New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 8
6274 East Avon-Lima Road, Avon, New York 14414-9519
Phone: (585) 226-2466 • **FAX:** (585) 226-8696
Website: www.dec.state.ny.us

Denise M. Sheehan
Commissioner

August 8, 2006

Ms. Susan Boyle
Haley & Aldrich of New York
200 Town Centre Drive
Suite 2
Rochester, NY 14623-4264

Dear Ms. Boyle:

Re: CooperVision Site # V00175-8
Sub-Slab Depressurization System (Amended Work Plan); May 18, 2006
Village of Scottsville, Monroe County

The New York State Department of Environmental Conservation (NYSDEC) has completed its review of the May 18, 2006 "CooperVision - Sub-Slab Depressurization System (Amended Work Plan)" (the IRM Work Plan) prepared by Haley and Aldrich of New York. Based upon the information and representations given in the Work Plan, the Work Plan is hereby approved as modified below:

1. The initial performance of the system will be evaluated against the following objectives:

   - A minimum differential pressure of 0.002 inches of water between the ambient and sub-slab measurements at approximately 20-ft from each of the five fan locations shown on Figure 2 of the IRM Work Plan.

   - A continuous minimum differential pressure of 0.002 inches of water between the ambient and sub-slab measurements between locations F1 and F5.

2. If necessary, additional activities will be completed to the extent practicable if the performance objectives are not achieved with the five proposed locations. These activities may include installation of additional sub-slab depressurization systems, alternate system configuration, indoor and outdoor air sampling, or other appropriate action approved by NYSDEC and the New York State Department of Health (NYSDOH).

3. Per your letter of June 16, 2006 regarding the CooperVision Sub-Slab Depressurization System, the GP-501 high static pressure fans will be used instead of the RP-265 fans.

4. The fans will not be placed in air conditioned, livable, or occupied spaces unless approved by the NYSDOH.

5. A Final Engineering Report (FER) will also be submitted for the IRM. The IRM FER must include the following:

   - A description of the IRM, as constructed, pursuant to the IRM Work Plan;
   - A description of any problems encountered during construction and their resolution;
   - The sub-slab vacuum monitoring data;
   - A description of backdrafting evaluation and any associated corrective measures ;
   - A description of the smoke tube evaluations and any associated corrective measures; and
   - As-built drawings for each system and a map of the roof showing the locations each sub-slab depressurization vent along with the location of any air intakes on the roof.

6. The IRM FER, drawings, and certification will be prepared, signed, and stamped by a professional engineer licensed, or otherwise authorized, to practice in New York State. The certification will include the following language: "I certify that the IRM Work Plan was implemented and that all construction activities were completed substantially in accordance with the Department-approved IRM Work Plan and were personally witnessed by me (or "by a person under my direct supervision")."

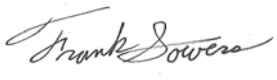
7. The IRM OM&M report will also be stamped and signed by a professional engineer licensed, or otherwise authorized, to practice in New York State.

8. The IRM FER will be submitted within 90-days of the completion of construction activities.

The IRM Work Plan consists of this letter and the May 18, 2006 document entitled "CooperVision - Sub-Slab Depressurization System (Amended Work Plan)" prepared by Haley & Aldrich.

Please contact me at (585) 226-5357 when the field work has been scheduled or if you have any questions regarding this letter.

Sincerely,



Frank Sowers, P.E.
Environmental Engineer 2

cc:
Jonathan Babcock, P.E. (Haley & Aldrich)
Vince Dick (Haley & Aldrich)
Claire DeBergalis (Haley & Aldrich)
Tarun Patel (CooperVision)
file

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HALEY&
ALDRICH

18 May 2006
File No: 70665-011

Frank Sowers, P.E.
New York State Department of Environmental Conservation
6274 East Avon-Lima Rd.
Avon, NY 14414

Subject: CooperVision – **Sub-Slab Depressurization System (Amended Work Plan)**
711 North Road
Scottsville, NY

Dear Mr. Sowers:

On behalf of our client, CooperVision, we are submitting this Amended Work Plan for the installation of a sub-slab depressurization system, as a contingency measure only, for the CooperVision site in Scottsville, New York. Installation of a sub-slab depressurization system is intended to mitigate potential effects from vapor intrusion. This plan incorporates input from NSYDEC representatives (as described in your 13 June 2005 letter), and was developed in a manner generally consistent with USEPA "radon mitigation" design criteria. After installation of the system, demonstration of sub-slab depressurization will be confirmed, plus periodic certification of system function along with other administrative controls will be performed under the Voluntary Cleanup Agreement (VCA) between CooperVision and NYSDEC. This submittal details the active sub-slab depressurization system intended for installation at the above-referenced site, amended to include additional depressurization locations requested by NYSDEC.

SUB-SLAB DEPRESSURIZATION SYSTEM

The objective of the sub-slab depressurization system is to mitigate potential vapor intrusion to indoor airspace above sub-slab area which may be affected by volatile organic compounds. This is accomplished by creating lower pressure in the sub-slab compared to the ambient indoor air space.

