ARCADIS
Infrastructure, environment, facilities

National Grid

Soil Vapor Investigation Work Plan

North Albany Service Center
Albany, New York

October 2008

ARCADIS

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North Albany Service Center
Albany, New York

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National Grid

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1. Introduction

1.1 General

This work plan describes proposed soil vapor investigation activities to be performed at the National Grid North Albany former manufactured gas plant (MGP) site (the "Site") located in Albany, New York. This work plan has been prepared in response to a verbal request from the New York State Department of Environmental Conservation (NYSDEC) during a February 4, 2008 site meeting. The NYSDEC requested that National Grid evaluate potential vapor intrusion to occupied onsite structures located within or in close proximity to areas where MGP-related subsurface impacts have been identified. The soil vapor investigation will be performed in general accordance with the National Grid document entitled *Standard Operating Procedures for Soil Vapor Intrusion Evaluation at National Grid MGP Sites in New York State* (O'Brien & Gere, latest revision September 2007) (hereinafter, "National Grid's Soil Vapor Sampling SOP").

The organization of this work plan is presented below, followed by a summary of relevant background information and the soil vapor investigation objectives.

1.2 Plan Organization

This work plan has been organized into the following sections:

Section	Purpose
Section 1 – Introduction	Presents background information relevant to the proposed soil vapor investigation.
Section 2 – Proposed Soil Vapor and Sub-Slab Vapor Investigation Activities	Presents a detailed description of proposed soil vapor investigation activities.
Section 3 – Reporting	Presents a description of the report to be prepared following completion of the soil vapor investigation field activities.
Section 4 – Schedule	Presents the anticipated schedule for implementing proposed soil vapor investigation activities.

1.3 Background Information

This section presents relevant background information used to develop the approach for the soil vapor investigation activities presented in this work plan. The site location and

history are described below, followed by a discussion of the geologic and hydrogeologic setting of the Site, and a summary of previous site investigations.

1.3.1 Site Description and History

The geographic location of the North Albany Service Center is shown on the Site Location Map presented as Figure 1. The Site is bordered by Broadway to the west, Interstate I-90 to the north, a Canadian Pacific (CP) Railroad right-of-way to the east, and Bridge Street to the south. Erie Boulevard, Interstate I-787, and the Hudson River are located to the east of the CP Railroad right-of-way. Land use in the surrounding area is primarily commercial/industrial, with residential areas located to the west of the facility.

The North Albany Service Center serves as the primary maintenance/supply and office facility for National Grid's operations in portions of eastern New York located north of the New York City Metropolitan Area. The North Albany Service Center is located on an approximately 25-acre parcel which consists of several buildings, parking lots, and storage areas. A Site Layout Plan is presented on Figure 2. Occupied buildings and other primary site features at the facility include the following:

- The Versaire Building is a warehouse and crew headquarters building. A storage shed, which is part of the former North Albany Treatment Storage and/or Disposal Facility (TSDF), is located along the western side of the Versaire Building.

- Building 2 is a slab-on-grade steel-framed building that was constructed in the 1930s and occupies a total footprint of approximately 70,000 square feet. The southern portion of the building consists of three stories and the northern half of the structure has two stories. The first floor is used for a variety of purposes, including mechanical rooms, loading dock and storage areas, a vehicle garage area, utility crew break rooms and support facilities, a machine shop area, a transformer maintenance shop, and offices. The second and third floors of the building are primarily occupied by offices, meeting rooms, and a cafeteria.

- A Vehicle Maintenance Building located in the northeastern section of the property. The Vehicle Maintenance Building is a two-story slab-on-grade structure. The first floor of the structure is a vehicle service garage with a series of large roll up overhead doors along the north and south sides of the building. A small second floor area of the building contains offices.

- A paved storage yard (the yard storage area) which extends across the southern portion of the Site. The yard storage area historically has been used to store various electrical equipment, cable spools, steel framing, and wood poles. National Grid implemented an interim remedial measure (IRM) during 2006 and 2007 that addressed surface and subsurface environmental concerns in the yard storage area.

- An electrical substation (the Genesee Street Substation) and gas regulator station are located at the northwestern corner of the property.

- A High Temperature Superconductive (HTS) Cable Control Building located in the northern portion of the Site. The HTS Control building is an occupied slab-on grade structure that contains mechanical and electrical systems associated with an ongoing electrical transmission research project.

