time of collection to analysis. The Chain-of-Custody form will be completed for each sample at the time of collection and will be maintained while shipping the sample to the laboratory. The following information must be entered on the Chain-of-Custody form:

- Project number,
- Project name,

- Signature of sampler,
- Sample number,
- Date and time,
- Sample matrix,
- Parameters for analysis, and
- Remarks, as needed.

All samples will be delivered to the laboratory within 24 hours from time of collection.

3.8 Sample Custody

A chain-of-custody record will be maintained for each sample collected and will provide an accurate written record that can be used to trace the possession of samples from collection through analysis and reporting.

The procedures that will be followed to provide the chain-of-custody in the field from sample collection through shipment to the laboratory (including sample preservation) are specified in the Sampling Plan. The procedures that will be used to continue the chain-of-custody for each sample from its arrival in the laboratory through analysis and reporting will be specified in the laboratory QAPP. The laboratory sample custody procedures will conform to USEPA guidelines. The project samples will be retained by the laboratory for 30 days after completion of analyses.

3.9 Analytical Procedures

Samples will be analyzed by a NYSDOH ELAP-certified laboratory. The laboratory must maintain current NYSDOH certifications during the project. All analyses will be performed in accordance with the EPA protocol established for the specified analyses.

3.10 Data Reduction and Reporting

Data collected during the air sampling program, including field and laboratory results, will be reduced, reviewed, summarized, and reported. The reduction of the field data will consist of summarizing the raw field data, which may be presented in the form of tables, logs, illustrations, and graphs, as deemed appropriate by the project manager. The laboratory data will also be reduced and tabulated electronically. The data will then be suitable for inclusion in reports and will be designed to facilitate comparison and evaluation of the results.

Gannett Fleming

FIGURE 1

RAY STREET

SGP-1 SGP-2 SGP-3

DRIVEWAY

FENCED AREA

SGP-4

SGP-5

SGP-6

SIDEWALK

GRASS AREA

WESTEND AVENUE

BULKHEAD

MILBURN CREEK

3-STORY CONCRETE BLOCK BUILDING

ASPHALT PARKING AREA

ASPHALT PARKING AREA

SGP-9 SGP-8 SGP-7

LEGEND

SGP-5 EXISTING SOIL GAS POINTS (PERMANENT)