Five Radonaway RP--265 fans (or equivalent as determined by field evaluation) will be installed at locations as follows: 1) Cafeteria NE corner (fan above drop ceiling), 2) compressor room SE corner near door, 3) storage building west wall near exit door, 4) the SW corner of the switch gear room/utility area, and 5) the SW corner of the western laboratory corridor (see attached Figure 1 for a site plan and monitoring well locations and Figure 2 for depressurization system suction locations). These locations were determined based on historic site data, facility usage, and recommendations received from NYSDEC representatives. The suction locations will be located towards the perimeter of the room to avoid active manufacturing areas and foot traffic. Specific equipment locations will be determined in the field during installation to accommodate existing manufacturing equipment

and operations. Final locations will be documented in the Site Operation, Maintenance, and Monitoring Plan that is to be submitted at a later date.

Based on our understanding of the site conditions, the anticipated required pressure differential and operational requirements, an in-line vent fan with an approximate 0-325 cubic feet/minute (cfm) flow at 0-2.6 inches of water vacuum is anticipated to be required. A minimum differential pressure of 0.002 inches of water between the ambient and sub-slab measurements at 20 feet from the suction point has been adopted as a target depressurization objective.

Mitigation Tech, a National Environmental Health Association certified radon mitigation contractor, has reviewed the facility layout and the slab/sub-slab construction information from the owner. Mitigation Tech performed a directed site study in the southeastern portion of the site building (in the vicinity of MW-2 and MW-3) to determine the appropriate suction point configuration in that area. A vacuum test was conducted at each location to confirm that the appropriate equipment and configuration has been specified. The testing consisted of applying a sub-slab vacuum at the intended suction point and measuring sub-slab response at adjacent test points. Refer to Appendix A for more information regarding the testing results and proposed work scope provided by Mitigation Tech.

Operation of the system at the five installation locations is anticipated to meet the sub-slab depression objective in the target areas. However, Mitigation Tech will be prepared to modify locations in the field if installation testing indicates it is required. Installation of the fans also includes manometers on each of the suction pipe runs for post-installation monitoring. The manometers will be easily visible, and will serve as the system operational warning devices.

Each of the five proposed sub-slab depressurization system suction points will be installed as follows: A 3- or 4-inch diameter hole will be cut through the concrete floor to a minimum depth of 1-inch below the slab. A 3- or 4-inch PVC suction pipe shall be installed to conduct soil vapor vertically from below the slab to the in-line fan. From there, a 3- or 4-inch discharge pipe will penetrate the wall or the roof to convey the vapor to the building exterior with the vent pipe carried a minimum of 12 inches above the roof line.

The vent fan and discharge piping will not be located in or below an occupied or livable area of the building, the vent pipe's exhaust will be at least 10 feet from the ground level, 10 feet away from any opening that is less than 2 feet below the exhaust point, and at least 10 feet from any adjoining/adjacent buildings, and HVAC intakes or supply registers. Labels on the depressurization piping will clearly identify the purpose of the system.

All components of the system shall be installed compliant with the applicable mechanical, electrical, building, plumbing, energy and fire prevention codes, standards, and regulations of the local jurisdiction. If a building permit is required, a copy will be provided to the owner.

INSTALLATION

In conjunction with Haley & Aldrich, Mitigation Tech developed the proposed depressurization system configuration and will perform the installation. Mitigation Tech will provide appropriate Environmental Protection Agency and National Environmental Health Association (NEHA) radon system installation certifications to NYSDEC if required.

Prior to installation, the presence of natural draft combustion appliances such as furnaces or water heaters will be identified. The building will be tested for backdrafting of the appliances, and if necessary the backdrafting condition will be corrected before the depressurization system is placed into operation

Subsequent to installation, sub-slab pressure will be measured using a digital manometer to verify that the system lowers sub-slab pressure below the building ambient interior pressure. A manometer will be permanently installed on the suction side of each fan (to confirm fan's effective operation) and a temporary sub-slab monitoring point will be installed for each fan to verify the minimum 0.002-inches water pressure differential at 20 feet from the suction point. The manometer will be used to verify that the system is functioning properly.

Adequate operation of the warning system will be confirmed, and the building occupants will be made aware of this warning device and how it functions. In addition, "smoke tubes" will be used to check for leaks through cracks or floor joints near the suction point. Observable leaks will be sealed. The temporary monitoring point will be sealed after the acceptable system performance has been established.

MAINTENANCE AND MONITORING

An Operations, Maintenance, and Monitoring (OM&M) Plan will be submitted to the NYSDEC following installation, which will include a report on the system installation and performance, including drawings. This OM&M Plan will be provided to the site owner and occupants to facilitate their understanding of the system's operation, maintenance and monitoring.