Historical industrial usage of the property includes the MGP facility which operated in the northern portion of the Site from the 1870s through the 1940s, and electric/gas utility support services which began in connection with the MGP operation and continue to the present. Prior to being acquired by National Grid, the southern portion of the property was formerly used for ice storage and distribution, lumber planing and milling, and petroleum distribution operations. During the entire period of industrial usage of the Site (e.g., 1870s to present), the property has been bordered to the west by Broadway and to the east by the CP Railroad right-of-way (formerly the Delaware and Hudson Railway). Site usage to the east and south of the current property has varied and includes transportation facilities (railway and streetcar), lumber planing and milling, chemical manufacturing, and rendering.

The former MGP at the North Albany Service Center property initially used the coal-carbonization process. The MGP switched to the water gas process around the 1890s and to the carbureted water gas process prior to 1908. Various equipment and appurtenances associated with the MGP operation included a horizontal retort house, carbureted water gas sets, gas purification equipment, gas holders, oil-drip tanks, and tar pits/tar tanks. The layout of historical MGP features at the Site as indicated on Sanborn Mapping for the years 1892, 1908, and 1935 is shown on Figure 3.

1.3.2 Geology and Hydrogeology

The North Albany Service Center is located in the Hudson-Champlain Lowland physiographic province. Bedrock beneath the Site is the Black Snake Hill Shale. The depth to bedrock generally varies from 16 to 24 feet in the western/northwestern part of the Site, and is generally greater than 25 feet in the eastern/southeastern part of the Site.

Overburden soils in the vicinity of the Site consist of fill, glacial-fluvial deposits, and till. Surface and shallow subsurface soil in the vicinity of the Site consist of a mixture of imported fill and native materials that have been disturbed by excavation and grading activities.

Surface topography in the vicinity of the North Albany Service Center slopes gently towards the south and east. The majority of the North Albany Service Center property (including the entire footprint of the former MGP operation) is paved. Storm water is conveyed offsite via a series of catch basins, manholes, and piping.

Groundwater in the immediate vicinity of the Site flows towards the southeast and the groundwater table is located in a perched fill unit in the western and central portions of the Site, but decreases in elevation into a semi-confining unit along the eastern portion of the Site. The water table is generally encountered at a depth of approximately 10 to 15 feet below ground surface (bgs).

1.3.3 Previous Investigation Results

The presence and extent of MGP-related impacts at the Site has been extensively characterized by ongoing investigation and remedial activities that have been conducted since 1994. Based on results of the previous investigation and remedial activities, MGP-related impacts are primarily encountered in the northern portion of the property, in the vicinity of the former MGP operation. The primary MGP-related impacts identified at the Site include:

- MGP residuals (including coal tar and purifier waste) have been identified in onsite overburden soil and weathered shale bedrock. Coal tar has been identified in unsaturated soil in the northwest corner of the site (the current Genesee Street Substation) and purifier waste has been encountered in shallow unsaturated soil in the area immediately east of Building 2. Coal tar was also reportedly encountered in unsaturated soil within geotechnical borings that were completed in the eastern portion of Building 2 during the early 1990s. MGP residuals in overburden soil throughout the remainder of the former MGP area appear to be restricted to saturated soil located below the water table which is typically encountered at depths of approximately 10 to 15 feet bgs. MGP residuals were not identified in soil borings completed in the Vehicle Maintenance Building (in connection with the installation and replacement of hydraulic vehicle lifts) or in soil borings that were completed within the footprint of the HTS Control Building prior to construction.

- Benzene, toluene, ethylbenzene, and xylenes (BTEX compounds) and polynuclear aromatic hydrocarbons (PAHs) are present in onsite subsurface soil in the former MGP area at concentrations exceeding NYSDEC-recommended soil cleanup objectives. With the exception of the area in the immediate vicinity of a former relief gas holder located in the northwest corner of the property and the area of MGP purified waste identified immediately east of Building 2, soil impacts are primarily restricted to saturated soil.

- Dissolved-phase BTEX and PAHs have been detected in groundwater at the Site at concentrations exceeding groundwater screening levels (Table 1 of National Grid's Soil Vapor Sampling SOP). Results for detected BTEX and PAHs in groundwater samples collected at the Site during December 2006 are shown on Figure 4.

- DNAPL has been identified in shallow overburden soils, deep overburden soils, and weathered bedrock at the Site and immediately downgradient of the Site. DNAPL is primarily encountered in the former MGP area north of Building 2 and within the area immediately downgradient (east) of the site along the CP railroad right-of-way.

- LNAPL has been detected in the perched fill zone at the Site and immediately downgradient (east) of the Site along the CP railroad right-of-way. Onsite LNAPL is primarily encountered immediately north of Building 2 and in the vicinity of the current aboveground storage tank facility located immediately south of Building 2. Small quantities of LNAPL have previously been encountered on water in excavations completed below the floor slab in Building 2.

