nationalgrid

**James F. Morgan**
Lead Senior Environmental Engineer
Environmental Department

February 13, 2009

Mr. Anthony Karwiel
Remedial Bureau C, 11th Floor
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7014

Re: National Grid
Erie Boulevard Former MGP Site
Syracuse, New York
Site No. 734060
Vapor Intrusion Investigation Report

Dear Mr. Karwiel:

Please find the enclosed *Vapor Intrusion Investigation Report* prepared by ARCADIS for the above-referenced project. The enclosed report summarizes the work performed and results obtained for the vapor intrusion investigation performed at the Erie Boulevard former manufactured gas plant site in November 2008.

Please do not hesitate to call me at (315) 428-3101 or Mr. John C. Brussel, P.E. of ARCADIS at (315) 671-9441 if you have any questions or require additional information.

Sincerely,

James F. Morgan

James F. Morgan
Lead Senior Environmental Engineer

cc: George Heitzman, P.E., NYSDEC
Richard Jones, NYSDOH
Charles Willard, National Grid (w/o enclosure)
Richard Capozza, Hiscock & Barclay
James Nuss, P.E., ARCADIS
John Brussel, P.E., ARCADIS



Environmental Department, 300 Erie Boulevard West, Syracuse, New York 13202
T: (315) 428-3101 ■ F: (315) 460-9644 ■ James.F.Morgan@us.ngrid.com ■ www.nationalgrid.com

ARCADIS
*Infrastructure, environment, buildings*

Imagine the result

**National Grid**

# Vapor Intrusion Investigation Report

Erie Boulevard Former MGP Site
Syracuse, New York

February 2009

ARCADIS

# Vapor Intrusion Investigation Report

Erie Boulevard Former MGP Site
Syracuse, New York

Prepared for:
National Grid

Prepared by:
ARCADIS
6723 Towpath Road P.O. Box 66
Syracuse
New York 13214-0066
Tel 315.446.9120
Fax 315.449.4111

Our Ref..
B0036694.0001 #10

Date:
February 2009

# Table of Contents

## Tables



## Figures



## Appendices



## Compact Disc

# 1. Introduction

This report summarizes the results of the vapor intrusion (VI) investigation performed at the National Grid former manufactured gas plant (MGP) located on Erie Boulevard in Syracuse, New York (the "site"). The VI investigation was implemented to evaluate the following:

- The potential presence, concentration, and distribution of MGP-related volatile organic compounds (VOCs) and other non MGP-related VOCs in soil vapor below certain existing onsite buildings (hereafter, "sub-slab vapor").

- The potential for vapor intrusion into existing onsite buildings.

The VI investigation consisted of a building reconnaissance, product inventory, and sub-slab vapor and indoor air sampling in Buildings B, C, and D. The VI investigation focused on these buildings because they: (1) were built over the former locations of MGP holders/ structures; (2) are near soil boring locations where non-aqueous phase liquid (NAPL) has been identified; (3) are near locations where MGP-related VOCs have been identified in soil and groundwater; and/or (4) have relatively large basement areas that extend several feet below grade.

The VI investigation field activities were implemented by ARCADIS in November 2008. The activities were implemented in accordance with the work plan contained in an October 27, 2008 letter from National Grid to the New York State Department of Environmental Conservation (NYSDEC) ("the VI Work Plan"). NYSDEC approval of the work plan was provided in a letter to National Grid dated November 5, 2008.

The laboratory analytical data report presenting results of the VI investigation was previously submitted to the NYSDEC and the New York State Department of Health (NYSDOH) in an e-mail correspondence from ARCADIS dated December 9, 2008.

## 1.1 Report Organization

The report is organized as follows:

| Section | | Purpose |
|---|---|---|
| Section 1 - | Introduction | Presents a brief overview of the VI investigation and relevant site background information. |
| Section 2 - | Vapor Intrusion Investigation Activities | Describes work activities performed as part of the VI investigation. |

| Section | | Purpose |
|---|---|---|
| Section 3 - | Vapor Intrusion Investigation Results | Summarizes the results obtained from the VI investigation field activities. |
| Section 4 - | Conclusion and Recommendations | Presents conclusions and recommendations based on the investigation results. |
| Section 5 - | References | Presents references used in preparing this report. |

### 1.2 Background

The location of the Erie Boulevard former MGP site is shown on Figure 1. The former MGP occupied approximately 10 acres of land within a heavily urbanized area of Syracuse, New York. The site is within a city block bounded by West Genesee Street to the north, Erie Boulevard to the south, North Franklin Street to the east, and Onondaga Creek to the west. The National Grid Syracuse office complex currently occupies the site and consists of four adjoining multi-story office buildings (Buildings A through D), a separate two-story office building (Building F), and a guard house. The remainder of the site is covered by driveways, paved parking lots, concrete sidewalks, and landscaped areas. The site layout is shown on Figure 2.

The MGP at the site was constructed in 1849 and operated until 1933. Construction of the existing office buildings began in 1926 with the construction of a building in the northwestern corner of the property for the Syracuse Board of Education (this is now Building F). Construction of the main building at the site (Building A) began in 1931. Around the same time, a parking garage was built in the northern portion of the site, incorporating the western foundation wall of a former gas holder (Holder No. 3, as shown on Figure 2). Portions of the parking garage and the former holder foundation were later incorporated into construction of Building D. The last gas holders were removed by 1950.

A number of previous environmental investigations have been performed to evaluate potential impacts related to the former MGP. These investigations included the Preliminary Site Assessment/Interim Remedial Measure (PSA/IRM) Study performed between 1995 and 1997, the Remedial Investigation (RI) performed between 2000 and 2003, the Supplemental RI performed in 2006 and 2007, and the Final RI performed in 2008. These investigations evaluated the presence and extent of MGP-related impacts in soil, soil vapor, groundwater, surface water, and sediment at and near the site. The results of the investigations are summarized in the NYSDEC-approved *Final Remedial Investigation Report* (ARCADIS, September 2008).

Based on the investigations, it was determined that MGP residuals are present in subsurface soil, groundwater, and soil vapor at the site, primarily beneath the parking lot west of Buildings B, C, and D. Coal tar dense non-aqueous phase liquid (DNAPL) was identified in a number of soil borings drilled in that area. Subsurface soil samples collected from several of those borings contained benzene, toluene, ethylbenzene, and xylenes (BTEX compounds) and polycyclic aromatic hydrocarbons (PAHs) at concentrations exceeding commercial use soil cleanup objectives. Groundwater in the western portion of the site was also found to contain BTEX and PAHs at concentrations exceeding groundwater quality standards and guidance values. Certain VOCs, including BTEX, were identified in soil vapor at permanent soil vapor probes installed at locations across the property. The VOC concentrations in soil vapor samples collected from depths near the building foundations appeared to be generally consistent with typical background indoor air values.

Based on the detection of VOCs in the soil vapor samples, the NYSDOH requested that a VI investigation be performed to evaluate if vapors extend below the buildings at the site and could potentially be entering the buildings. The NYSDOH requested that the VI investigation be performed after the Fall 2008 "heating season" got underway (i.e., after November 15$^{th}$).

## 2. Vapor Intrusion Investigation Activities

### 2.1 General

This section presents a description of the field activities performed as part of the VI investigation, including:

- Building Reconnaissance and Product Inventory
- Sub-Slab Vapor Sampling
- Indoor Air Sampling
- Outdoor Air Sampling

A discussion of the building reconnaissance and product inventory is presented below, followed by a discussion of the sub-slab vapor and indoor/outdoor air sampling activities.

### 2.2 Building Reconnaissance and Product Inventory

ARCADIS completed building reconnaissance and product inventory activities inside Buildings B, C, and D on November 17 and 18, 2008. The activities focused on the lowest floor of each building (i.e., the main floor of Building B and the basements of Buildings C and D).

The building reconnaissance was performed to: (1) observe the layout and construction of each building; (2) identify floor penetrations, cracks, or other preferential pathways where VOCs, if present in the subsurface, could potentially enter the buildings; and (3) select final sub-slab vapor and indoor air sampling locations. The NYSDOH accompanied National Grid and ARCADIS during a walkthrough of the buildings on November 17, 2008 and participated in the selection of sampling locations. As part of the reconnaissance, ARCADIS used a photoionization detector (PID) capable of measuring VOCs at the parts per billion level (i.e., a ppbRAE) to evaluate the potential presence of VOCs migrating through the observed potential pathways.

The product inventory was performed to document products containing VOCs (or potentially containing VOCs) that are used, handled, or stored in the buildings. ARCADIS used the ppbRAE to evaluate the presence of VOCs originating from storage containers/vessels and other potential sources inside the buildings.

As part of these activities, ARCADIS also met with personnel from National Grid's facilities department to discuss the types of heating and ventilation systems used in the buildings.

Results of the reconnaissance and product inventory for each building were documented on the NYSDOH Indoor Air Quality Questionnaire and Building Inventory form (Appendix B to the NYSDOH document titled *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, dated October 2006 [hereinafter, "the NYSDOH VI Guidance"]). The completed form is included in Appendix A of this report. Drawings showing the building layouts with notes from observations made during the reconnaissance are included in Appendix B. Representative photographs taken inside the buildings are included in Appendix C. The approximate locations where the photographs were taken are shown on the drawings in Appendix B.