The OM&M Plan will include the following:

- a description of the mitigation system installed and its basic operating principles;
- how the owner or tenant can check that the system is operating properly;
- how the system will be maintained and monitoring and by whom;
- a list of appropriate actions for the owner or tenant to take if a system warning device (manometer) indicates system degradation or failure;
- a description of the proper operating procedures for the system, including manufacturer's operation and maintenance instructions and warrantees; and
- contact information if the owner or tenant has questions, comments, or concerns.

Future monitoring will be performed on a quarterly basis for one year to monitor system performance. Frequency will be reduced to semi-annual monitoring following the first year. This routine monitoring will include:

- visual inspection of the equipment and piping;
- inspection of exhaust points to verify that no air intakes have been located nearby;
- identification and subsequent repair of any leaks;
- inspection of the exhaust and discharge points to verify that air intakes are not nearby;
- audible operational status check of the fan to verify fan's operational performance; and
- measurement of differential pressure between the indoor air and the sub-slab to ensure a lower pressure is being maintained in the sub-slab relative to indoor ambient, as indicated by the pressure gauge on the fan suction pipe.

In addition non-routine maintenance may be conducted should it appear that the mitigation system has reduced its effectiveness due to malfunction, renovation, or other unplanned circumstance. Examples of such circumstances include the following:

- the building's owners or tenants report that a warning device indicates that the mitigation system is not operating properly;
- the mitigation systems becomes damaged; or
- the building has undergone renovations that may reduce the effectiveness of the mitigation system.

Information regarding the operation and maintenance of the sub-slab depressurization systems will be included in the Operational Monitoring and Management (OM&M) Plan. A copy of this plan will be placed at the facility.

SCHEDULE

We request approval of this submittal from NYSDEC. We anticipate installation can be completed within approximately three to four weeks of receipt of NYSDEC's written approval. NYSDEC will be notified in advance of the installation activities, consistent with the VCA requirements.

If you have any questions or concerns, please do not hesitate to contact us.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Susan L. Boyle
Senior Engineer

Jonathan D. Babcock, P.E.
Senior Engineer

Vincent B. Dick
Vice President

Attachments: Figure 1 – Site Plan
Figure 2 – Sub-slab Depressurization System Detail
Appendix A – "CooperVision Facility Investigation and Work Plan for Soil Vapor Intrusion Mitigation" dated 28 February 2006. Prepared by Mitigation Tech

c: Nicholas Mouganis, Mitigation Tech
Tarun Patel, CooperVision, Inc.

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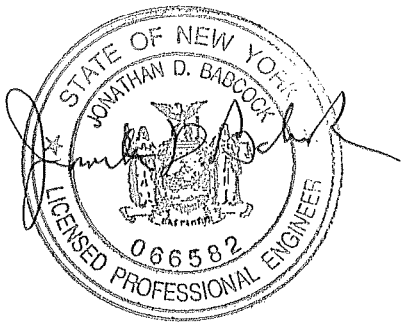
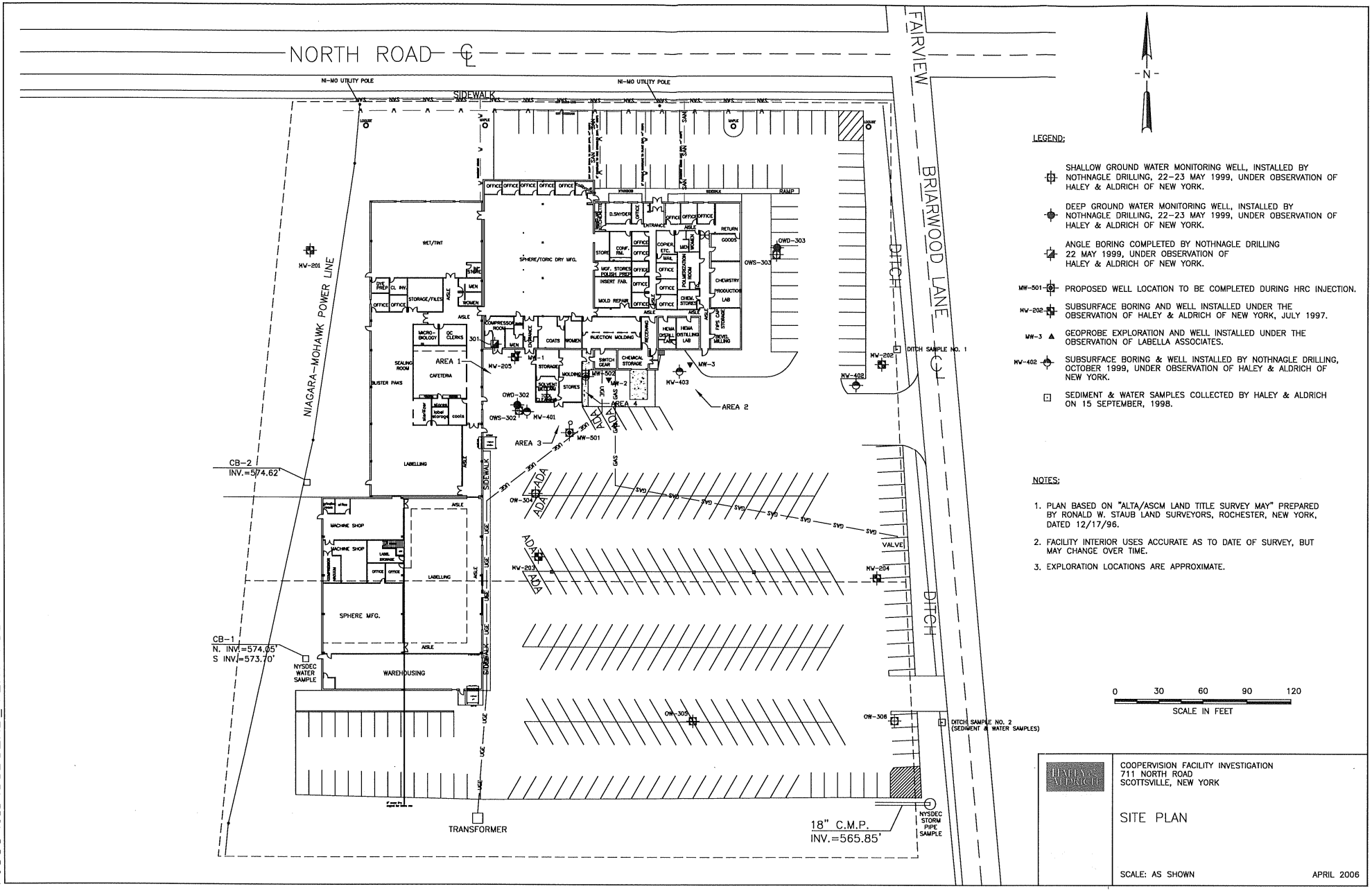