1.4 Soil Vapor and Sub-Slab Vapor Investigation Objectives

Based on the NYSDEC's request during the February 4, 2008 meeting, the presence and location of occupied buildings, the locations of the former MGP operations, and the identified MGP-related impacts in soil and groundwater at the Site, the soil vapor investigation activities proposed in this work plan will be performed to evaluate the following:

- Potential for vapor intrusion in the Vehicle Maintenance Building.

- Potential for vapor intrusion in Building 2.

- Potential for vapor intrusion in the HTS Control Building.

2. Proposed Soil Vapor and Sub-Slab Vapor Investigation Activities

2.1 General

The proposed soil vapor and sub-slab vapor investigation activities that will be conducted to address the objectives presented in Section 1.4 will consist of the following:

- A building reconnaissance and product inventory within Building 2, the Vehicle Maintenance Building, and the HTS Control Building.
- Outdoor ambient samples to evaluate background conditions in the vicinity of the Site.
- Soil vapor sampling to evaluate potential vapor intrusion in the HTS Control Building.
- Sub-slab vapor sampling within two occupied buildings within the vicinity of the former MGP, including Building 2 and the Vehicle Maintenance Building.

A discussion of the proposed building reconnaissance and product inventory activities is presented below, followed by a discussion of the proposed soil vapor and sub-slab vapor sampling activities.

2.2 Building Reconnaissance and Product Inventory

ARCADIS will conduct a preliminary building reconnaissance and general product inventory accompanied by personnel from the North Albany Service Center. The reconnaissance and general product inventory will focus on Building 2, the Vehicle Maintenance Building, and the HTS Control Building.

The building reconnaissance will be performed to observe the building layouts and construction and to identify locations where VOCs (if present in the subsurface) could potentially enter the buildings. As part of this task, ARCADIS will review drawings (if available) to collect information related to the depth of footings, basements, foundation walls, doorways, equipment, and other factors that influence pressure, ventilation, and air movement in the buildings. If sufficient drawings are not available, ARCADIS will conduct a field reconnaissance to collect the building layout and construction information. ARCADIS will document observed floor penetrations, cracks, or other preferential pathways that could potentially serve as a route for vapors to enter the buildings. The results of the building reconnaissance will be used to modify the proposed soil vapor and sub-slab soil vapor sampling locations.

The general product inventory will be performed to document products containing VOCs (or potentially containing VOCs) that are used, handled, or stored in the buildings. The chemical inventory should be a general survey of chemical storage locations and handling practices to assess potential indoor air sources.

Photographs of the buildings will be taken during the reconnaissance and general product inventory activities. Results of the reconnaissance and general product inventory will be documented on the New York State Department of Health's (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"]).

As a final step of the building reconnaissance, ARCADIS will obtain and review readily available mapping showing locations, depths, construction materials, and bedding for underground utilities located in the vicinity of the proposed soil vapor and sub-slab vapor sampling locations. The map information will support an evaluation of potential soil vapor migration pathways. Soil vapor and sub-slab vapor sampling locations identified in the work plan will be adjusted (in consultation with the NYSDEC/NYSDOH onsite representative), as needed, based on locations of underground utilities (to avoid direct contact with the utilities) and to minimize disruption of the operations at the facility.

2.3 Soil Vapor Sampling

Soil vapor sampling will be performed following completion of the building reconnaissance and product inventory activities. As part of the proposed soil vapor investigation, a soil vapor sample will be collected from a temporary soil vapor probe installed near the southwest corner of the HTS Control Building (sample location SV-1, as shown on Figure 5). One soil vapor sample will be collected from a depth of approximately 4 to 5 feet bgs (below the soil frost line at the approximate depth of the building foundation footers). The soil vapor sample will be collected using a pre-cleaned 6-Liter SUMMA® canister with an attached flow regulator. The flow regulator will be pre-set to draw soil vapor at a uniform rate over an approximate 2-hour period (i.e, at approximately 200 mL/min). The sampling location will be adjusted, as needed, based on the presence of underground utilities and the results of the building reconnaissance. The location and ground surface elevation of the final sampling location will be documented by land surveying activities performed by ARCADIS.

Work activities to be performed in connection with the soil vapor sampling include installing and purging the temporary soil vapor probe, completing a tracer gas test, and collecting a

soil vapor sample for laboratory analysis. Details of these work activities are presented in Appendix A to National Grid's Soil Vapor Sampling SOP, with the following modifications:

1. A machined stainless steel implant will not be utilized. Under the revised approach, a "twist-to-lock" connector attached to inert sample tubing will be lowered through small-diameter steel drive rods and threaded into an expendable point holder. Instead of being drawn from a stainless steel implant, soil vapor will be drawn from the void created when the expendable drive point is disengaged (pulled up approximately 0.5 feet) from the expendable point, as detailed below.