PROPOSED PERMANENT SOIL GAS POINTS

0 20

Scale In Feet

PROPOSED SOIL GAS POINTS

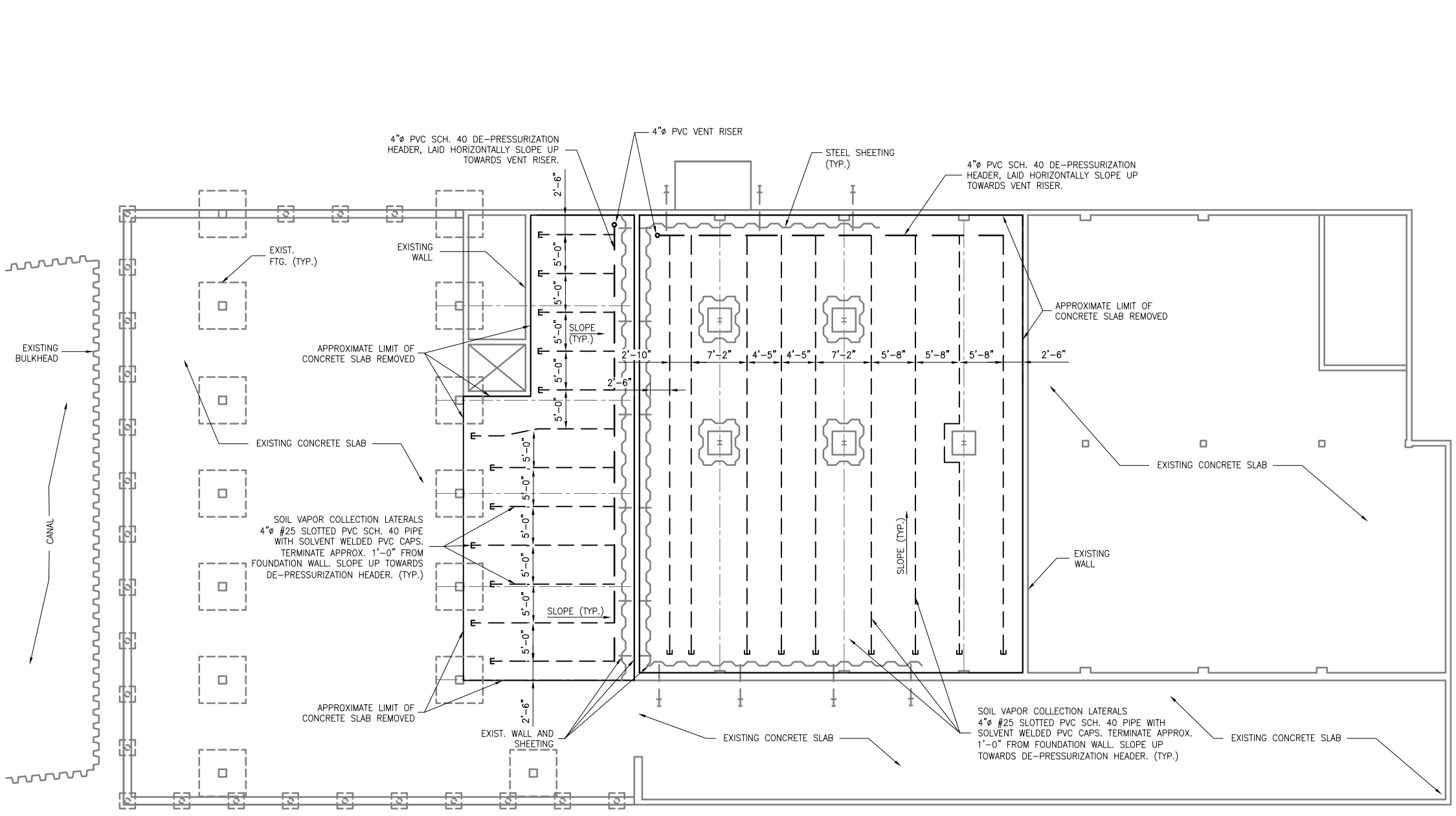
NASSAU UNIFORM SERVICES

FREEPORT, NEW YORK

02/24/10 11:22am FILE= K:\PROJECTS\47000's\47750\009\Figures\F1- PROPOSED SOIL GAS POINTS.dwg by MAMBROSIO XREF FILE = NONE

APPENDIX A

PROPOSED SUB-SLAB DEPRESSURIZATION SYSTEM DESIGN DRAWINGS



NOTES:

1. THE SUB-SLAB DE-PRESSURIZATION SYSTEM (SSDS) SHOWN HEREIN IS REFERENCED TO A FOOTING PLAN DESIGN PREPARED BY PETRACCA DESIGN AND ENGINEERING, P.C.. THE FOUNDATION DESIGN IS SHOWN "AS RECEIVED" FROM PETRACCA DESIGN AND ENGINEERING, P.C. AND HAS NOT BEEN SUBJECT TO TECHNICAL REVIEW BY GANNETT FLEMING. THE INTENT OF THE SSDS/FOUNDATION DESIGN IS TO SHOW THE ENTIRE WORK AS A BASIS FOR PERMITS AND BIDS. AS, SUCH, IT IS CONCEPTUAL AND IS NOT INTENDED TO SHOW CONSTRUCTABILITY OR CONVEY ASSURANCE OF ANY AS-BUILT.
2. LAYOUT BASED ON "FOOTING PLAN", PREPARED BY PETRACCA DESIGN AND ENGINEERING, P.C. DATED DECEMBER, 2009.
3. FOR BUILDING DIMENSIONS SEE STRUCTUDAL/ARCHITECTURAL DRAWINGS.
4. ALL PVC PIPING SHALL BE ASTM D1785. ALL PVC JOINTS TO BE SOLVENT WELDED.