LEGEND:

- SHALLOW GROUND WATER MONITORING WELL, INSTALLED BY NOTHNAGLE DRILLING, 22-23 MAY 1999, UNDER OBSERVATION OF HALEY & ALDRICH OF NEW YORK.
- DEEP GROUND WATER MONITORING WELL, INSTALLED BY NOTHNAGLE DRILLING, 22-23 MAY 1999, UNDER OBSERVATION OF HALEY & ALDRICH OF NEW YORK.
- ANGLE BORING COMPLETED BY NOTHNAGLE DRILLING 22 MAY 1999, UNDER OBSERVATION OF HALEY & ALDRICH OF NEW YORK.
- MW-501 PROPOSED WELL LOCATION TO BE COMPLETED DURING HRC INJECTION.
- MW-202 SUBSURFACE BORING AND WELL INSTALLED UNDER THE OBSERVATION OF HALEY & ALDRICH OF NEW YORK, JULY 1997.
- MW-3 GEOPROBE EXPLORATION AND WELL INSTALLED UNDER THE OBSERVATION OF LABELLA ASSOCIATES.
- MW-402 SUBSURFACE BORING & WELL INSTALLED BY NOTHNAGLE DRILLING, OCTOBER 1999, UNDER OBSERVATION OF HALEY & ALDRICH OF NEW YORK.
- SEDIMENT & WATER SAMPLES COLLECTED BY HALEY & ALDRICH ON 15 SEPTEMBER, 1998.

NOTES:

1. PLAN BASED ON "ALTA/ASCM LAND TITLE SURVEY MAY" PREPARED BY RONALD W. STAUB LAND SURVEYORS, ROCHESTER, NEW YORK, DATED 12/17/96.
2. FACILITY INTERIOR USES ACCURATE AS TO DATE OF SURVEY, BUT MAY CHANGE OVER TIME.
3. EXPLORATION LOCATIONS ARE APPROXIMATE.