2. A filter pack and a bentonite slurry will not be needed. Under the revised approach, steel drive rods inserted into the subsurface will be kept in-place during sampling (there will be no "open" borehole to seal). The "twist-to-lock" connector will isolate the sampling interval from atmospheric air inside the steel drive rods, as detailed below.

The proposed changes to the SOP are consistent with soil vapor sampling procedures that have previously been implemented for the National Grid Watertown (Engine Street) and Ogdensburg (King Street) former MGP sites and for proposed soil vapor sampling to be conducted for the National Grid Hiawatha Boulevard former MGP site. The changes to the SOP will provide for collection of a representative sample while: (1) minimizing interference that might otherwise occur through use of a machined steel implant and other non-native materials (filter pack, bentonite grout); and (2) minimizing the amount of investigation-derived waste materials (steel implant, filter pack, and bentonite) that would otherwise be generated.

At the proposed soil vapor sampling location, the PowerProbe™ rig will be used to advance an assembly consisting of interconnected 4-foot lengths (as needed) of 1.25"-inch diameter steel probe rod, affixed with an expendable point holder and expendable point at the downhole end, to the desired sampling depth. Bentonite will be used to seal the space (if any) between the steel rod and borehole wall to further isolate the subsurface interval from atmospheric air. After the target depth is reached, the expendable point will be disengaged by hydraulically retracting the steel probe rod upwards approximately 0.5-feet to create a void in the subsurface for soil vapor sample collection. A food-grade (inert) Teflon-lined polyethylene or fluoropolymer sample delivery tube (3/16" or 1/4" inside diameter) with an attached Post-Run-Tubing (PRT) threaded adapter (a "twist-to-lock" connector) will be lowered through the 1.25"-diameter steel rod and threaded into the expendable point holder. Digital photographs will be taken to document the soil vapor probe installation and subsequent purging and sampling activities.

2.4 Sub-Slab Vapor Sampling

Sub-slab vapor sampling will be performed following completion of the building reconnaissance and product inventory activities. As part of the proposed sub-slab vapor investigation, sub-slab vapor samples will be collected from temporary sub-slab vapor probes installed at 6 onsite sampling locations (locations SS-1 through SS-6), as shown on Figure 5. Sub-slab sampling locations will be modified as necessary based on the results of the building reconnaissance activities as discussed in Section 2.2. The sub-slab sampling locations will be installed, purged and samples will be collected in accordance with Appendix D to National Grid's Soil Vapor Sampling SOP. Foundation/floor sub-slab vapor sampling locations will be restored following completion of the sampling activities.

Sub-slab vapor sampling will be performed at one sample interval per location and will involve use of a pre-cleaned 6-Liter SUMMA® canister with an attached flow regulator. The flow regulator will be pre-set to draw soil vapor at a uniform rate over an approximate 2-hour period (i.e, at approximately 200 mL/min). Sub-slab vapor samples will generally be collected at a depth approximately 2 inches below the slab.

The sampling locations will be adjusted, as needed, based on the results of the building reconnaissance, access considerations, the presence of underground utilities, and in coordination with facility personnel to minimize disruption to the facility operations. The location and finished floor elevation of each sub-slab sampling location will be documented based on building record drawings.

2.5 Ambient Air Sampling

A minimum of two upwind (relative to Building 2, the Vehicle Maintenance Building, and the HTS Control Building) ambient air samples will be collected during the soil vapor and sub-slab vapor sampling event. At least one upwind ambient air sample will be collected for each day of sampling activities. The ambient air sample collection will be performed in accordance with the procedures presented in Appendix B to National Grid's Soil Vapor Sampling SOP.

The proposed air sampling will also involve use of a pre-cleaned 6-liter SUMMA® canister with an attached flow regulator and will be collected approximately 4-5 ft abovegrade. The location of the ambient air sample(s) will be determined by field personnel the day of sampling based on wind direction and will be documented by land surveying activities performed by ARCADIS.

2.6 Quality Assurance/Quality Control

Key QA/QC measures to be implemented in connection with the soil vapor sampling include obtaining multiple canister vacuum readings, using a tracer gas, and collecting and analyzing duplicate samples, as discussed below.