0 4 16
SCALE: 1/8" = 1'-0"

No.	DESCRIPTION	DATE	BY
	REVISIONS		

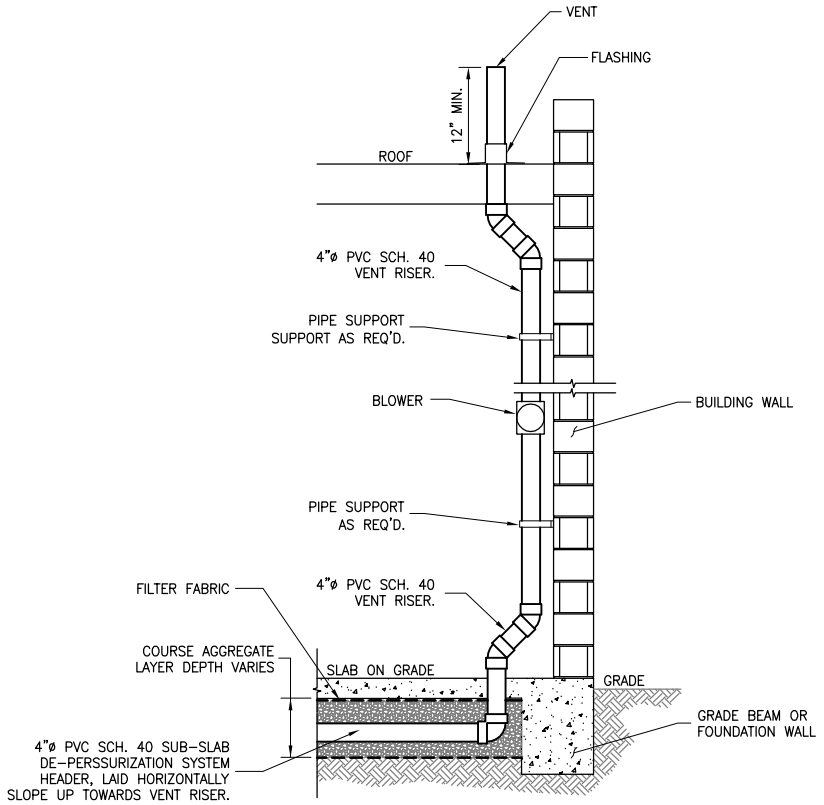
DRAWN	MSA
DESIGNED	VF
APPROVED	FP
SCALE	1/8"=1'-0"
JOB No.	47750.009
DATE	DEC. 2009

Gannett Fleming
HARRISBURG, PENNSYLVANIA LOCUST VALLEY, NEW YORK

PROJECT
SUB-SLAB DE-PRESSURIZATION SYSTEM
NASSAU UNIFORM SERVICES
FREEPORT, NEW YORK

TITLE
BELOW SLAB PIPING PLAN

SHEET No.
V101



VENT RISER DETAILS

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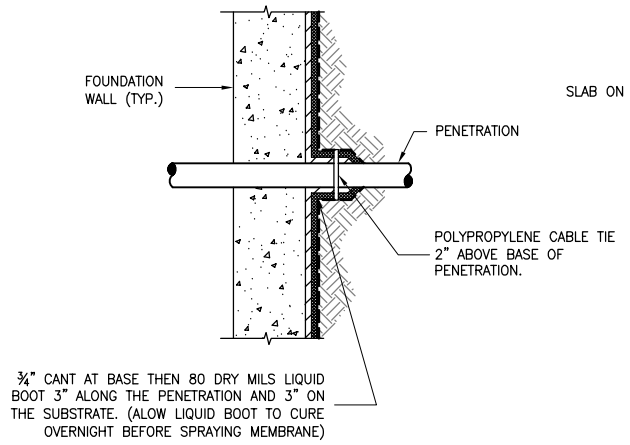
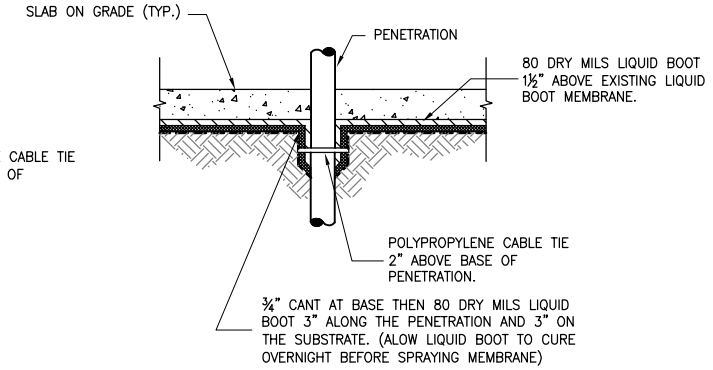