HALEY & ALDRICH

COOPERVISION FACILITY INVESTIGATION
711 NORTH ROAD
SCOTTSVILLE, NEW YORK

SITE PLAN

SCALE: AS SHOWN

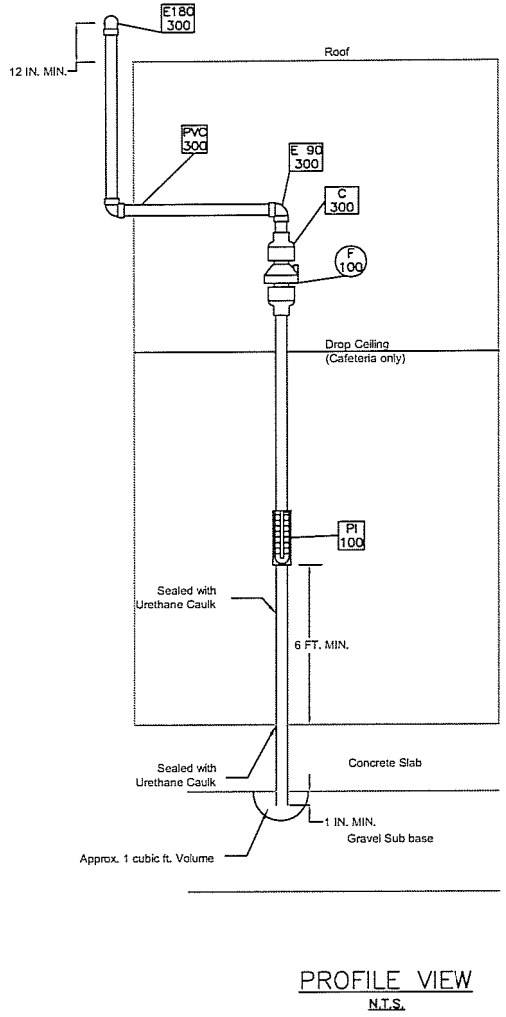
APRIL 2006

FILENAME: SITE PLAN.DWG

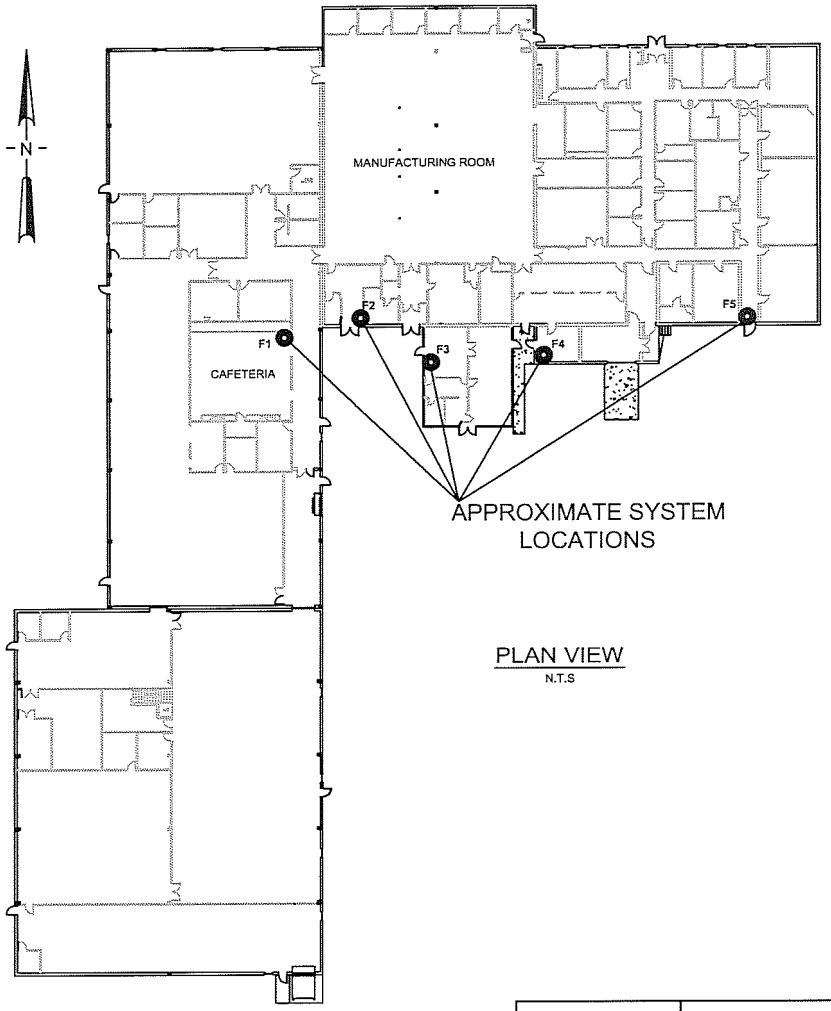
FIGURE 1

70665\011\SUBSLAB_VENT\FIG 1 SITE PLAN.DWG

70665\011\SUBSLAB_VENT\FIG 2 BLOWER DETAIL.DWG



PROFILE VIEW
N.T.S.



PLAN VIEW
N.T.S

Mechanical and Instrumentation Schedule

TAG	ITEM DESCRIPTION
PIPE	
PVC 300	4" Diameter Pipe Schedule 40 PVC
BLOWER	
F 100	Exhaust Fan 0-325 CFM 0-2.5 in. Water
FITTINGS	
E90 300	4" Diameter 90° Elbow Schedule 40 PVC
E180 300	4" Diameter 180° Elbow Schedule 40 PVC
C 300	4" X 6" Flexible Coupling
GAUGES	
PI 100	Dwyer U-tube Manometer 0-5 In. Water Column

NOTES:

1. FINAL FAN LOCATIONS TO BE FIELD DETERMINED.
2. ELECTRICAL POWER AT INSTALLATION POINTS TO BE PROVIDED BY COOPERVISION.
3. PENETRATION LOCATION TO BE FIELD DETERMINED (MINIMUM VENT HEIGHT TO BE 12 IN. ABOVE ROOF LINE).