Four sets of SUMMA® canister vacuum readings will be obtained in connection with sampling and analysis: (1) following canister cleaning for shipping to the field; (2) prior to sampling, with all the connections and leak checks completed; (3) at the end of sampling; and (4) prior to analysis in the laboratory. Vacuum readings (1) and (2) are expected to be within 5 in. of Hg, as are vacuum readings (3) and (4). Additional canisters will be available in the field for use in the event that vacuum reading (2) is less than reading (1) by > 5 in. of Hg. If vacuum readings (3) and (4) are outside of 5 in. of Hg, the vacuum differences will be taken into consideration during the results evaluation, and the results will be qualified, as needed.

A tracer gas (helium) will be used in connection with the soil vapor sampling to evaluate the integrity of the seals around the soil vapor probe. The tracer gas will provide a means to: (1) evaluate whether the soil vapor samples could be diluted by surface air; and (2) determine if improvements to the seals might be needed prior to sampling. Additional detail on the use of tracer gas is provided in the National Grid's Soil Vapor Sampling SOP.

Field duplicates will be collected in support of the soil vapor investigation at a frequency of one duplicate per 10 samples, with at least one duplicate per sample delivery group. Based on the total number of soil vapor and ambient air samples to be collected as part of the soil vapor investigation (1 soil vapor plus 6 sub-slab vapor plus 2 air samples), one field duplicate sample will be collected and submitted for laboratory analysis for QA/QC purposes.

Equipment blanks and trip blanks will not be used for the proposed investigation for the following reasons:

- The tubing to be used for the soil vapor sampling will be manufactured from laboratory- or food-grade quality inert material (i.e., fluoropolymer) that does not adsorb or off-gas VOCs. All vapor probe materials (e.g., sampling point, tubing, valves, and fittings) will be new, and prior to sampling the vapor probe and attached tubing will be purged until one to three volumes are evacuated. In the remote chance that the tubing were to be a source of VOCs in the soil vapor samples, this could be identified by comparing results from one location to the next [for similar levels of a particular constituent(s)].

- SUMMA® canister vacuum readings obtained prior to shipment and following laboratory receipt will be compared. If the vacuum readings prior to and following shipment are consistent, this will support that gases did not enter or escape from the canisters while in transit (i.e., there was no cross-contamination of VOCs or introduction of VOCs during shipping and handling).

2.7 Laboratory Analysis

The soil vapor and ambient air samples will be submitted to TestAmerica Laboratories, Inc. (TestAmerica) located in Knoxville, Tennessee for laboratory analysis for VOCs in accordance with United States Environmental Protection Agency (USEPA) Compendium Method TO-15. The VOC analyte list and associated detection limits are presented in Table 1. The soil vapor samples will also be analyzed for helium using ASTM Method D1946 to verify the vapor seal performance during sampling. TestAmerica is New York State Environmental Laboratory Approval Program (ELAP) certified to perform TO-15 air sample analyses. Laboratory analysis will be performed on a standard turn-around for reporting of analytical results (i.e., approximately three weeks following sample collection). The deliverable package provided by the laboratory will include the following items:

- Chain of custody forms.
- Instrument run logs with time and date information.
- A case narrative describing any QC problems (i.e. initial calibration, continuing calibration, system blank contamination) encountered by the lab, or conversely, a statement saying that there were no QC problems. The case narrative shall include a written statement with regard to sample holding times from collection to analysis (30 days for SUMMA® canisters).
- Contract Laboratory Procedure (CLP) Form I sheets for each sample analyzed plus total/extracted ion chromatograms.
- CLP Form II, system monitoring compound (surrogate) recoveries.
- CLP Form IV, system, field and trip blanks, where applicable.
- CLP Form V, GC/MS instrument performance check for bromofluorobenzene.

- CLP Form VI, GC/MS initial calibration form.

- CLP Form VII, internal standard area and retention time summaries.

- Starting and ending vacuum/pressure readings of each sample canister. If the laboratory pressurizes the canisters during the sample analysis, it will apply the appropriate dilution factor. The information used by the laboratory to calculate the dilution factor will be presented in the laboratory analytical data report.

Matrix spike/matrix spike duplicate (MS/MSD) recoveries and relative percent differences (RPDs) are not included under USEPA Method TO-15. Results for laboratory control/laboratory control spike (LC/LCS) samples will instead be provided in accordance with the analytical method.

2.8 Decontamination/Waste Management

Prior to moving from one soil vapor or sub-slab vapor sampling location to the next, all downhole equipment (i.e., steel rods, expendable point holder) will be decontaminated by washing with Alconox and water and then rinsing with deionized water. Following completion of the sampling activities, the boreholes will be backfilled with bentonite grout. Soil vapor sample tubing will be placed in steel 55-gallon drums for offsite transportation and disposal. Water generated by the decontamination activities will be containerized in separate steel 55-gallon drums for offsite transportation and disposal.