### 2.3 Sub-Slab Vapor, Indoor Air, and Outdoor Air Sampling

Sub-slab vapor and indoor/outdoor air sampling were performed following completion of the building reconnaissance and product inventory. Temporary sampling probes were installed at each sub-slab vapor sampling location on November 18, 2008 (with one exception, as discussed below in Subsection 2.3.1). Samples were collected concurrently on November 19, 2008 from a total of 10 sub-slab vapor sampling locations, 7 indoor air sampling locations (each indoor air sampling location was paired with a sub-slab vapor sampling location), and one outdoor air sampling location. The sub-slab vapor and indoor air sampling locations were selected to provide coverage in/below the lowest occupied level of each building. The outdoor (ambient) air sample was collected from a location that was generally upwind of the buildings.

The sub-slab vapor and indoor air samples were designated by the prefix "SSV-" (for sub-slab vapor) and "IA-" (for indoor air), followed by a letter designating the building ("B", "C", or "D") and unique number. The outdoor air sample was designated "AA-1". The sub-slab vapor and indoor/outdoor air sampling locations are shown on Figure 2 and on the floor plans included in Appendix B. The sub-slab vapor and indoor air sampling locations and corresponding floor elevations are identified in Table 1.

Details of the sub-slab vapor probe installation and sampling activities are presented below.

#### 2.3.1 Temporary Sub-Slab Vapor Probe Installation

The sub-slab vapor probes were installed in accordance with the procedures approved by the NYSDEC and NYSDOH that are presented in the VI Work Plan. Probes were installed

at all, but one sub-slab vapor sampling location inside the buildings. A temporary sub-slab vapor sampling probe was not needed or installed at location SSV-D4 because it was determined that the "sub-slab" sample could be collected from a crawl space identified below the eastern portion of Building D during the building reconnaissance. The crawl space had an earthen floor and was of sufficient size for entry to collect sample SSV-D4. Although the crawl space also extended below sampling location SSV-D5, there was insufficient room for access in that area, and a conventional probe was installed instead.

Each probe was installed by coring through the floor slab using a hammer drill equipped with a ½-inch or ¾-inch diameter pulverizing bit, and then inserting a section of ¼-inch inside diameter Teflon®-lined polyethylene tubing into the corehole. The drill bit was advanced an additional 1½ to 5 inches into the sub-slab material (where encountered) to create an open cavity. The tubing was extended 1 inch below the bottom of the concrete floor slab at all probe locations, except location SSV-D5, where the tubing was extended more than 1 foot below the bottom of the concrete floor slab into the crawl space. At each probe location, the annular space between the tubing and the corehole was sealed using: (1) modeling clay at the base of the corehole; (2) melted beeswax over the modeling clay to within an inch of the concrete surface; and (3) modeling clay over the beeswax at the surface. The exposed end of the sample tubing was sealed with melted beeswax and by crimping the tubing.

### 2.3.2 Sub-Slab Vapor Purging

Purging was performed at each sub-slab vapor probe on November 19, 2008 (one day following probe installation and immediately prior to sampling). Purging was performed to remove atmospheric air from each sub-slab vapor probe. At least 2 to 3 "implant" volumes (the interior volume of the tubing at each sub-slab vapor probe location) were purged from each probe using a gas-tight syringe. The purging was performed at a flow rate of less than 200 milliliters per minute (mL/min). Purge air collected in the syringe was discharged outdoors.

A tracer gas (helium) was used in connection with the purging activities to provide a means to evaluate the integrity of the seals around the sub-slab vapor probe at two representative locations (locations SSV-D1 and SSV-B2). A small enclosure was placed over each probe, and helium was introduced into the enclosure. The helium levels in the enclosure (prior to purging) and in the vapor extracted through the sample tubing (during purging) were measured using a gas detector. Helium levels in connection with the purging are presented on the sampling logs included in Appendix D.

Helium was not detected in the purge gas at sampling location SSV-D1. Based on the detection of helium in the initial purge gas at sampling location SSV-B2 at approximately 0.61% (equivalent to 6,111 parts per million), the seals around the sub-slab vapor probe were replaced. This was done as a conservative measure (the helium reading was well-below the 10% threshold identified in Section 2.7.5 of the NYSDOH VI Guidance). Helium was detected in the purge gas following the seal replacement at a lower concentration of 0.38%. Field personnel suspected that the helium may have entered the sub-slab vapor probe through cracked floor tiles observed around the sampling location.

### 2.3.3 Sub-Slab Vapor Sampling

Following purging, sub-slab vapor samples were collected concurrently from each sampling location over an approximate 8 hour period. Each sample was collected using a 6-liter SUMMA® canister with an attached flow regulator pre-set to draw vapor at approximately 12.5 mL/min. The pre-cleaned (batch-certified) canisters were provided by the laboratory with an initial vacuum of at least 28 inches of mercury (in. of Hg). When canister vacuums reached between 3.5 and 6.0 in. of Hg, the valves on the SUMMA® canisters were closed, leaving a vacuum in the canisters as a means for the laboratory to verify that the canisters did not leak while in transit. Vacuum readings obtained prior to and at the end of sampling are presented on the soil vapor sampling logs included in Appendix D. Representative photographs taken during purging and sampling are included in Appendix E.

Two duplicate sub-slab vapor samples were collected in support of the VI investigation. The duplicate samples (samples DUP-1 and DUP-2) were collected at sampling locations SSV-B1 and SSV-D1, respectively. The sub-slab vapor samples and duplicate samples were delivered to TestAmerica Laboratories, Inc. (TestAmerica) of Knoxville, Tennessee for laboratory analysis for NYSDEC Target Compound List (TCL) VOCs and select supplemental VOCs in accordance with United States Environmental Protection Agency (USEPA) Compendium Method TO-15.

The sub-slab vapor sampling probes were removed following sample collection, and the core holes at each location were filled with cement grout.

### 2.3.4 Indoor and Outdoor Air Sampling

One to three indoor air samples were collected from each building and one outdoor air sample was collected west of Building D (generally upwind from the building) over an 8-hour sampling period, concurrent with the collection of sub-slab vapor samples. Consistent with the sub-slab vapor sampling approach, the indoor air and outdoor air samples were

collected using 6-liter SUMMA® canisters with an attached flow regulator set to draw air at 12.5 mL/min. The valve on each canister was closed when the canister vacuum reached approximately 2.5 to 5.5 in. of Hg. Each indoor and outdoor air sample was delivered to TestAmerica and analyzed for VOCs on the project-specific analyte list. The analysis was performed in accordance with USEPA Compendium Method TO-15. Conditions encountered during the indoor and outdoor air sampling are identified on the sampling logs included in Appendix D.

# 3. Vapor Intrusion Investigation Results

## 3.1 General

This section summarizes the results obtained for the vapor intrusion investigation, including findings from the building reconnaissance and product inventory, and analytical results obtained for the sub-slab vapor, indoor air, and outdoor air sampling.

## 3.2 Building Reconnaissance and Product Inventory Findings

Key findings from the building reconnaissance and product inventory are summarized below. For additional details, refer to the questionnaire/inventory forms, building layout drawings, and photographs presented in Appendices A, B, and C, respectively.

### 3.2.1 Building and Product Use

The layout of the lowest occupied level of each building and observations made during the reconnaissance are presented in Appendix B. Detailed product inventory information for each building is presented in Table 2. A general description of each building and its use is presented below.

- Building B is a 4-story structure comprised mainly of office space on the upper floors and office space, a fitness area, stock rooms/storage areas, shipping/receiving areas (loading docks), and garage areas on the main floor. Based on the land topography around Building B (the ground slopes downward from south to north), the main floor of the structure is generally a few feet below grade on the Erie Boulevard side and several feet above grade on most of the opposite side, except where loading/receiving areas slope downward to meet the driveway areas. A small mechanical room (boiler room) located at the south end of the building has a floor that is recessed a few feet below the main floor (and several feet below grade).

- Building C consists of a raised office structure located above at-grade vehicle parking, a small credit union, and various driveways. The credit union sits atop a basement referred to as the "Building C core" that extends an estimated 15 feet or more below grade and houses mechanical equipment (boilers, pumps, and other machinery) and electric service for the building.

- Building D is a 3-story structure comprised mainly of office space on the main floor and upper floors, and offices, a copy center, record/map storage, and mechanical room in

the basement. The floor in the eastern half of the basement (the location of the copy center) is generally 3 to 5 feet below the surrounding grade and is underlain via an earth-lined crawl space. The floor in the western half of the basement is approximately 10 feet below the surrounding grade and is directly over the sub-base materials. The two halves of the basement are connected via a ramp.

Maintenance vehicles, various equipment (e.g., forklift, small loader, chain saw, leaf blower, etc.), and a generator are stored inside the garage areas along the northeast end of Building B. Supplies such as motor oil, cleaners, propane, paint, fuel, and adhesives used in connection with facility operation/maintenance were observed in various storage rooms and garage areas in the northeastern portion of Building B. Minimal product storage was observed in Buildings C and D as compared to Building B.