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

COOPERVISION FACILITY INVESTIGATION
711 NORTH ROAD
SCOTTSVILLE, NY

SUB–SLAB DEPRESSURIZATION SYSTEM DETAIL

SCALE: NONE

APRIL 2006

FIGURE 2

mitigation tech *radon correction specialists*

February 28, 2006

Ms. Claire DeBergalis
Haley & Aldrich of New York
20 Town Center Dr., Suite 200
Rochester, NY 14623
Via fax: 585-486-8225

Re: Sub-slab Ventilation --- Coopervision Facility Investigation and
Work plan for Soil Vapor Intrusion Mitigation
711 North Rd., Scottsville, NY

Overview

Based on our discussion and survey, following is our proposal to provide soil vapor intrusion mitigation by active sub-slab depressurization. Three independent systems are shown for occupied building areas immediately to the west, north and east of the subject area designated Area 1, and two more independent systems are shown in the general vicinities of monitoring wells 2 and 3. All work will comply with EPA Radon mitigation standard 402-R93-078 and with Section 4 of the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated February, 2005. Saturday/Sunday installation will be provided where requested.

Background

On February 18, 2006, as part of a directed site study, we performed a series of sub-slab air communication tests at this location to determine the general appropriateness of the technique known as sub-slab ventilation (and sub-slab depressurization) to the mitigation of soil vapor intrusion, and to predict appropriate suction point configuration and the performance requirements of vacuum fans. We drilled three holes into the slab at potential system suction point locations in the east central section of the south perimeter wall. We applied a known vacuum to each point and made differential pressure measurements at various neighboring points to estimate the expected radius of influence for each point. The objective of this procedure is to specify a design that will provide a minimum average air pressure differential of .002 water column inches to the designated areas of the sub-slab by installing a series of efficient independent sub-slab vapor extraction systems of the type commonly used in the radon mitigation industry

General Findings

Our general finding is that the above referenced technique is viable although of marginal utility in some areas. Different slab sections show differences in sub-slab air communication, so area alone is not a sufficient predictor of suction point requirements. Slab seams and other potential vapor entry routes will require sealing. Using a high performance fan, a maximum radius of influence is anticipated to be 25 feet, yielding a maximum coverage of 2000 sq. ft. per system or suction point, less in higher density sub-slab areas or with perimeter suction points.

Recommendations

As a comprehensive approach to provide soil vapor influence to all areas of the sub-slab, we recommend the installation of five high performance radon-type soil vapor extract fans, strategically placed both along the perimeter of the building and near monitoring wells. Each fan will support one suction point, which will be installed so as not to constitute obstacles to the full use of the interior space.

Proposed Work Plan

NYSDOH Guidance Compliance

This work plan shall comply with Section 4 of the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated February, 2005.

Furnish and Install:

- Professional design and supervision; post installation performance evaluation and documents
- (5) Radonaway RP--265 328 cfm max [or GP-501 high static pressure]centrifugal in-line fans to provide sub-slab ventilation via 3" or 4" schedule 40 pvc pipe to sidewall exit vertical discharge, at each of five locations as follows: 1) Cafeteria NE corner (fan above drop ceiling), 2) compressor room SE corner near door, 3) storage building west wall near door (direct roof penetration for exhaust) 4) Utility room, 5) lab area corridor
- Suction points as follows: (5) cavities in sub-slab to 3" or 4" pvc pipe, with urethane seal, located at base of fan pipe runs as specified above
- (5) Vacuum indicators on vertical pipe runs
- Customer to provide or designate110v power source (1.2 amp average maximum draw) in immediate vicinity (min 1', max 4') of each fan concurrent or immediately subsequent to mechanical installation
- Vacuum testing to measure effective pressure field and report
- Workmanship to best standards of trade and comparable to existing
- Three year warranty; labor and installed components; although system design is based on achieving a sufficient pressure differential, no specific warranty of effectiveness –effectiveness shall be determined by continuing field measurement provided by others; additional or modified suction points or fans may be required by others at other's expense
- Monthly fan operating cost is approximately each

System Description

The purpose of the system is to maintain a depressurized zone below the designated portion of the sub-slab compared to the ambient air pressure above the slab. The system shall be of the type typically used in radon mitigation, shall be designed and constructed in accordance with the standards detailed in the following documents: US Environmental Protection Agency (EPA) 402-R-93-078, Radon Mitigation Standards; NYS DEC document, Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Actual configurations of the suction holes and pipe runs will be determined by the Contractor in the field.

System Design

1.1 The sub slab depressurization system shall be designed and installed as permanent, integral addition to the buildings.

1.2 The sub slab depressurization unit shall be designed to avoid the creation of other health, safety, or environmental hazards to building occupants, such as back drafting of natural draft combustion appliances.

1.3 The sub slab depressurization unit shall be designed to maximize soil vapor reduction above the basement slab and in consideration of the need to minimize excess energy usage, to avoid compromising moisture and temperature controls and other comfort features, and to minimize noise.

1.4 The sub slab depressurization unit and its components shall be designed to comply with the laws, ordinances, codes, and regulations of relevant jurisdictional authorities, including applicable mechanical, electrical, building, plumbing, energy, and fire prevention codes.

System Installation

General Requirements

2.1.1 All components of the sub slab depressurization unit shall be installed in compliance with the applicable mechanical, electrical, building, plumbing, energy and fire prevention codes, standards, and regulations of the local jurisdiction.