3. Reporting

Unvalidated analytical results for the soil vapor, sub-slab vapor and ambient air samples will be submitted to the NYSDEC and NYSDOH within 48 hours of receipt from the laboratory. In addition, a summary report will be prepared following receipt of the laboratory analytical results. The report will include:

- A summary of work activities performed and analytical results obtained for the soil vapor investigation.
- An identification of potential VOC sources observed during the building reconnaissance/product inventory and soil vapor investigation, including outdoor sources that could bias soil vapor sampling results (vehicles, lawn mowers/snow removal equipment, construction equipment, etc.).
- An evaluation of the soil vapor results, including comparisons to potential screening values (discussed below).
- Data tables presenting validated laboratory analytical results.
- Figures showing the surveyed ambient air and soil vapor sampling locations, tie-in locations for sub-slab vapor sampling locations and corresponding laboratory analytical results.
- A copy of the data validation report. Validation of the soil vapor analytical results will be performed in accordance with procedures in the USEPA National Functional Guidelines dated October 1999.
- An electronic copy of the full laboratory analytical data reports.
- Recommendations for follow-up activities or no further action related to soil vapor, as appropriate.

4. Schedule

ARCADIS is prepared to implement the proposed soil vapor and sub-slab vapor sampling activities shortly following NYSDEC/NYSDOH approval of this work plan. The proposed field activities will take approximately two weeks to complete. Preliminary laboratory analytical results for the soil vapor sampling activities will be available approximately three weeks following sampling. Data validation is anticipated to be completed within approximately one month following receipt of the final laboratory analytical results. The summary letter report will be submitted to the NYSDEC/NYSDOH approximately five weeks after the laboratory analytical results are validated.

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Tables

TABLE 1
TARGET ANALYTE LIST AND REPORTING LIMITS

SOIL VAPOR INVESTIGATION WORK PLAN
NATIONAL GRID
NORTH ALBANY SERVICE CENTER
ALBANY, NEW YORK

Analyte	CAS Number	Molecular Weight	Reporting Limit (ppbv)	Reporting Limit ($\mu g/m^3$)
NYSDEC DER TO-15 TCL				
Benzene	71-43-2	78.11	0.20	0.64
Benzyl chloride	100-44-7	140.57	0.40	2.3
Bromodichloromethane	75-27-4	163.83	0.20	1.3
Bromoform	75-25-2	252.75	0.20	2.1
Bromomethane (Methyl bromide)	74-83-9	94.95	0.20	0.78
2-Butanone (Methyl ethyl ketone)	78-93-3	72.11	1.0	2.9
Carbon Tetrachloride	56-23-5	153.84	0.20	1.3
Chlorobenzene	108-90-7	112.56	0.20	0.92
Chloroethane	75-00-3	64.52	0.20	0.53
Chloroform	67-66-3	119.39	0.20	0.98
Chloromethane (Methyl chloride)	74-87-3	50.49	0.50	1.0
Cyclohexane	110-82-7	84.16	0.50	1.7
Dibromochloromethane	124-48-1	208.29	0.20	1.7
1,2-Dibromoethane	106-93-4	187.88	0.20	1.5
1,2-Dichlorobenzene	95-50-1	147.01	0.20	1.2
1,3-Dichlorobenzene	541-73-1	147.01	0.20	1.2
1,4-Dichlorobenzene	106-46-7	147.01	0.20	1.2
Dichlorodifluoromethane (Freon 12)	75-71-8	120.92	0.20	0.99
1,1-Dichloroethane	75-34-3	98.97	0.20	0.81
1,2-Dichloroethane	107-06-2	98.96	0.20	0.81
1,1-Dichloroethene	75-35-4	96.95	0.20	0.79
1,2-Dichloroethene (cis)	156-59-2	96.95	0.20	0.79
1,2-Dichloroethene (trans)	156-60-5	96.95	0.20	0.79
1,2-Dichloropropane	78-87-5	112.99	0.20	0.92
cis-1,3-Dichloropropene	10061-01-5	110.98	0.20	0.91
trans-1,3-Dichloropropene	10061-02-6	110.98	0.20	0.91
1,2-Dichlorotetrafluoroethane (Freon 114)	76-14-2	170.93	0.20	1.4
1,4-Dioxane	123-91-1	88.11	0.50	1.8
Ethanol *	64-17-5	46.07	0.20	0.38
Ethylbenzene	100-41-4	106.16	0.20	0.87
Hexachlorobutadiene	87-68-3	260.76	1.0	10.7
n-Hexane	110-54-3	86.18	0.50	1.8
Methylene Chloride	75-09-2	84.94	0.50	1.7
4-Methyl-2-pentanone (MIBK)	108-10-1	100.16	0.50	2.0
MTBE (Methyl tert-butyl ether)	1634-04-4	88.15	1.0	3.6
Styrene	100-42-5	104.14	0.20	0.85
Tertiary Butyl Alcohol (TBA)	76-65-0	74.12	2.0	6.1
1,1,2,2-Tetrachloroethane	79-34-5	167.86	0.20	1.4
Tetrachloroethene (PCE)	127-18-4	165.85	0.20	1.4
Toluene	108-88-3	92.13	0.20	0.75
1,2,4-Trichlorobenzene	120-82-1	181.46	1.0	7.4
1,1,1-Trichloroethane	71-55-6	133.42	0.20	1.1
1,1,2-Trichloroethane	79-00-5	133.42	0.20	1.1
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)	76-13-1	187.38	0.20	1.5
Trichloroethene (TCE)	79-01-6	131.40	0.20	1.1
Trichlorofluoromethane (Freon 11)	75-69-4	137.38	0.20	1.1
1,2,4-Trimethylbenzene	95-63-6	120.19	0.20	0.98
1,3,5-Trimethylbenzene	108-67-8	120.19	0.20	0.98
2,2,4-Trimethylpentane	540-84-1	114.23	0.50	2.3
Vinyl Chloride	75-01-4	62.50	0.20	0.51