The offices on the main and upper floors of Building B are typically occupied throughout the workday, while other areas along the main floor of the building are occupied only for part of the workday. The Building C core and the western half of the Building D basement (the record/map storage room and mechanical room) are occupied occasionally for maintenance of the building heating and ventilation systems and for accessing records, maps, or other items stored in the Building D basement. The copy center in the Building D basement and the upper levels of Buildings C and D are typically occupied throughout the workday.

### 3.2.2 Building Heating and Ventilation

Based on discussions with National Grid's facilities personnel and observations during the building reconnaissance, the heating and ventilation systems in Buildings B, C, and D, for the most part, are separate and independent from one another. The buildings are heated via a combination of methods, including indirect natural gas-fired components/forced air systems, natural gas-fired boilers/hot water circulation (steam radiation), and inlet electric heaters. Central air conditioning units located atop the roof of each building provide the source for cooling within the buildings.

Outside makeup air is introduced and circulated throughout each building during the heating and cooling seasons. Outside makeup air from the roof of Buildings B and C is mixed with re-circulated indoor air and distributed throughout most of each building. The outside makeup air for the Building C credit union is drawn from a separate source that consists of intakes at ground level. The makeup air for Building D is provided by several small commercial units that draw outside air directly through the exterior walls of the building and also heat and cool the air

### 3.2.3 Potential Pathways and Indoor Sources

The lowest level of each building was the primary focus for an assessment of potential soil vapor intrusion pathways. The floors at the lowest level of each building are constructed of poured concrete that ranges from approximately 6 to 12 inches in thickness. The poured concrete is covered by tile throughout much of the Building B main floor and by tile or carpet in parts of the eastern half of the Building D basement. The poured concrete floor in the remaining portions of the Building D basement, the Building C core, and the Building B storage rooms, shipping/receiving areas, and garage areas, is bare, painted, or covered with an epoxy sealant. An earthen floor is located below a crawl space that opens into the mechanical room at the west end of the Building D basement. The walls of each building are constructed of poured concrete, concrete block, or brick. The walls and concrete flooring in each building were generally observed to be in good condition.

Observations specific to each building are summarized below:

- *Building B*: Various sumps, cracked tiles, and other small penetrations and cracks in the concrete flooring where observed throughout the main floor of Building B. No PID readings above 0.0 parts per billion (ppb) were detected in areas where cracked/broken tile and cracks in exposed concrete floor were observed. Elevated PID readings were observed near the equipment/container storage areas. The highest PID readings were observed in the stock room near a shelf storing paints, oils, solvent, lubricants, and propane. Elevated PID readings were also observed near chemicals and oils in other areas of the facility storage room.

- *Building C*: Various sumps and drains were observed in the Building C basement, including a manhole with a grated cover in the northwest corner of the basement. Cracks were also observed in the concrete floor in certain areas. A background PID reading greater than 0.0 ppb was observed throughout the basement. A PID reading approximately 100 ppb above background was observed near an oil storage cabinet.

- *Building D*: Floor drains were observed in the concrete and tile-covered floor in the Building D basement. Cracks were observed along control joints and in other areas of the concrete floor in the record/map storage area. Elevated background PID readings were observed throughout the Building D basement. Analytical results for the indoor air samples from the basement (discussed below) support that the elevated PID readings are unrelated to the subsurface. The readings may be associated with humidity or a source inside the basement such as blueprints/drawings. Ammonia is commonly

related to blueprints and certain drawings and is detectable by the ppbRAE, but was not included on the sub-slab vapor/indoor air VOC analyte list.

PID readings obtained in the buildings, including near equipment/product containers, are presented in Table 2 and identified on the drawings in Appendix B.

### 3.3 Sub-Slab Vapor and Indoor/Outdoor Air Analytical Results

Laboratory analytical results for the sub-slab vapor, indoor air, and outdoor air samples are presented in Table 3. The results have been validated by ARCADIS. The data validation report and full laboratory analytical data report, with NYSDEC Analytical Services Protocol (ASP) Category B data deliverable-type package, are included on the attached compact disc.

A summary of the sub-slab vapor analytical results is presented below, followed by a summary of the indoor and outdoor air analytical results.

#### 3.3.1 Sub-Slab Vapor Analytical Results

The NYSDEC has not established standards, criteria, or guidance values for VOCs in sub-slab vapor. Observations made based on review of the sub-slab vapor analytical results, including comparison of the results to the 90$^{th}$ percentile of background indoor air values observed by the USEPA in a study of public and commercial office buildings, per USEPA database information referenced in section 3.2.4 of the NYSDOH VI Guidance (i.e., "NYSDOH-published background indoor air values"), are summarized below.

- One or more VOC constituents were identified in the sub-slab vapor samples collected at each sampling point. Most of the VOCs identified in the sub-slab vapor are unrelated to or not necessarily related to former MGP operations.

- The VOC concentrations detected at three sub-slab vapor sampling locations (locations SSV-B1, SSV-D3, and SSV-D5) were all less than the NYSDOH-published background indoor air values.

- The concentrations of selected VOCs detected at the remaining sub-slab vapor sampling locations were greater than the NYSDOH-published background indoor air values, but not by more than one order of magnitude. Results for all corresponding (paired) indoor air samples (with two exceptions, as discussed below) were less than the NYSDOH-published background indoor air values.

### 3.3.2 Indoor Air Analytical Results

Based on review of the indoor air analytical results, MGP-related VOCs were not identified in any of the indoor air samples at concentrations exceeding typical background indoor air values. Non-MGP related VOCs were identified at two indoor air sampling locations at concentrations slightly greater than the typical background indoor air values, but the concentrations at these sampling locations are less than the NYSDOH air guideline values presented in Table 3.1 of the NYSDOH VI Guidance, as follows:

- *Location IA-B3 (Facilities Department Storage Room on the Main Floor of Building B)* – Methylene chloride and trichloroethylene (TCE) were identified at this sampling location at concentrations of 11 µg/m$^3$ and 4.9 µg/m$^3$. The background indoor air values for these constituents are 10 µg/m$^3$ and 4.2 µg/m$^3$, respectively, and the NYSDOH air guideline values for these constituents are 60 µg/m$^3$ and 5 µg/m$^3$, respectively. Note that various products containing VOCs used for facilities operations were identified in storage in this room. The indoor air concentrations identified in the Facilities Department Storage Room are less than NYSDOH air guideline values.

- *Location IA-D4 (Copy Room in the Building D Basement)* – Methylene chloride was identified at this sampling location at a concentration of 36 µg/m$^3$. This is greater than the 10 µg/m$^3$ background indoor air value but less than the 60 µg/m$^3$ NYSDOH indoor air guideline.

No other VOCs besides methylene chloride and TCE were identified in the indoor air samples at concentrations exceeding the background indoor air values.

### 3.3.3 Outdoor Air Analytical Results

Several VOCs were detected in the outdoor air sample, but the concentrations were all below the typical background indoor air values. Several of the VOCs identified in the outdoor air sample were identified at similarly low levels in the indoor air samples.

## 4. Conclusions and Recommendations

The validated analytical results for the sub-slab vapor and indoor/outdoor air samples support that conclusion that (1) there is no confirmed soil vapor intrusion pathway; and (2) the VOCs detected in the indoor samples are operationally-related (not MGP-related) and less than the NYSDOH air guideline values. The low concentrations of VOCs identified in indoor air are primarily related to activities and operational use of a various products within the Syracuse Office complex and not as a result of vapor intrusion. The VOC levels identified in indoor air within the buildings are within guidelines for residential settings. No further vapor intrusion investigation activities are proposed for this site.

## 5. References

ARCADIS, 2007. Supplemental Remedial Investigation Report, Erie Boulevard Former MGP Site, Syracuse, NY. November 2007.

ARCADIS, 2008. Final Remedial Investigation Report, Erie Boulevard Former MGP Site, Syracuse, NY. September 2008.

ARCADIS, 2008. Vapor Intrusion Investigation Work Plan, Erie Boulevard Former MGP Site, Syracuse, NY. October 2008.

NYSDOH. 2006. Final – Guidance for Evaluating Soil Vapor Intrusion in the State of New York. New York State Department of Health, Center for Environmental Health, Bureau of Environmental Exposure Investigation. October.