WALL PENETRATION (IF REQUIRED)



SLAB PENETRATION

TYPICAL SUB-SLAB DE-PRESSURIZATION SYSTEM PENETRATION DETAILS

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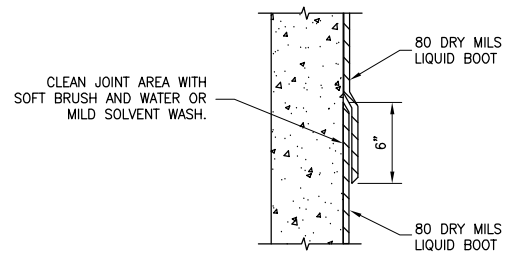
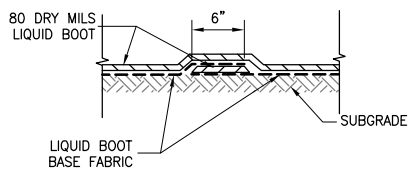


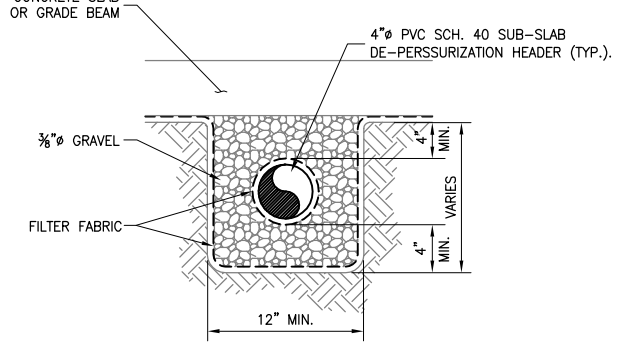
WALL LAP (IF REQUIRED)



GEOTEXTILE LAP

TYPICAL SUB-SLAB DE-PRESSURIZATION SYSTEM LAP JOINT DETAILS

NOT TO SCALE



TYPICAL SUB-SLAB DE-PRESSURIZATION SYSTEM TRENCH DETAIL

NOT TO SCALE

NOTES:

1. THE SUB-SLAB DE-PRESSURIZATION SYSTEM (SSDS) SHOWN HEREIN IS REFERENCED TO A FOOTING PLAN DESIGN PREPARED BY PETRACCA DESIGN AND ENGINEERING, P.C.. THE FOUNDATION DESIGN IS SHOWN "AS RECEIVED" FROM PETRACCA DESIGN AND ENGINEERING, P.C. AND HAS NOT BEEN SUBJECT TO TECHNICAL REVIEW BY GANNETT FLEMING. THE INTENT OF THE SSDS/FOUNDATION DESIGN IS TO SHOW THE ENTIRE WORK AS A BASIS FOR PERMITS AND BIDS. AS, SUCH, IT IS CONCEPTUAL AND IS NOT INTENDED TO SHOW CONSTRUCTABILITY OR CONVEY ASSURANCE OF ANY AS-BUILT.
2. LAYOUT BASED ON "FOOTING PLAN", PREPARED BY PETRACCA DESIGN AND ENGINEERING, P.C. DATED DECEMBER, 2009.
3. FOR BUILDING DIMENSIONS SEE STRUCTUDAL/ARCHITECTURAL DRAWINGS.
4. ALL PVC PIPING SHALL BE ASTM D1785. ALL PVC JOINTS TO BE SOLVENT WELDED.