2.1.2 The Contractor shall obtain all required local licenses and permits, and display them in the work areas as required by local ordinances.

2.1.3 Where portions of structural framing material must be removed to accommodate vent pipes, material removed shall be no greater than that permitted for plumbing installations by applicable building or plumbing codes.

2.1.4 Where installation of the sub slab depressurization unit requires pipes or ducts to penetrate a firewall or other fire resistance rated wall or floor, penetrations shall be protected in accordance with applicable building, mechanical, fire, and electrical codes.

Vent Pipe Installation Requirements

2.2.1 All joints and connections in sub slab depressurization unit using plastic vent pipes shall be permanently sealed with adhesives as specified by the manufacturer of the pipe material used. Joints or connections in other vent pipe materials shall be made airtight.

2.2.2 Vent pipes shall be fastened to the structure of the building with hangers, strapping, or other supports that will adequately secure the vent material. Existing plumbing pipes, ducts, or mechanical equipment shall not be used to support or secure a vent pipe.

2.2.3 Supports for vent pipes shall be installed at least every 6 feet on horizontal runs. Vertical runs shall be secured either above or below the points of penetration through floors, ceilings, and roofs, or at least every 8 feet on runs that do not penetrate floors, ceilings, or roofs.

2.2.4 To prevent the blockage of air flow into the bottom of vent pipes, these pipes shall be supported or secured in a permanent manner that prevents their downward movement to the

bottom of suction pits or sump pits, or into the soil beneath an aggregate layer under a slab.

2.2.5 Vent pipes shall be installed in a configuration that ensures that any rain water or condensation within the pipes drains downward into the ground beneath the slab.

2.2.6 Vent pipes shall not block access to any areas requiring maintenance or inspection. Vents shall not be installed in front of or interfere with any light, opening, door, window or equipment access area required by code. If vent pipes are installed in sump pits, the system shall be designed with removable or flexible couplings to facilitate removal of the sump pit cover for sump pump maintenance.

2.2.7 To prevent re-entrainment of vapors, the point of discharge from vents of fan-powered soil depressurization and block wall depressurization systems shall meet all of the following requirements: (1) be above the eave of the roof, (2) be ten feet or more above ground level, (3) be ten feet or more from any window, door, or other opening into conditioned spaces of the structure that is less than two feet below the exhaust point, and (4) be ten feet or more from any opening into an adjacent building. The total required distance (ten feet) from the point of discharge to openings in the structure may be measured either directly between the two points or be the sum of measurements made around intervening obstacles. Whenever possible, the exhaust point should be positioned above the highest eave of the building and as close to the roof ridge line.

Vent Fan Installation Requirements

2.3.1 Vent fans used in the sub-slab depressurization unit shall be designed or otherwise sealed to reduce the potential for leakage of soil gas from the fan housing.

2.3.2 The vent fan system shall be equipped with a vacuum indicator mounted in an easily visible location.

2.3.3 Vent fans shall be installed on the exterior of the building or in the interior above the conditioned air space.

2.3.5 Vent fans shall be installed in a configuration that avoids a condensation buildup in the fan housing. Fans should be installed in vertical runs of the vent pipe.

2.3.6 Vent fans mounted on the exterior of buildings shall be rated for outdoor use or installed in a water tight protective housing.

2.3.7 Vent fans shall be mounted and secured in a manner that minimizes transfer of vibration to the structural framing of the building.

2.3.8 To facilitate maintenance and future replacement, vent fans shall be installed in the vent pipe using removable couplings or flexible connections that can be tightly secured to both the fan and the vent pipe.

Suction Pit Requirement for Sub-slab Depressurization Systems

2.4.1 To provide optimum pressure field extension of the sub slab communication zone, adequate material shall be excavated from the area immediately below the slab penetration point of system vent pipes. The Contractor will make a determination on the adequate amount of material to be removed based on field conditions and experience.

2.5.1 Sump pits that permit entry of soil-gas or that would allow conditioned air to be drawn into a sub-slab depressurization system shall be covered and sealed. The covers on sumps that previously provided protection or relief from surface water collection shall be fitted with a water or mechanically trapped drain. Water traps should be fitted with an automatic supply of priming water.

2.5.2 Openings around vent pipe penetrations of the slab and the foundation walls, shall be cleaned, prepared, and sealed in a permanent, airtight manner using compatible caulks or other sealant materials. (See paragraph 3.5.) Openings around other utility penetrations of the slab, walls, or soil-gas retarder shall also be sealed.

2.5.3 Openings, perimeter channel drains, or cracks that exist where the slab meets the foundation wall (floor-wall joint), shall be sealed with urethane caulk or equivalent material. When the opening or channel is greater than 0.50 inches in width, a foam backer rod or other comparable filler material shall be inserted in the channel before application of the sealant. This sealing technique shall be done in a manner that retains the channel feature as a water control system. Other openings or cracks in slabs or at expansion or control joints should also be sealed. Openings or cracks that are determined to be inaccessible or beyond the ability of the Contractor to seal shall be disclosed to the client and included in the documentation.