ARCADIS

# Tables

## TABLE 1
## SAMPLING LOCATIONS AND CORRESPONDING FLOOR ELEVATIONS

## VAPOR INTRUSION INVESTIGATION REPORT
## NATIONAL GRID
## ERIE BOULEVARD FORMER MGP SITE
## SYRACUSE, NEW YORK

| Sample ID/ Building Location | Sampling Location | | Approximate Floor Elevation (feet) |
|---|---|---|---|
| | Room/Area Inside Building | Location Inside Room/Area | |
| **Building B (Main Floor)** | | | |
| SSV-B1/ IA-B1 | Vestibule – Western Portion of Building | Section of building near MW-8 where sheen has been observed on groundwater in monitoring well | 391.9 |
| SSV-B2/ IA-B2 | Middle of the main corridor – Southern Portion of Building | South side of hall near a corner in the middle of the building | |
| SSV-B3/ IA-B3 | Northwest corner of the stock room – Northeastern End of Building | North side of building, closest to former holder | |
| **Building C (Basement)** | | | |
| SSV-C1/ IA-C1 | Mechanical Room – Central Portion of Building | West side of room | 373.0 (estimated) |
| SSV-C2 | | East side of room | |
| **Building D (Basement)** | | | |
| SSV-D1/ IA-D1 | Mechanical Room – Northwest Portion of Building | Near the crawl space with earthen floor where possible odors have been noticed | 380.8 |
| SSV-D2 | Existing Map Storage Room (Former Electric Supply & Delivery SBU) – Western Portion of Building | South side of the room, closest to May/June 2008 soil borings where greatest amount of NAPL was observed | |
| SSV-D3/ IA-D3 | | North side of the room, further from area of impacted soil/groundwater than SSV-D2 | |
| SSV-D4/ IA-D4 | Existing Copy Room (Office B74 and Office B83) – Eastern Portion of Building | South side of the room | 386.1 |
| SSV-D5 | | North side of the room | |

**Note:**

1. Vertical datum is the North American Vertical Datum (NAVD) 88, NGS Station S34, Elevation 405.340 feet.

TABLE 2
PRODUCT INVENTORY

VAPOR INTRUSION INVESTIGATION REPORT
NATIONAL GRID
ERIE BOULEVARD FORMER MGP SITE
SYRACUSE, NEW YORK

| Location | Product Description | Container Size | Container Condition | Chemical Ingredients | PID Reading (ppb) | Photograph # (refer to Appendix C for Photos) |
|---|---|---|---|---|---|---|
| **Building B - Main Floor** | | | | | | |
| Stock Room | Aerosal adhesive | 16 oz - can | Good, used | Acetone, propane, heptanes | 0 | -- |
| | Lubricants | 11 oz - can | Good, used | Heptane with teflon | 0 | -- |
| | Caulk | 10.3 oz - tube | Good, new | Silicone | 0 | -- |
| | Baseboard adhesive | 1 gal - bucket | Good, new | Calcium carbonate, sodium bicarbonate, magnesium carbonate | 0 | -- |
| | Vinyl wall adhesive | 1 gal - bucket | Good, new | NA | 0 | -- |
| | WD-40 | 11 oz - can | Used, dinged and rusty | Aliphatic hydrocarbon, petroleum base oil, LVP aliphatic hydrocarbon | 0 | -- |
| | Wire pulling lubricant | 4 - 1 L - tubes | Good, used | NA | 0 | -- |
| | Paint, epoxy, motor oil | Approx 30 assorted can sizes | Good, used | Acetone, xylene, propane, butane | 10,000+ | 1 |
| | Petroleum tanks | 5 - 16 oz cans | Good, used | Methyl acetylene propediene | 10,000+ | 1 |
| | Paint remover/bug spray/motor oil | Approx 30 assorted cans | Good, used | Methyl benzene, cyclohexane, propane, petroleum oil | 10,000+ | -- |
| | Xylene | 1 gal bucket | Good, used | Xylene | 10,000+ | -- |
| | Cloroben (drain cleaner) | 1 gal bucket | Good, used | Hydrochloric acid | 10,000+ | -- |
| | Paint (spray), adhesive, hardener, mineral spirits | Assorted cans | Good, used | Methyl alcohol, propane, isobutane, n-butane | 10,000+ | -- |
| | Condenser coil cleaner | 2 - 1 gal buckets | Good, used | Sodium hydroxide | 10,000+ | -- |
| | Carbon monoxide, propane | 3 - 2 gal tanks | Good, used | Carbon monoxide, propane | 10,000+ | -- |
| | Oil | 5 - 1 qt cans | Good, used | Petroleum oil | 10,000+ | -- |
| | Lime remover, urethane/enamel | Assorted cans | Good, used | Hydrochloric acid, xylene, resin | 10,000+ | -- |
| | Cloroben, drain cleaner | Assorted cans | Good, used | Xylene, hydrochloric acid | 10,000+ | -- |
| | Oil/lubricants | Assorted cans | Good, used | Petroleum oil | 5,900 | -- |
| | Tool coolant, aerosol window cleaner | Assorted cans | Good, used | Tichlorofluoroethane, trichlorofluoromethane | 5,900 | -- |
| | Propane | 16 oz - can | Good, used | Propane | 5,900 | -- |
| | Refrigerant | 5 gal - canister | Good, used | Refrigerant | 5,900 | -- |
| | Propane | 12 - 16 oz cans | Good, used | Propane | 5,900 | 2 |
| | Grease | 2 - 11 oz tubes | Good, used | Petroleum oil | 5,900 | 2 |
| | Bug spray | 12 oz can | Good, used | Deet | 5,900 | 2 |
| | Refrigerant | 3 - 5 gal canisters | Good, used | Trifluoroethene, pentafluoroethene, tetrafluoroethene | 1,120 | -- |
| | Rotabond, seam sealer | 2 - 8 oz can | Good, used | Bisphenol A, diglicydl ether, toluene, naphtha, styrene, hydrocarbon resin | 1,120 | -- |
| | Rotabond 2000 | 6 - 10.3 oz tubes | Good | 4,4-MDI, xylene, petroleum distillate, polyvinyl chloride | 1,120 | -- |
| | Sealicon adhesive | 4 - 7.25 oz cans | Good | Methyl methoxysilane, dimethyl siloxane | 1,120 | -- |
| | PVC cleaner | 4 - 8 oz cans | Good | Methyl ethyl ketone, acetone | 432 | -- |
| West Stock Room | Primer | 60 - 1 gallon buckets | Good, used | Ammonium phosphate, vinyl resin, melamine, vinyl acetate | 43 | 3 |
| | Paint | 60 - 1 gallon buckets | Good, used | 2 - Propanoic acid, butyl ester, propanoic acid | 43 | 3 |
| | Glass cleaner | 4 - 32 oz bottles | Good, used | Isopropanol, isopropylene, ethylene glycol n-hexyl ether, acetic acid | 157 | -- |
| | Cleaner and polish | 2 - 1 qt bottles | Ok, used, dented and dirty | Mineral oil, mineral spirits, emulsifier, sorbitol | 88 | -- |

TABLE 2
PRODUCT INVENTORY

VAPOR INTRUSION INVESTIGATION REPORT
NATIONAL GRID
ERIE BOULEVARD FORMER MGP SITE
SYRACUSE, NEW YORK

| Location | Product Description | Container Size | Container Condition | Chemical Ingredients | PID Reading (ppb) | Photograph # (refer to Appendix C for Photos) |
|---|---|---|---|---|---|---|
| **Building B - Main Floor (continued)** | | | | | | |
| West Stock Room | Hand cleaner | 8 - 1 L bottles | Good, new | Acetate | 88 | -- |
| | Furniture polish | 17 - 17 oz cans | Good, new | Aliphatic hydrocarbon, liquified petroleum gas, petroleum distillates | 123 | -- |
| | Carpet shampoo | 1 gal bucket | Good, new | Telomer with ethylbenzene and (1-methylethyl) benzene | 123 | -- |
| | Cleaners | 2 - 1 qt bottles | Good, new | 2-Butoxyethanol, butane, propane, propylene glycol n-butyl ether, 1-methoxy-2-propanol ethanoalimine | 123 | -- |
| | 2 - Locked cabinets | NA | NA | NA | 890 | -- |
| | Floor coating | 6 - 5 gal buckets | Good | Polyethylene, 2-(2methylethoxy) ethanol | 59 | -- |
| | Kaidri | 3 - 1 gal, 8 - 1 qt | Good | C12-C14 linear alcohol ethylene oxide/propylene oxide adduct, glycol | 59 | -- |
| | Floor Prep | 10 - 1 gal bucket | Good, new | Tetrasodium ethylene diamine tetra acetate | 59 | -- |
| | Cleaning/polishing compound | 12 - 16 oz cans | Good, new | Propylene glycol, polyethylene glycol | 59 | -- |
| | Carpet protector, floor conditioner | 6 - 1 gal bucket | Good, new | Morpholine, acrylic acid, 2-butoxyethanol, sodium xylene sulfanates | 59 | -- |
| | Heavy duty cleaner concentrate | 14 - 2 L container | Good, new | 1-Methoxy-2-propanol, ethanolamine, hydroxy alkyl amine oxides | 66 | -- |
| | Bathroom cleaner concentrate | 20 - 2 L container | Good, new | Hydroxy acetic acid, 1-ethyl-2-pyrolidiene, malic acid | 66 | -- |
| | Degreaser concentrate | 5 - 2 L container | Good, new | Polyoxyethylene tridecyl ether | 66 | -- |
| | Tile, grout, bowl cleaner | 7 - 2 L container | Good, new | Hydrogen chlorine, polyoxyethylene, tallow amine | 66 | -- |
| | Antimicrobial soap | 10 - 5 L container | Good, new | Chloroxylenol | 66 | -- |
| Janitor's Room | Neutral cleaner | 2 L container | Good, used | n-octylpyrolidine, 1-undecanol | 199 | -- |
| | Glass cleaner | 32 oz container | Good, used | Isopropanol, isopropylene, ethylene glycol, n-hexyl ether, acetic acid | 199 | -- |
| | Cleaner and polish | 1 qt bottle | Ok, used, dented and dirty | Mineral oil, mineral spirits, emulsifier, sorbitol | 199 | -- |
| | Heavy duty cleaner concentrate | 2 L container | Good, used | 1-Methoxy-2-propanol, ethanolamine, hydroxy alkyl amine oxides | 199 | -- |
| | Extraction cleaner | 2 L container | Good, used | 2-Butoxyethanol, sodium citrate | 199 | -- |
| Break Room | Steel polish | 17 oz can | Good, used | White metal oil, liquified petroleum oils | 0 | -- |
| Mailroom | Glass cleaner | 32 oz container | Good, used | Isopropanol, isopropylene, ethylene glycol n-hexyl ether, acetic acid | 0 | -- |
| | Cleaner and polish | 1 qt bottle | Ok, used, stained | Mineral oil, mineral spirits, emulsifier, sorbitol | 0 | -- |
| PACC Storage | Glass cleaner | 32 oz container | Good, used | Isopropanol, isopropylene, ethylene glycol n-hexyl ether, acetic acid | 245 | -- |