No.	DESCRIPTION	DATE	BY
	REVISIONS		

DRAWN	MSA
DESIGNED	VF
APPROVED	FP
SCALE	NONE
JOB No.	47750.009
DATE	DEC. 2009

Gannett Fleming

HARRISBURG, PENNSYLVANIA LOCUST VALLEY, NEW YORK

PROJECT

SUB-SLAB DE-PRESSURIZATION SYSTEM

NASSAU UNIFORM SERVICES

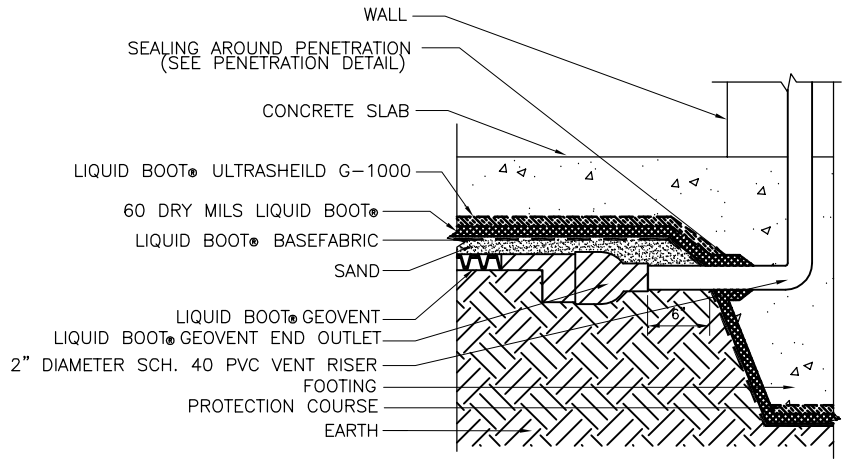
FREEPORT, NEW YORK

TITLE

SYSTEM DETAILS

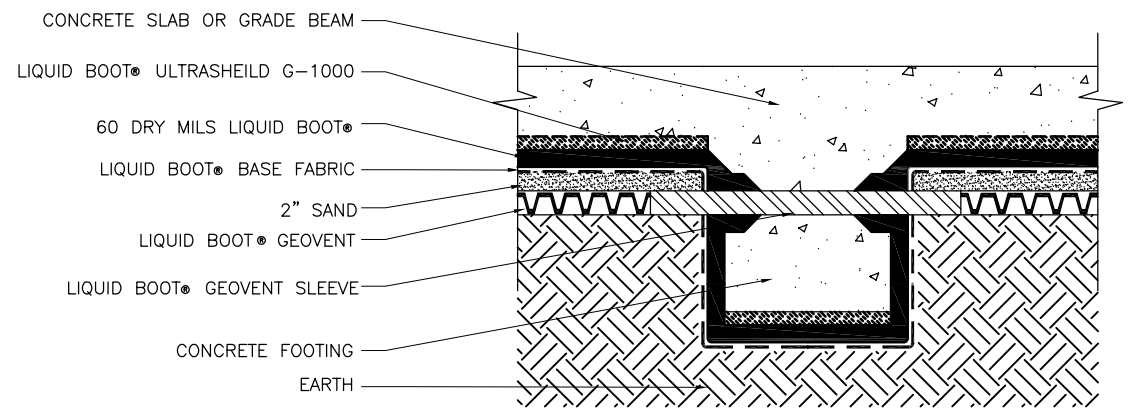
SHEET No.

