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New York State Electric & Gas

Sub-Slab Depressurization System Operation, Monitoring & Maintenance Plan

Geneva Former MGP Site
Geneva, New York

February 2011

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New York State Electric & Gas Corporation

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1. Introduction

This *Operation, Maintenance and Monitoring Plan* (OM&M Plan), prepared by ARCADIS on behalf of New York State Electric and Gas Corporation (NYSEG), presents the methods to be used to continually implement, maintain, and monitor the sub-slab depressurization system (SSDS) installed in April 2009 (Figure 1). As described in the *Vapor Intrusion Evaluation Summary Report* (ARCADIS 2010) the primary objective of SSDS system is to reduce/eliminate the potential for BTEX and naphthalene to enter into the occupied portions of the building from below the floor slab. This OM&M Plan describes the methods to be used to continually implement, maintain and monitor the SSDS, and will be provided to the current site owner to facilitate their operation and maintenance of the SSDS.

1.1 OM&M Plan Objectives

As required by the Draft DER-10 *Technical Guidance for Site Investigation and Remediation* (New York State Department of Environmental Conservation [NYSDEC], 2004), this OM&M Plan presents the site-specific program developed to operate, maintain and monitor the SSDS. Accordingly, this OM&M Plan:

- describes the installation and function of the SSDS
- describes the process for maintaining and monitoring the SSDS
- provides instructions for the owner or tenant to check if a SSDS is operating
- lists appropriate actions for the owner or tenant to take if a SSDS warning device (manometer) indicates system degradation or failure
- describes the proper operating procedures for the SSDS, including manufacturer's operation and maintenance instructions and warrantees

1.2 Site Description

The City of Geneva's Public Safety Building (PSB) is located at 255 Exchange Street in Geneva, New York and is partially located on property formerly occupied by a manufactured gas plant (MGP). The vapor intrusion evaluation was initially conducted in 2007 as an element of the remedial investigation of the former MGP, known formally as the Wadsworth Street former MGP site (the site). Follow-up remedial activities and additional vapor intrusion evaluations have been conducted in 2008 & 2009.

Based on results of the vapor intrusion mitigation assessment performed at the PSB and discussions with NYSDEC and NYSDOH, NYSEG has requested that ARCADIS address vapor intrusion concerns at the facility as described in the Vapor Intrusion Mitigation Evaluation Report prepared by ARCADIS dated May 7, 2008.

A SSDS is a mechanical system that creates a lower pressure beneath a floor slab relative to indoor air. This low pressure is created by a fan and a series of piping and slab penetrations. The system is intended to reduce potential vapor migration from the substructure to indoor air. For the PSB, this system is intended to reduce the potential for BTEX and naphthalene to adversely impact PSB indoor air quality through soil vapor intrusion. A SSDS was designed for the northwest quadrant of the facility consistent with the Guidance for Evaluating Soil Vapor Intrusion in the State of New York dated October, 2006. The SSDS was installed in accordance with the NYSDOH and NYSDEC approved Work Plan.

2. Description of the SSDS

2.1 Installation of the Sub-Slab Depressurization System

NYSEG retained Envirotesting (a National Environmental Health Association-certified radon mitigation contractor) to install the SSDS in the PSB to mitigate potential vapor intrusion conditions. The SSDS consists of a fan-powered vent and piping to draw vapors from sub-slab soils (i.e., essentially creating a vacuum beneath the slab) and discharging the vapors to the atmosphere. The SSDS installation included sealing expansion joints, cracks and penetrations, as well as installing and operating venting systems in accordance with the United States Environmental Protection Agency (USEPA) radon mitigation standard 402-R93-078.

The primary objective of the SSDS is to reduce/eliminate the potential for BTEX and naphthalene to enter into the occupied portions of the building from below the floor slab. The SSD system creates a vacuum beneath the floor slab, resulting in lower air pressure beneath the slab relative to indoor air pressure. The SSD system was designed consistent with Section 4 of the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York dated October, 2006.

In addition to a typical SSDS design and installation, a HVAC and exhaust system air balance was completed. During the air balance activities, adjustments were made to system set-points to maintain a balanced or slightly positive pressure within the building relative to the subslab. It is necessary to maintain the adjustments and setpoints for the effective operation of the SSDS design.