TABLE 1
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ALBANY, NEW YORK

Analyte	CAS Number	Molecular Weight	Reporting Limit (ppbv)	Reporting Limit ($\mu g/m^3$)
NYSDEC DER TO-15 TCL (cont'd)				
Xylenes (m&p)	1330-20-7	106.16	0.20	0.9
Xylenes (o)	95-47-6	106.16	0.20	0.87
Compounds on National Grid Standard List, but not on NYSDEC DER TO-15 TCL				
Acetone (2-propanone)	67-64-1	58.08	5.0	12
Bromoethene	593-60-2	106.96	0.20	0.87
1,3-Butadiene	106-99-0	54.09	0.40	0.88
Carbon Disulfide	75-15-0	76.14	0.50	1.6
3-Chloropropene (allyl chloride)	107-05-1	76.53	0.20	0.63
2-Chlorotoluene	95-49-8	126.59	0.40	2.1
4-Ethyltoluene (p-ethyltoluene)	622-96-8	120.20	0.40	2.0
n-Heptane	142-82-5	101.20	0.50	2.1
Isopropyl Alcohol	67-63-0	61.09	2.0	5.0
Methyl Butyl Ketone	591-78-6	100.16	0.50	2.0
National Grid Supplemental Compound List				
n-Butane	106-97-8	58.12	0.40	1.0
n-Decane	124-18-5	142.29	1.0	5.8
n-Dodecane	112-40-3	170.34	1.0	7.0
n-Nonane	111-84-2	128.26	0.50	2.6
n-Octane	111-65-9	114.23	0.40	1.9
n-Pentane	109-66-0	72.15	1.0	3.0
n-Undecane	1120-21-4	156.31	1.0	6.4
1,2,3-Trimethylbenzene**	80-62-6	120.19	0.20	1.0
Naphthalene	91-20-3	128.17	0.50	2.6
1-Methylnaphthalene**	90-12-0	142.20	2.50	15
2-Methylnaphthalene**	91-57-6	142.20	2.50	15
Tetramethylbenzene*	25619-60-7	134.21	TBD	TBD
Indene**	95-13-6	116.16	0.40	1.9
Indane**	496-11-7	118.18	0.20	1.0
Thiophene**	110-02-1	84.14	0.20	0.7

Notes:

1. 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."
2. 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.
3. Analyses to be performed by TestAmerica Laboratories, Inc. located in Knoxville,Tennessee using United States Environmental Protection Agency (USEPA) Compendium Method TO-15.
4. CAS = Chemical Abstract Services.
5. Molecular weights are presented in grams per mole.
6. ppbv = parts per billion volumetric basis.
7. $\mu g/m^3$ = micrograms per cubic meter.
8. TBD = To be determined; reporting limit not available.
9. * = Compound to be included in laboratory analysis as a tentatively identified compound (TIC).
10. ** = 1-point calibration.