V102



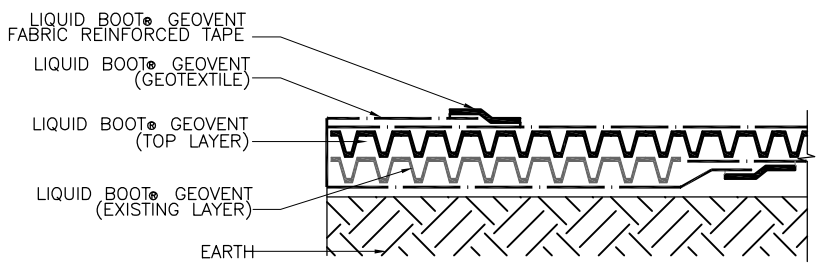
GAS VAPOR BARRIER LIQUID BOOT® GEOVENT CONNECTOR TO VENT RISER

NOT TO SCALE



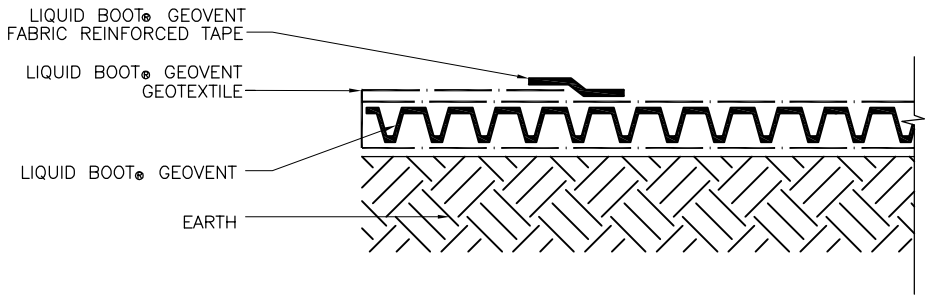
GAS VAPOR BARRIER LIQUID BOOT® GEOVENT THROUGH FOOTING

NOT TO SCALE



GAS VAPOR BARRIER LIQUID BOOT® GEOVENT INTERLOCKING CONNECTIONS

NOT TO SCALE



GAS VAPOR BARRIER LIQUID BOOT® GEOVENT TERMINATION

NOT TO SCALE

NOTES:

1. DETAILS PROVIDED BY:
   © 2007 CETCO Liquid Boot Company
2. ALL PVC PIPING SHALL BE ASTM D1785.

No.	DESCRIPTION	DATE	BY
REVISIONS			

DRAWN	MSA
DESIGNED	VF
APPROVED	FP
SCALE	NONE
JOB No.	47750.009
DATE	DEC. 2009

Gannett Fleming

HARRISBURG, PENNSYLVANIA LOCUST VALLEY, NEW YORK

PROJECT
SUB-SLAB DE-PRESSURIZATION SYSTEM
NASSAU UNIFORM SERVICES
FREEPORT, NEW YORK

TITLE
ALTERNATE 1
LIQUID BOOT® DETAILS

SHEET No.
V103

APPENDIX B

NYSDOH - SOIL VAPOR/INDOOR AIR MATRIX 2 FOR PCE

Gannett Fleming

Soil Vapor/Indoor Air Matrix 2

October 2006

	INDOOR AIR CONCENTRATION of COMPOUND (mcg/m³)			
SUB-SLAB VAPOR CONCENTRATION of COMPOUND (mcg/m³)	< 3	3 to < 30	30 to < 100	100 and above
< 100	1. No further action	2. Take reasonable and practical actions to identify source(s) and reduce exposures	3. Take reasonable and practical actions to identify source(s) and reduce exposures	4. Take reasonable and practical actions to identify source(s) and reduce exposures
100 to < 1,000	5. MONITOR	6. MONITOR / MITIGATE	7. MITIGATE	8. MITIGATE
1,000 and above	9. MITIGATE	10. MITIGATE	11. MITIGATE	12. MITIGATE

No further action:
Given that the compound was not detected in the indoor air sample and that the concentration detected in the sub-slab vapor sample is not expected to significantly affect indoor air quality, no additional actions are needed to address human exposures.

Take reasonable and practical actions to identify source(s) and reduce exposures:
The concentration detected in the indoor air sample is likely due to indoor and/or outdoor sources rather than soil vapor intrusion given the concentration detected in the sub-slab vapor sample. Therefore, steps should be taken to identify potential source(s) and to reduce exposures accordingly (e.g., by keeping containers tightly capped or by storing volatile organic compound-containing products in places where people do not spend much time, such as a garage or outdoor shed). Resampling may be recommended to demonstrate the effectiveness of actions taken to reduce exposures.

MONITOR:
Monitoring, including sub-slab vapor, basement air, lowest occupied living space air, and outdoor air sampling, is needed to determine whether concentrations in the indoor air or sub-slab vapor have changed. Monitoring may also be needed to determine whether existing building conditions (e.g., positive pressure heating, ventilation and air-conditioning systems) are maintaining the desired mitigation endpoint and to determine whether changes are needed. The type and frequency of monitoring is determined on a site-specific and building-specific basis, taking into account applicable environmental data and building operating conditions. Monitoring is an interim measure required to evaluate exposures related to soil vapor intrusion until contaminated environmental media are remediated.