TABLE 2
PRODUCT INVENTORY

VAPOR INTRUSION INVESTIGATION REPORT
NATIONAL GRID
ERIE BOULEVARD FORMER MGP SITE
SYRACUSE, NEW YORK

| Location | Product Description | Container Size | Container Condition | Chemical Ingredients | PID Reading (ppb) | Photograph # (refer to Appendix C for Photos) |
|---|---|---|---|---|---|---|
| **Building B - Main Floor (continued)** | | | | | | |
| Emergency Generator | Natural gas engine oil | 5 gal | Good, used | Motor oil | 337 | -- |
| Electric Room 382 | Floor stripper | 2 L | Good, used | Benzyl alcohol, ethanoaniline | 51 | -- |
| | Kaidri | 3 - 1 gal, 8 - 1 qt | Good | C12-C14 linear alcohol ethylene oxide/propylene oxide adduct, glycol monobutyl ether | 51 | -- |
| | Hand cleaner | 8 - 1 L bottles | Good, new | Acetate | 51 | -- |
| | Carpet protector, floor conditioner | 6 - 1 gal bucket | Good, new | Morpholine, acrylic acid, 2-butoxyethanol, sodium xylene sulfanates | 51 | -- |
| Facilities Storage Room | Self leveling caulk adhesive | 35 - 825 mL tubes | Good, new | Toluene diisocyanate | 1,749 | 4 |
| | Refrigerant | 9 - ~30 lbs canisters | Good | NA | 1,749 | 5 |
| | Weed wacker (2 cycle) | ~ 1 L | Good, used | Oil, gasoline | 1,755 | -- |
| | Fluorescent bulbs | ~ 100 | Ok, burned out, possibly broken | NA | 1,750 | -- |
| | Trash can | ~ 25 gal | Unknown | Dirty paint rags | 1,750 | -- |
| | Light ballasts/capacitors | 55 gal drum | Ok, broken | NA | 1,750 | 6 |
| | Paint cans | 55 gal drum | Unknown | NA | 1,750 | 6 |
| | Aerosol cans | 55 gal drum | Unknown | NA | 1,750 | 6 |
| | Batteries | 55 gal drum | Unknown | NA | 1,750 | 6 |
| | Pressure washer | 1 L | Good, used | Gasoline | 1,755 | 6 |
| | Leaf blower | 1 L | Good, used | Gasoline | 1,819 | -- |
| | Paint, enamel, stain | 9 - 1 gal | Good | acryllic vinyl polymer, petroleum distillates, solvent naptha, trimethyl benzene, ethylene glycol | 1,755 | -- |
| | Pressure washer fluid | 1 gal | Good, used | Sodium hydroxide, potassium hydroxide, butyl cellulose | 1,752 | -- |
| | Graffiti remover | 1 qt can | Good, used | Petroleum distillate, ethyl lactate, 1-undecanol | 1,752 | -- |
| | Kaidri | 1 gal | Good | C12-C14 linear alcohol ethylene oxide/propylene oxide adduct, glycol | 1,752 | -- |
| | Winshield washer fluid | 1 gal | Good, used | Methanol | 1,752 | -- |
| | Diesel, gasoline, 2-stroke fuel | 2 - 5 gal and 2-2.5 gal containers | Ok, rusty and dented | Diesel, gasoline, oil | 3,600 | 7 |
| | Waste oil | ~3/4 gal | Ok, used | Oil | 3,600 | 7 |
| | Traffic paint | 19 - 18 oz cans | Good, new | Naphtha, propane, n-butane, xylene, toluene | 3,600 | 7 |
| | Motor oil | 5 qt | Good, used | Oil | 3,600 | 7 |
| | Fuel stabilizer | 2 qt | Good, used | Petroleum distillate | 3,600 | 7 |
| | Bar and chain lubricant | 1 gal | Good, used | "highly refined oils" | 3,600 | 7 |
| | Xylene | 1 gal | Good, used | Xylene | 3,600 | 7 |
| | Lubricant | 4 - 12 oz cans | Good, used | Methylbenzene, cyclohexane, kerosene, propane, petroleum oil, methyl chloroform, 1,1,1-trichloroethane | 3,600 | 7 |
| | Paint | 2 - 1 gal buckets | Good, used | Stoddard solvent, acryllic resin, ethylene glycol | 3,600 | 7 |

TABLE 2
PRODUCT INVENTORY

VAPOR INTRUSION INVESTIGATION REPORT
NATIONAL GRID
ERIE BOULEVARD FORMER MGP SITE
SYRACUSE, NEW YORK

| Location | Product Description | Container Size | Container Condition | Chemical Ingredients | PID Reading (ppb) | Photograph # (refer to Appendix C for Photos) |
|---|---|---|---|---|---|---|
| **Building B - Main Floor (continued)** | | | | | | |
| Facilities Storage Room | Spray paint | 4 - 12 oz cans | Good | Methyl-isobutyl ketone, acetone, butane, propane, xylene, methyl propyl ketone, toluene, toluol | 3,600 | 7 |
| | Degreaser | 12 oz can | Good | Ethylene trichloride | 3,600 | 7 |
| | Brake cleaner | 2 - 14 oz cans | Good, used | 1,1,1-trichloroethane, heptane, xylene, acetone, | 3,600 | 7 |
| | 2-cycle motor oil | 36 - 2.3 oz bottles | Good, new | Oil | 3,600 | 7 |
| | Paint, traffic paint | 13 - 5 gal | Good | NA | 1,755 | 8 |
| | Chain saw | 1 L | Good, used | Gasoline | 1,753 | -- |
| | Wood glue | 32 oz bottle | Good, used | NA | 1,753 | -- |
| | Windshield washer fluid | 2 - 1 gal bottles | Good | NA | 1,753 | -- |
| | Self leveling caulk adhesive | 8 - 825 mL tubes | Good, new | Toluene diisocyanate | 1,753 | -- |
| | Kubota - diesel 4x4 | NA | NA | Gasoline, oil | 1,754 | -- |
| | CAT with plow | NA | NA | Gasoline, oil | 1,754 | -- |
| **Building C - Core (Basement)** | | | | | | |
| Mechanical Room | Spray paint | 11 oz - can | Good, used | Methylene chloride, toluene, propane, butane | 403 | -- |
| | Drain cleaner | 16 oz - bottle | Good, used | Sulfuric acid | 403 | -- |
| | Cleaner/solvent | 3 - 1 qt bottle | Good, used | Citrus oil, trisodium phosphate, 2-butoxyethanol | 403 | -- |
| | Lubricant | 14 oz - can | Good, used | NA | 403 | -- |
| | Stain under pump | ~ 1 oz | Dried on pad | NA | 403 | 11 |
| | Polish, cleaner (heavy duty) | 2 - 1 qt bottles | Good, used | NA | 403 | -- |
| | Clear liquid (from Henkinson machine) | ~ 1 oz - bottle | Collecting in bottle | NA | 403 | 12 |
| | Epoxy-like substance on floor | ~ 1 qt | Dried and hardened on floor | NA | 403 | -- |
| | Cooling tower treatment | 2 - 1 gal buckets | Good, used | NA | 403 | 13 |
| | Organic deposit penetrant | 5 gal bucket | Good, used | NA | 403 | 13 |
| | Synthetic centrifugal oil | 2 - 5 gal buckets | Good, used | Oil | 403 | -- |
| | Intubisol | 11 oz - can | Ok, dented & stained | 1,1,1-trichloroethane | 500 | 14 |
| | Dow coloring | ~ 12 oz - can | Good | Dimethyl, phenylmethyl silixane, trimethyl-terminated lithium steareate, di(2-ethylhexyl) sebeceate | 500 | 14 |
| | Motor oil | 1 qt - bottle | Good, used | Oil | 500 | 14 |
| **Building D - Basement** | | | | | | |
| Office B74 | OCE 9600 printer | Cartridge (assumed) | Good, used | Toner | 1,560* | 17 |
| | OCE 9600 printer | Cartridge (assumed) | Good, used | Toner | 1,565* | -- |
| | OCE TCS color printer | Cartridge (assumed) | Good, used | Toner | 1,570* | 18 |
| | Photo receptor solvent | 8 oz - bottle | Good, used | Isopropanol, odorless mineral spirits | 1,674 | -- |
| | Anti-static spray | 11 oz - bottle | Good, used | "Quarternary compounds" | 1,565* | -- |
| | Brillianize | 8 oz - bottle | Good, used | NA | 1,565* | -- |
| | Electric typewriter | Ribbon (assumed) | Good, used | Ink/toner | 1,336* | -- |