Electrical Requirements

2.6.1 Wiring for the subslab depressurization unit shall conform to provisions of the National Electric Code and any additional local regulations.

2.6.2 Wiring may not be located in or chased through the mitigation installation ducting or any other heating or cooling duct work.

2.6.3 Mitigation fans installed on the exterior of buildings shall be hardwired into an electrical circuit. Plugged fans shall not be used outdoors.

2.6.4 If the rated electricity requirement of a sub slab depressurization unit fan exceeds 50 percent of the circuit capacity into which it will be connected, or if the total connected load on the circuit (including the vent fan) exceeds 80 percent of the circuit's rated capacity, a separate, dedicated circuit shall be installed to power the fan.

2.6.5 An electrical disconnect switch or a circuit breaker shall be installed in sub slab depressurization unit fan circuits to permit deactivation of the fan for maintenance or repair by the building owner or servicing Contractor (Disconnect switches are not required with plugged fans).

Materials

3.1 All mitigation system electrical components shall be U.L. listed or of equivalent specifications.

3.2 All plastic vent pipes in mitigation systems shall be made of Schedule 40 PVC.

3.3 Vent pipe fittings in a mitigation system shall be of the same material as the vent pipes. (See paragraph 2.3.7 for exception when installing vent fans, and paragraph 2.2.7 for exception when installing vent pipes in sump pit covers.)

3.4 Cleaning solvents and adhesives used to join plastic pipes and fittings shall be as recommended

by manufacturers for use with the type of pipe material used in the mitigation system.

3.5 When sealing cracks in slabs and other small openings around penetrations of the slab and foundation walls, caulks and sealants designed for such application shall be used.

3.6 When sealing holes for plumbing rough-in or other large openings in slabs and foundation walls that are below the ground surface, non-shrink mortar, grouts, expanding foam, or similar materials designed for such application shall be used.

3.7 Sump pit covers shall be made of durable plastic or other rigid material and designed to permit airtight sealing. To permit easy removal for sump pump servicing, the cover shall be sealed using silicone or other nonpermanent type caulking materials or an airtight gasket.

3.8 Penetrations of sump covers to accommodate electrical wiring, water ejection pipes, or vent pipes shall be designed to permit airtight sealing around penetrations, using caulk or grommets. Sump covers that permit observation of conditions in the sump pit are recommended.

3.9 A sub membrane depressurization system made be installed in crawlspaces and on soil exposed basements and shall be a minimum of 6 mils (3 mils cross-laminated) polyethylene or equivalent flexible material. Heavier gauge sheeting should be used when areas are used for storage, or frequent entry is required for maintenance of utilities.

Post-Mitigation Testing

4.1 After installation, the Contractor shall reexamine and verify the integrity of the fan mounting seals and all joints in the interior vent piping.

4.2 After installation, the Contractor shall measure suctions or flows in system piping or ducting to assure that the system is operating as designed. A test of pressure field extension shall be performed using established test points. The Contractor shall test the vacuum achieved at each test hole by using a digital manometer, document the findings and prepare a report for the client.

Worker Health and Safety

5.1 Contractors shall comply with all OSHA, state and local standards or regulations relating to worker safety and occupational vapor exposure.

5.2.1 In addition to the OSHA and NIOSH standards, the following requirements that are specific or uniquely applicable for the safety and protection of vapor mitigation workers shall be met:

5.2.2 The Contractor shall have a worker protection plan on file that is available to all employees and is approved by any state or local regulating agencies that require such a plan.

5.2.3 The Contractor shall ensure that appropriate safety equipment such as hard hats, face shields, ear plugs, steel-toe boots and protective gloves are available on the job site during cutting, drilling, grinding, polishing, demolishing or other activity associated with vapor mitigation projects.

5.2.4 All electrical equipment used during mitigation projects shall be properly grounded. Circuits used as a power source should be protected by Ground-fault Circuit Interrupters (GFCI).

5.2.5 When work is required at elevations above the ground or floor, the Contractor shall ensure that ladders or scaffolding are safely installed and operated.

5.2.6 The Contractor shall ensure that respiratory protection conforms with the requirements in the NIOSH Guide to Industrial Respiratory Protection.

5.2.7 Where combustible materials exist in the specific area of the building where vapor mitigation work is to be conducted, and the Contractor is creating temperatures high enough to induce a flame, the Contractor shall ensure that fire extinguishers suitable for type A, B, and C fires are available in the immediate work area.

5.2.8 In any planned work area where the Contractor or Consultant believes friable asbestos may exist and be disturbed, vapor mitigation work shall not be conducted until a determination is made by a properly trained or accredited person that such work will be undertaken in a manner which complies with applicable asbestos regulations.

5.2.10 When mitigation work requires the use of sealants, adhesives, paints, or other substances that may be hazardous to health, Contractors shall provide employees with the applicable Material Safety Data Sheets (MSDS) and explain the required safety procedures.

End of proposed work plan

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