MITIGATE:
Mitigation is needed to minimize current or potential exposures associated with soil vapor intrusion. The most common mitigation methods are sealing preferential pathways in conjunction with installing a sub-slab depressurization system, and changing the pressurization of the building in conjunction with monitoring. The type, or combination of types, of mitigation is determined on a building-specific basis, taking into account building construction and operating conditions. Mitigation is considered a temporary measure implemented to address exposures related to soil vapor intrusion until contaminated environmental media are remediated.

MONITOR / MITIGATE:
Monitoring or mitigation may be recommended after considering the magnitude of sub-slab vapor and indoor air concentrations along with building- and site-specific conditions.

See additional notes on page 2.

ADDITIONAL NOTES FOR MATRIX 2

This matrix summarizes the minimum actions recommended to address current and potential exposures related to soil vapor intrusion. To use the matrix appropriately as a tool in the decision-making process, the following should be noted:

[1] The matrix is generic. As such, it may be appropriate to modify a recommended action to accommodate building-specific conditions (e.g., dirt floor in basement, crawl spaces, etc.) and/or factors provided in Section 3.2 of the guidance (e.g., current land use, environmental conditions, etc.). For example, resampling may be recommended when the matrix indicates "no further action" for a particular building, but the results of adjacent buildings (especially sub-slab vapor results) indicate a need to take actions to address exposures related to soil vapor intrusion. Additionally, actions more protective of public health than those specified within the matrix may be proposed at any time. For example, the party implementing the actions may decide to install sub-slab depressurization systems on buildings where the matrix indicates "no further action" or "monitoring." Such an action is usually undertaken for reasons other than public health (e.g., seeking community acceptance, reducing excessive costs, etc.).

[2] Actions provided in the matrix are specific to addressing human exposures. Implementation of these actions does not preclude investigating possible sources of vapor contamination, nor does it preclude remediating contaminated soil vapors or the source of soil vapor contamination.

[3] Appropriate care should be taken during all aspects of sample collection to ensure that high quality data are obtained. Since the data are being used in the decision-making process, the laboratory analyzing the environmental samples must have current Environmental Laboratory Approval Program (ELAP) certification for the appropriate analyte and environmental matrix combinations. Furthermore, samples should be analyzed by methods that can achieve a minimum reporting limit of 3 micrograms per cubic meter for indoor and outdoor air samples. For sub-slab vapor samples, a minimum reporting limit of 5 micrograms per cubic meter is recommended.

[4] Sub-slab vapor and indoor air samples are typically collected when the likelihood of soil vapor intrusion to occur is considered to be the greatest (i.e., worst-case conditions). If samples are collected at other times (typically, samples collected outside of the heating season), then resampling during worst-case conditions may be appropriate to verify that actions taken to address exposures related to soil vapor intrusion are protective of human health.

[5] When current exposures are attributed to sources other than soil vapor intrusion, the agencies should be given documentation (e.g., applicable environmental data, completed indoor air sampling questionnaire, digital photographs, etc.) to support a proposed action other than that provided in the matrix box and to support agency assessment and follow-up.

[6] The party responsible for implementing the recommended actions will differ depending upon several factors, including the identified source of the volatile chemicals, the environmental remediation program, and site-specific and building-specific conditions. For example, to the extent that all site data and site conditions demonstrate that soil vapor intrusion is not occurring and that the potential for soil vapor intrusion to occur is not likely, the soil vapor intrusion investigation would be considered complete. In general, if indoor exposures represent a concern due to indoor sources, then the State will provide guidance to the property owner and/or tenant on ways to reduce their exposure. If indoor exposures represent a concern due to outdoor sources, then the NYSDEC will decide who is responsible for further investigation and any necessary remediation. Depending upon the outdoor source, this responsibility may or may not fall upon the party conducting the soil vapor intrusion investigation.