TABLE 2
PRODUCT INVENTORY

VAPOR INTRUSION INVESTIGATION REPORT
NATIONAL GRID
ERIE BOULEVARD FORMER MGP SITE
SYRACUSE, NEW YORK

| Location | Product Description | Container Size | Container Condition | Chemical Ingredients | PID Reading (ppb) | Photograph # (refer to Appendix C for Photos) |
|---|---|---|---|---|---|---|
| Office B83 | OCE TDS 800 printer | Cartridge (assumed) | Good, used | Toner | 1,370* | -- |
| | HP LaserJet 4250tn | Cartridge (assumed) | Good, used | Toner | 1,370* | -- |
| | HP toner cartridge | Cartridge (assumed) | Good, used | NA | 1,484* | -- |
| | OCE TDS 800 printer | Cartridge (assumed) | Good, used | Toner | 1,375* | -- |
| | OCE TDS 600 printer | Cartridge (assumed) | Good, used | Toner | 1,380* | -- |
| | OCE TDS 600 printer | Cartridge (assumed) | Good, used | Toner | 1,382* | -- |
| | Lens cleaner solution | ~ 8 oz | Good, used | "K-Lens-M" | 1,380* | -- |
| | Glass and repro machine cleaner | 4 - 32 oz bottles | Good, used | Isopropyl alcohol, ethylene glycol, monoethyl ether, detergent, anti-static | 1,387* | 19 |
| | Contrac-rat and mouse bait | 1.5 oz pack | Ok, stained | Bromodiolane | 1,398* | 20 |
| | Plexiglass cleaner | 16 oz - bottle | Good, used | NA | 1,382* | -- |
| | Glass cleaner | 0.5 gal - bottle | Good, used | NA | 1,382* | 21 |
| | Cleaner and polish | 1 qt - bottle | Good, used | Mineral oil, mineral spirits | 1,380* | -- |
| | Luxury lotion soap | 2 L - container | Good, used | Sodium laureth sulfate, ammonium chloride, butylene glycol, glycerine | 1,380* | -- |
| Men's Room B85 | Air freshener | 9.1 oz - canister | Good, used | NA | 1,747* | -- |
| | Palmolive dishwashing liquid | 22 oz - container | Good, used | NA | 1,382* | -- |
| | Hand soap | 2 L - container | Good, used | NA | 1,382* | -- |
| | Lens cleaner solution | ~ 8 oz | Good, used | "K-Lens-M" | 1,511* | -- |
| | Air freshener (automatic device) | | Good, used | NA | 1,389* | -- |
| Women's Room B84 | Air freshener | ~ 2 oz | Good, used | NA | 1,632* | -- |
| | Lysol wipes | | Good, used | Alkyl dimethyl benzyl ammonium chlorides | 1,632* | -- |
| | Hand soap | 2 L - container | Good, used | NA | 1,635* | -- |
| Office B12 | Stamp pad ink | 3 - 2 oz | Good, used | NA | 1,720* | -- |
| | Glass and repro machine cleaner | 1 - 32 oz bottles | Good, used | Isopropyl alcohol, ethylene glycol, monoethyl ether, detergent, anti-static | 1,775* | -- |
| | Stamp pad ink | 6 - 2 oz | Good, used | NA | 1,710* | -- |
| | Hand sanitizer | 6 oz | Good, used | Benzophenone-4 | 1,732* | -- |
| | Savin 2513 - printer | Cartridge (assumed) | Good, used | Toner | 1,640* | -- |
| | Savin - toner | 8 oz | Good, used | Styrene acrylic polymer | 1,634* | -- |
| | Stamp pad ink | 8 - 2 oz | Good, used | NA | 1,602* | 22 |
| Office B78 | HP LaserJet 4200n | Cartridge (assumed) | Good, used | NA | 1,510* | -- |
| Storage B64 | Hand labeled cleaning fluid | ~ 6 oz | Good, used | NA | 1,416* | -- |
| | Heavy duty glass cleaner | ~ 6 oz | Good, used | NA | 1,416* | -- |
| | Black liquid roofing | ~ 5 gal | Slight damage, rusted | NA | 1,465* | -- |
| Storage B02 | Spray paint/street lining | ~ 100 cans | Good, possible | NA | 1,465* | -- |
| | Motor oil (2 cycle) | 4 qt | Good, possible | Motor oil | 1,465* | -- |

TABLE 2
PRODUCT INVENTORY

VAPOR INTRUSION INVESTIGATION REPORT
NATIONAL GRID
ERIE BOULEVARD FORMER MGP SITE
SYRACUSE, NEW YORK

| Location | Product Description | Container Size | Container Condition | Chemical Ingredients | PID Reading (ppb) | Photograph # (refer to Appendix C for Photos) |
|---|---|---|---|---|---|---|
| **Building D - Basement (continued)** | | | | | | |
| Office B77 | Printer | Cartridge (assumed) | Good, used | Toner | 1,409* | -- |
| | Fax machine | Cartridge (assumed) | Good, used | Toner | 1,415* | -- |
| Storage B08 | Glass and repro machine cleaner | 1 - 32 oz bottle | Good, used | Isopropyl alcohol, ethylene | 1,481* | -- |
| | Toner kit (Oce) | 7 - 1 lbs packages | Good, new | Toner, polyester resin, | 1,445* | -- |
| | Xerox fuser | 2 - packages | Good, new | NA | 1,445* | -- |
| | Xerox cartridge | 7 - 1.4 lbs packages | Good, new | Toner | 1,445* | 23 |
| | Oce ink tanks/cartridges | ~10 | Good, new | Toner | 1,445* | -- |
| | Xerox fuser agent II | NA | Good, used | Organo-funtional polydimethyl | 1,445* | -- |
| | Anti static fluid | NA | Good, used | Propylene glycol, dimethyl | 1,445* | -- |
| | Photo receptor solvent | 1 | Good, used | "Quarternary compounds" | 1,450* | -- |
| | Cylinder degreaser | 1 pint | Good, used | NA | 1,450* | -- |
| Mechanical Room B60 | Endosolv-SLD assurance line | 4 - 1 gal containers | Good, used | Cooling tower treatment | 1,241* | 24 |
| | Biobrom C-105L | 2 - 5 gallon containers | NA | 2,2-dibromo-3- | 1,295* | 24 |
| | MIS. DTEA 11 | 2 - 5 gallon containers | Good, used | siliphate proprietary amine | 1,293* | 24 |
| | Isopropyl alcohol | 2 - 1 gallon containers | Good, used | 2-propanol | 1,352* | 24 |
| | Endosolv-SLD assurance line | 0.5 gallon container | Good, used | Cooling tower treatment | 1,256* | -- |
| | Gasket sealer | 11 oz tube | Bad, broken, | NA | 1,256* | -- |
| | GoJo - lotion skin cleanser | 4 - 27 oz container | Good, used | Sodium laureth sulfate, | 1,250* | -- |
| | Nickel safe ice machine cleaner | 16 oz container | Ok | CAS # 7661.38.3 | 1,264* | -- |
| | Purple primer | 0.5 pint | Bad, broken, spilled, hardened | MEK, tetrahydrofuran, acetone | 1,259* | -- |
| | Anderol 750 - Recip lube | ~5 gal | Good, used | Lubricant | 1,260* | -- |
| | Boiler room waste can | ~25 gal | Good, used | Cooling tower treatment | 1,204* | -- |

**Notes:**

1. '-- = No photographs available.
2. Photoionization detector (PID) readings (i.e., approximate total organic vapor concentratins) were obtained using a ppbRAE.
3. ppb = parts per billion.
4. NA = Not available.
5. '+ = Maximum instrument reading was reached. Total organic vapor concentration may be higher.
6. * = PID readings in the Building D basement appear to be somewhat elevated and generally consistent throughout. The readings may be attributed to general background conditions, including high humidity.