2.2 SSDS Components

The SSDS consist of four major components (see Figure 1 for a generalized system profile), which include:

- RadonAway™ GP-501 centrifugal in-line fans with an approximate 0 to 95 cubic feet per minute (cfm) flow at 0 to 4 inches of water vacuum (see Attachment A for a RadonAway™ GP Series Fans Information Sheet)

- 4-inch-diameter, Schedule 40 polyvinyl chloride (PVC) pipe installed a minimum of 1 inch below the concrete floor slab to conduct soil vapor vertically from below the slab to the in-line fan

- appropriate brackets to attach piping to building columns, walls and other areas
- manometer (u-tube type) at each suction end of the system, to obtain pressure readings

2.2.1 SSDS Installation

The SSDS was installed as shown on Figure 1, consistent with the generalized system profile also shown on Figure 1. Each SSDS consists of a 4-inch-diameter PVC pipe installed a minimum of 1 inch below the concrete floor slab to conduct soil vapor vertically from below the slab to the in-line fan. Soil vapor is then carried through a 4-inch-diameter PVC discharge pipe mounted to building columns and discharged at the following approximate locations:

- 12 inches above the roof line
- 10 feet above ground level
- 10 feet away from any opening that is less than 2 feet below the exhaust point
- 10 feet from any adjoining or adjacent buildings, intakes or supply registers

In addition, the in-line fan and discharge piping were not located in or below an occupied area of the buildings.

2.3 SSDS Startup and Continuous Operation

The SSDS has continued to operate with minimal, if any, interruptions. Operating information through March 2010 is included in the *Vapor Intrusion Evaluation Summary Report* (ARCADIS 2010). Similar documentation will be presented in subsequent annual reports, as defined in this OM&M Plan.

3. SSDS Operation, Monitoring and Maintenance

This section discusses proper operation and routine and non-routine maintenance procedures for the SSDS, based on the NYSDOH guidance (2006) and manufacturer's information (Attachments A and B). In addition to the routine OM&M activities described in this section, the building's owner will also be given information packages that explain SSDS operation, maintenance and monitoring. Therefore, at any time during SSDS operation, the building's owner or tenants may check that the SSDS is operating properly.

3.1 Routine Operation

The SSDS should run continuously and only be shut down in case of emergency. During normal operation, the u-shaped manometer should show a differential pressure (indicated by a difference in height between the two sides of the manometer) of 1 to 4 inches of water. This indicates that sub-slab depressurization is continuing to be maintained.

The SSDS was clearly labeled to avoid accidental modifications or changes to the system that could disrupt its function. Possible signs that the SSDS may not be functioning properly include:

- Lack of adequate pressure differential, as indicated by less than 1 inch difference in fluid level height on the u-shaped manometer. In this way, the manometer acts as a warning device.
- Excessive noise and/or vibration, or unusual sounds (e.g., hissing from air escaping through the piping).
- System components that become loose, cracked or broken.

Other conditions that may require SSDS maintenance or modification include:

- A change in the work pattern, such that the SSDS could be struck by equipment, or is otherwise in the way daily building activities.
- Repairs/alteration/penetrations that are made to the floor or walls near any portion of the SSDS.
- New/additional gas combustion or vented appliances are installed.

- New/additional air intake vents associated with the HVAC are installed.
- Modifications to the existing HVAC or powered exhaust systems and system setpoints.

3.2 Routine Monitoring

Monitoring frequency will continue every 18 months. 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 (i.e., within 10 feet in any direction).
- identification and subsequent repair of any leaks
- audible operational status check of the fan to verify the fan's operational performance
- verification of differential pressure between the indoor air and the sub-slab to maintain a lower pressure in the sub-slab relative to indoor ambient air, as indicated by the manometer on the fan suction pipe
- verification that the variable speed switches for the powered exhaust systems properly adjusted.

Table 1 provides a checklist for SSDS monitoring.

Repairs or adjustments will be made to the system as appropriate. If appropriate, design parameters of the system will be verified (as may be the case following building renovations), and the system will be recommissioned.

4. Documentation

This section summarizes the documentation required for SSDS OM&M.

4.1 OM&M Forms

As described in Section 3, field forms (Table 1) will be used to document the frequency and content of periodic SSDS inspections. These forms will be kept in the project files and will be included in the Inspection Report.

4.2 Routine Certification

The SSDS is considered an engineering control, and submission of a routine system inspection summary to the NYSDEC is required.

4.3 Inspection Report

In addition to the required certification described in Section 4.2, the Inspection Report will also include:

- summary of the SSDS monitoring program, including frequency and relevant findings
- summary of any SSDS-related routine or non-routine maintenance completed during the preceding year
- field forms will be included in an Appendix of the Inspection Report

5. Conclusions

This OM&M Plan provides the requirements for the ongoing operation, maintenance and routine (every 18 months) inspections of the SSDS. The SSDS will continue to operate under the OM&M Plan until such time when NYSDEC and NYSDOH determine that it is no longer necessary.

6. References

ARCADIS. 2010. *Vapor Intrusion Evaluation Summary Report*. Prepared for New York State Electric and Gas Corporation, Geneva, New York (March 2010).

New York State Department of Environmental Conservation. 2004. Draft DER-10 *Technical Guidance for Site Investigation and Remediation*.

New York State Department of Health. 2006. *Guidance for Evaluating Soil Vapor Intrusion in the State of New York, Decision Matrices*, October 2006 (and Draft February 2005).