TABLE 3
SUB-SLAB VAPOR, INDOOR AIR, AND OUTDOOR AIR ANALYTICAL RESULTS FOR DETECTED VOCS (µg/m$^3$)

VAPOR INTRUSION INVESTIGATION REPORT
NATIONAL GRID
ERIE BOULEVARD FORMER MGP SITE
SYRACUSE, NEW YORK

| Location ID: / Date Collected: | USEPA 90th Percentile Background Indoor Air Level | NYSDOH Air Guideline Values | Sub-Slab Vapor and Indoor Air Analytical Results | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Building B | | | | | | Building C | | | |
| | | | SSV-B1 11/19/08 | IA-B1 11/19/08 | SSV-B2 11/19/08 | IA-B2 11/19/08 | SSV-B3 11/19/08 | IA-B3 11/19/08 | SSV-C1 11/19/08 | IA-C1 11/19/08 | SSV-C2 11/19/08 | |
| **NYSDEC DER TO-15 TCL (µg/m$^3$)** | | | | | | | | | | | | |
| Benzene | 9.4 | -- | 4.6 J [0.63 J] | 1.1 | 5.2 J | 1.5 J | <6.4 J | 1.9 J | 0.82 J | <0.64 J | <0.64 J | No Indoor Air Sample Taken |
| 2-Butanone | 12 | -- | <2.9 J [<2.9 J] | <2.9 | 10 J | <2.9 J | <29 J | 3.0 J | <2.9 J | <2.9 J | <2.9 J | |
| Carbon Tetrachloride | 1.3 | -- | <1.3 J [<1.3 J] | <1.3 | 3.4 J | <1.3 J | <13 J | <1.3 J | <1.3 J | <1.3 J | 1.3 J | |
| Chloroform | 1.1 | -- | <0.98 J [<0.98 J] | <0.98 | 7.2 J | <0.98 J | 30 J | <0.98 J | 23 J | <0.98 J | 20 J | |
| Chloromethane | 3.7 | -- | <1.0 J [<1.0 J] | 1.3 | <1.0 J | <1.0 J | <10 J | <1.0 J | <1.0 J | 1.8 J | <1.0 J | |
| 1,2-Dichlorobenzene | 1.2 | -- | <1.2 J [<1.2 J] | <1.2 | <1.2 J | <1.2 J | <12 J | <1.2 J | <1.2 J | <1.2 J | <1.2 J | |
| Dichlorodifluoromethane | 16.5 | -- | 2.0 J [1.9 J] | 2.0 | 2.2 J | 2.3 J | <9.9 J | 2.5 J | 2.3 J | 2.6 J | 2.4 J | |
| Ethanol | 210 | -- | ND [ND] | ND | ND | 8.0 J | ND | 5.4 J | ND | 29 J | ND | |
| Ethylbenzene | 5.7 | -- | <0.87 J [<0.87 J] | <0.87 | 4.1 J | 1.2 J | <8.7 J | 2.0 J | 0.98 J | <0.87 J | <0.87 J | |
| Methylene Chloride | 10 | 60 | <1.7 J [<1.7 J] | 2.7 | <1.7 J | 4.7 J | 58 J | 11 J | <1.7 J | <1.7 J | 4.1 J | |
| Tetrachloroethene | 15.9 | 100 | <1.4 J [<1.4 J] | <1.4 | 20 J | <1.4 J | 200 J | <1.4 J | 6.3 J | <1.4 J | 4.6 J | |
| Toluene | 43 | -- | 2.0 J [1.8 J] | 3.4 | 35 J | 7.4 J | 7.7 J | 11 J | 5.3 J | <0.75 J | 2.2 J | |
| 1,1,2-trichloro-1,2,2-trifluoroethane | 3.5 | -- | <1.5 J [<1.5 J] | <1.5 | 3.2 J | <1.5 J | 29 J | <1.5 J | 42 J | <1.5 J | 13 J | |
| 1,1,1-Trichloroethane | 20.6 | -- | <1.1 J [<1.1 J] | <1.1 | 5.2 J | 1.4 J | 11 J | 2.0 J | 3.5 J | <1.1 J | 5.5 J | |
| Trichloroethene | 4.2 | 5 | <1.1 J [<1.1 J] | <1.1 | <1.1 J | 3.4 J | 26 J | 4.9 J | 1.8 J | <1.1 J | 11 J | |
| Trichlorofluoromethane | 18.1 | -- | <1.1 J [<1.1 J] | 1.1 | 1.7 J | 1.3 J | <11 J | 1.3 J | 1.9 J | 1.9 J | 1.9 J | |
| 1,2,4-Trimethylbenzene | 9.5 | -- | <0.98 J [<0.98 J] | <0.98 | 5.1 J | 1.8 J | <9.8 J | 2.3 J | 2.1 J | <0.98 J | 1.4 J | |
| 1,3,5-Trimethylbenzene | 3.7 | -- | <0.98 J [<0.98 J] | <0.98 | 1.8 J | <0.98 J | <9.8 J | <0.98 J | <0.98 J | <0.98 J | <0.98 J | |
| m&p-Xylene | 22.2 | -- | 1.3 J [0.94 J] | 1.8 | 18 J | 3.8 J | <8.7 J | 6.8 J | 4.3 J | <0.87 J | 2.3 J | |
| o-Xylene | 7.9 | -- | <0.87 J [<0.87 J] | <0.87 | 4.7 J | 1.2 J | <8.7 J | 2.0 J | 1.2 J | <0.87 J | <0.87 J | |
| **Compounds on National Grid Standard List, but not on NYSDEC DER TO-15 TCL (µg/m$^3$)** | | | | | | | | | | | | |
| Acetone | 98.9 | -- | 47 J [46 J] | <12 | 47 J | 17 J | <120 J | 19 J | 15 J | 38 J | <12 J | |
| Carbon Disulfide | 4.2 | -- | <1.6 J [<1.6 J] | <1.6 | 5.2 J | <1.6 J | <16 J | <1.6 J | <1.6 J | <1.6 J | <1.6 J | |
| Isopropyl alcohol | 250 | -- | <4.9 J [<4.9 J] | 8.3 | <4.9 J | 8.2 J | <49 J | <4.9 J | <4.9 J | 11 J | <4.9 J | |
| **National Grid Supplemental Compound List (µg/m$^3$)** | | | | | | | | | | | | |
| n-Butane | -- | -- | 1.6 J [1.1 J] | 7.9 | 17 J | 9.3 J | <9.5 J | 13 J | 2.4 J | 2.9 J | 0.98 J | |
| n-Decane | 17.5 | -- | <5.8 J [<5.8 J] | <5.8 | 15 J | <5.8 J | <58 J | <5.8 J | <5.8 J | <5.8 J | <5.8 J | |
| Heptane | -- | -- | <2.0 J [<2.0 J] | <2.0 | 16 J | <2.0 J | <20 J | <2.0 J | <2.0 J | <2.0 J | <2.0 J | |
| Hexane | 10.2 | -- | <1.8 J [<1.8 J] | <1.8 | 14 J | 2.2 J | <18 J | 3.1 J | <1.8 J | <1.8 J | <1.8 J | |
| Nonane | 7.8 | -- | <2.6 J [<2.6 J] | <2.6 | 9.0 J | <2.6 J | <26 J | <2.6 J | <2.6 J | <2.6 J | <2.6 J | |
| Octane | 4.5 | -- | <1.9 J [<1.9 J] | <1.9 | 16 J | <1.9 J | <19 J | <1.9 J | <1.9 J | <1.9 J | <1.9 J | |
| Pentane | -- | -- | <3.0 J [<3.0 J] | <3.0 | 12 J | 5.2 J | <30 J | 5.5 J | <3.0 J | <3.0 J | <3.0 J | |
| n-Undecane | 22.6 | -- | <6.4 J [<6.4 J] | <6.4 | 22 J | <6.4 J | <64 J | <6.4 J | 14 J | <6.4 J | 9.5 J | |
| 1,2,3-Trimethylbenzene | -- | -- | <0.98 J [<0.98 J] | <0.98 | 2.2 J | <0.98 J | <9.8 J | <0.98 J | <0.98 J | <0.98 J | <0.98 J | |

TABLE 3
SUB-SLAB VAPOR, INDOOR AIR, AND OUTDOOR AIR ANALYTICAL RESULTS FOR DETECTED VOCS (µg/m$^3$)

VAPOR INTRUSION INVESTIGATION REPORT
NATIONAL GRID
ERIE BOULEVARD FORMER MGP SITE
SYRACUSE, NEW YORK

| Location ID: / Date Collected: | USEPA 90th Percentile Background Indoor Air Level | NYSDOH Air Guideline Values | Sub-Slab Vapor and Indoor Air Analytical Results – Building D | | | | | | | | | | Outdoor Air Analytical Results |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SSV-D1 11/19/08 | IA-D1 11/19/08 | SSV-D2 11/19/08 | | SSV-D3 11/19/08 | IA-D3 11/19/08 | SSV-D4 11/19/08 | IA-D4 11/19/08 | SSV-D5 11/19/08 | | AA-1 11/19/08 |
| **NYSDEC DER TO-15 TCL (µg/m$^3$)** | | | | | | | | | | | | | |
| Benzene | 9.4 | -- | <0.64 [<0.64 J] | 0.83 J | <0.64 J | No Indoor Air Sample Taken | <0.64 J | 0.82 | 0.99 | 0.90 J | 0.97 J | No Indoor Air Sample Taken | 0.26 J |
| 2-Butanone | 12 | -- | <2.9 [<2.9 J] | 5.9 J | <2.9 J | | 2.9 J | <2.9 | <2.9 | <2.9 J | <2.9 J | | R |
| Carbon Tetrachloride | 1.3 | -- | <1.3 [<1.3 J] | <1.3 J | <1.3 J | | <1.3 J | <1.3 | <1.3 | <1.3 J | <1.3 J | | R |
| Chloroform | 1.1 | -- | 2.8 [2.9 J] | <0.98 J | <0.98 J | | <0.98 J | <0.98 | <0.98 | <0.98 J | <0.98 J | | R |
| Chloromethane | 3.7 | -- | <1.0 [<1.0 J] | <1.0 J | <1.0 J | | 1.6 J | <1.0 | <1.0 | 1.1 J | <1.0 J | | R |
| 1,2-Dichlorobenzene | 1.2 | -- | <1.2 [<1.2 J] | <1.2 J | 3.6 J | | <1.2 J | <1.2 | <1.2 | <1.2 J | <1.2 J | | R |
| Dichlorodifluoromethane | 16.5 | -- | 2.4 [2.5 J] | 2.5 J | 2.4 J | | 2.2 J | 2.5 | 2.5 | 2.5 J | 2.5 J | | 0.50 J |
| Ethanol | 210 | -- | ND [ND] | ND | ND | | ND | ND | ND | 21 J | ND | | R |
| Ethylbenzene | 5.7 | -- | <0.87 [<0.87 J] | <0.87 J | <0.87 J | | <0.87 J | <0.87 | <0.87 | <0.87 J | <0.87 J | | R |
| Methylene Chloride | 10 | 60 | 13 J [7.2 J] | 7.2 J | 8.5 J | | 6.8 J | 9.2 | 12 | 36 J | 7.2 J | | 1.5 J |
| Tetrachloroethene | 15.9 | 100 | <1.4 [<1.4 J] | <1.4 J | <1.4 J | | <1.4 J | <1.4 | <1.4 | <1.4 J | <1.4 J | | R |
| Toluene | 43 | -- | 2.0 [2.3 J] | 2.5 J | 1.8 J | | 1.7 J | 3.2 | 2.0 | 3.3 J | 3.1 J | | 0.75 J |
| 1,1,2-trichloro-1,2,2-trifluoroethane | 3.5 | -- | <1.5 [<1.5 J] | <1.5 J | <1.5 J | | <1.5 J | <1.5 | <1.5 | <1.5 J | <1.5 J | | R |
| 1,1,1-Trichloroethane | 20.6 | -- | <1.1 [<1.1 J] | <1.1 J | <1.1 J | | <1.1 J | <1.1 | <1.1 | <1.1 J | <1.1 J | | R |
| Trichloroethene | 4.2 | 5 | <1.1 [<1.1 J] | <1.1 J | <1.1 J | | <1.1 J | <1.1 | <1.1 | <1.1 J | <1.1 J | | R |
| Trichlorofluoromethane | 18.1 | -- | 1.6 [1.7 J] | 1.5 J | 1.6 J | | 1.6 J | 1.6 | 1.6 | 2.2 J | 1.5 J | | 0.23 J |
| 1,2,4-Trimethylbenzene | 9.5 | -- | <0.98 [<0.98 J] | <0.98 J | 1.2 J | | <0.98 J | <0.98 | <0.98 | <0.98 J | <0.98 J | | R |
| 1,3,5-Trimethylbenzene | 3.7 | -- | <0.98 [<0.98 J] | <0.98 J | <0.98 J | | <0.98 J | <0.98 | <0.98 | <0.98 J | <0.98 J | | R |
| m&p-Xylene | 22.2 | -- | 1.4 [1.7 J] | 1.5 J | 2.0 J | | 1.6 J | 1.6 | <0.87 | 1.0 J | 2.2 J | | 0.34 J |
| o-Xylene | 7.9 | -- | <0.87 [<0.87 J] | <0.87 J | <0.87 J | | <0.87 J | <0.87 | <0.87 | <0.87 J | <0.87 J | | R |
| **Compounds on National Grid Standard List, but not on NYSDEC DER TO-15 TCL (µg/m$^3$)** | | | | | | | | | | | | | |
| Acetone | 98.9 | -- | <12 [<12 J] | 43 J | <12 J | | 19 J | <12 | <12 | 13 J | <12 J | | R |
| Carbon Disulfide | 4.2 | -- | <1.6 [<1.6 J] | <1.6 J | 3.0 J | | 5.4 J | <1.6 | <1.6 | <1.6 J | <1.6 J | | R |
| Isopropyl alcohol | 250 | -- | <4.9 [<4.9 J] | <4.9 J | <4.9 J | | <4.9 J | <4.9 | <4.9 | 7.2 J | <4.9 J | | R |
| **National Grid Supplemental Compound List (µg/m$^3$)** | | | | | | | | | | | | | |
| n-Butane | -- | -- | <0.95 [<0.95 J] | 1.7 J | 1.7 J | | <0.95 J | 2.8 | 2.3 | 1.8 J | 1.7 J | | 0.77 J |
| n-Decane | 17.5 | -- | <5.8 [<5.8 J] | <5.8 J | <5.8 J | | <5.8 J | <5.8 | <5.8 | <5.8 J | <5.8 J | | R |
| Heptane | -- | -- | <2.0 [<2.0 J] | <2.0 J | <2.0 J | | <2.0 J | <2.0 | <2.0 | <2.0 J | <2.0 J | | R |
| Hexane | 10.2 | -- | <1.8 [<1.8 J] | <1.8 J | <1.8 J | | <1.8 J | <1.8 | <1.8 | <1.8 J | <1.8 J | | R |
| Nonane | 7.8 | -- | <2.6 [<2.6 J] | <2.6 J | <2.6 J | | <2.6 J | <2.6 | <2.6 | <2.6 J | <2.6 J | | R |
| Octane | 4.5 | -- | <1.9 [<1.9 J] | <1.9 J | <1.9 J | | <1.9 J | <1.9 | <1.9 | <1.9 J | <1.9 J | | R |
| Pentane | -- | -- | <3.0 [<3.0 J] | <3.0 J | <3.0 J | | <3.0 J | <3.0 | <3.0 | <3.0 J | <3.0 J | | R |
| n-Undecane | 22.6 | -- | <6.4 [<6.4 J] | <6.4 J | <6.4 J | | <6.4 J | <6.4 | <6.4 | <6.4 J | <6.4 J | | R |
| 1,2,3-Trimethylbenzene | -- | -- | <0.98 [<0.98 J] | <0.98 J | <0.98 J | | <0.98 J | <0.98 | <0.98 | <0.98 J | <0.98 J | | R |

TABLE 3
SUB-SLAB VAPOR, INDOOR AIR, AND AMBIENT AIR ANALYTICAL RESULTS FOR DETECTED VOCS ($\mu g/m^3$)

VAPOR INTRUSION INVESTIGATION REPORT
NATIONAL GRID
ERIE BOULEVARD FORMER MGP SITE
SYRACUSE, NEW YORK

Notes:

1. Samples collected by ARCADIS on the dates indicated.
2. Samples analyzed by TestAmerica, Inc. of Knoxville, Tennesse.
3. Analysis was performed using United States Environmental Protection Agency (USEPA) Compendium Method TO-15.
4. NYSDEC DER TO-15 TCL = New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER) Target Compound List (TCL) as presented in the February 2008 "NYSDEC Modifications to EPA Region 9 TO-15 QA/QC Criteria."
5. Compounds on "National Grid Standard List" and "Supplemental Compound List" are from Tables 2 and 7 of the "draft" Standard Operating Procedures document titled "Soil Vapor Intrusion Evaluation at National Grid MGP Sites in New York State", prepared by O'Brien & Gere, last updated September 2007.
6. Sample designations indicate the following:
   - SSV = Sub-slab vapor sample.
   - IA = Indoor air sample.
   - AA = Ambient (outdoor) air sample.
7. Concentrations for VOC constituents are reported in micrograms per cubic meter ($\mu g/m^3$).
8. < = Not detected above the associated reporting limit.
9. ND = Constituent was included in analysis as a tentatively-identified compound and was not detected. No reporting limit is available.
10. J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
11. R = The non-detect outdoor air sample results were rejected during data validation because the canister vacuum upon laboratory receipt was less than minus 1 inches mercury.
12. -- = None Available.
13. Field duplicate sample results are presented in brackets.
14. USEPA 90th Percentile Background Indoor Air Levels are the 90th percentile of background indoor air values observed by the United States Environmental Protection Agency (USEPA) in a study of public and commercial office buildings, per USEPA database information referenced in Section 3.2.4 of the "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (NYSDOH, October 2006) (NYSDOH SVI Guidance Document).
15. NYSDOH Air Guideline Values are from Table 3.1 of the NYSDOH SVI Guidance Document.
16. The results have been validated.

ARCADIS

Figures