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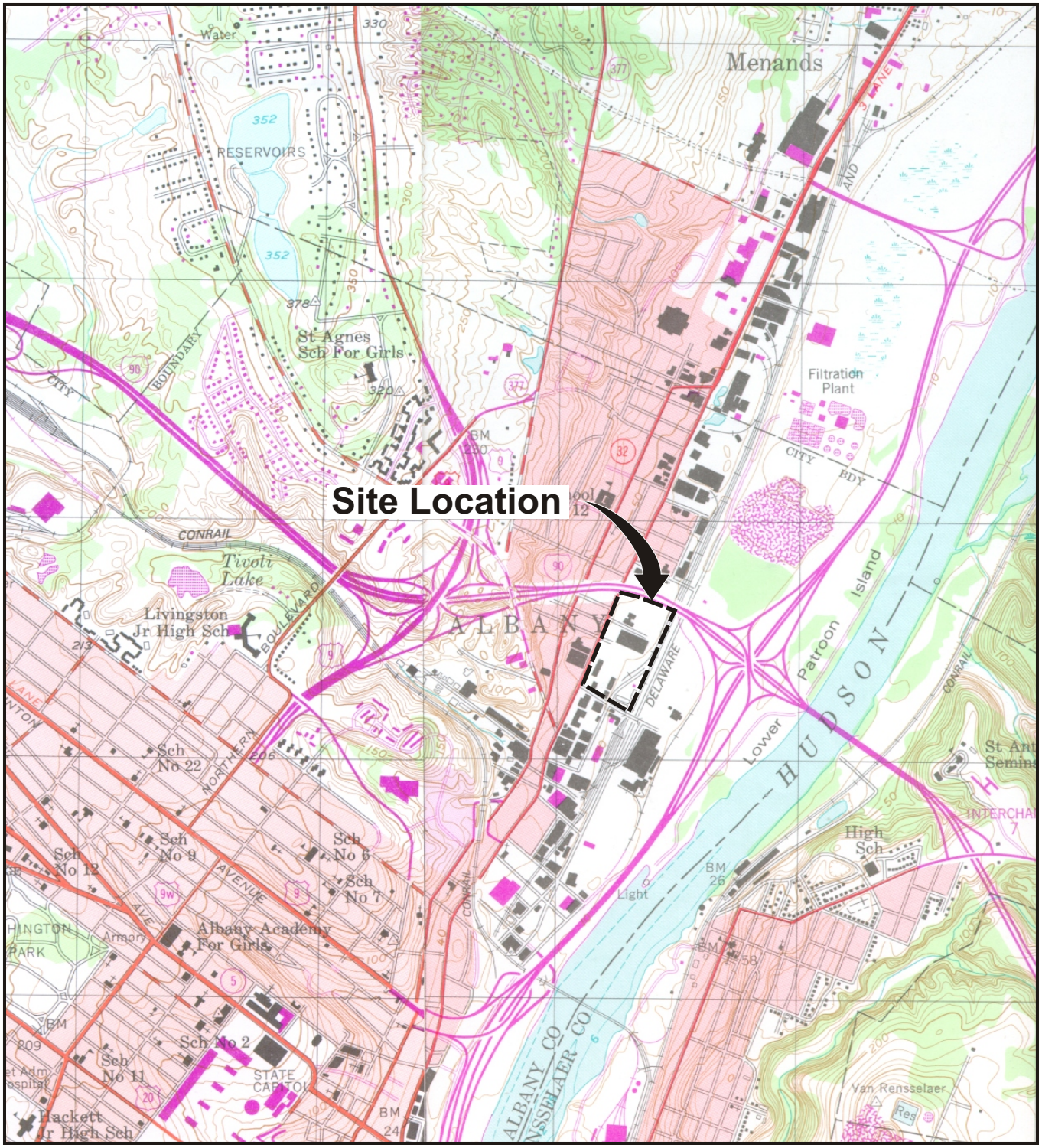
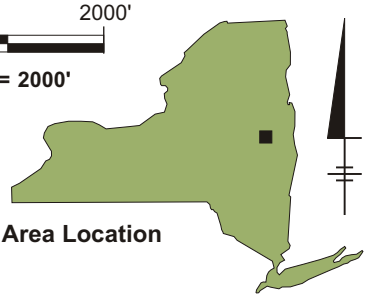
Figures



REFERENCE: Base Map USGS Quads., Albany, New York, 1980 and Troy South, New York, 1980.

2000' 0 2000'

Approximate Scale: 1" = 2000'



Area Location

NATIONAL GRID
NORTH ALBANY SERVICE CENTER
ALBANY, NEW YORK

SOIL VAPOR INVESTIGATION WORK PLAN

SITE LOCATION MAP

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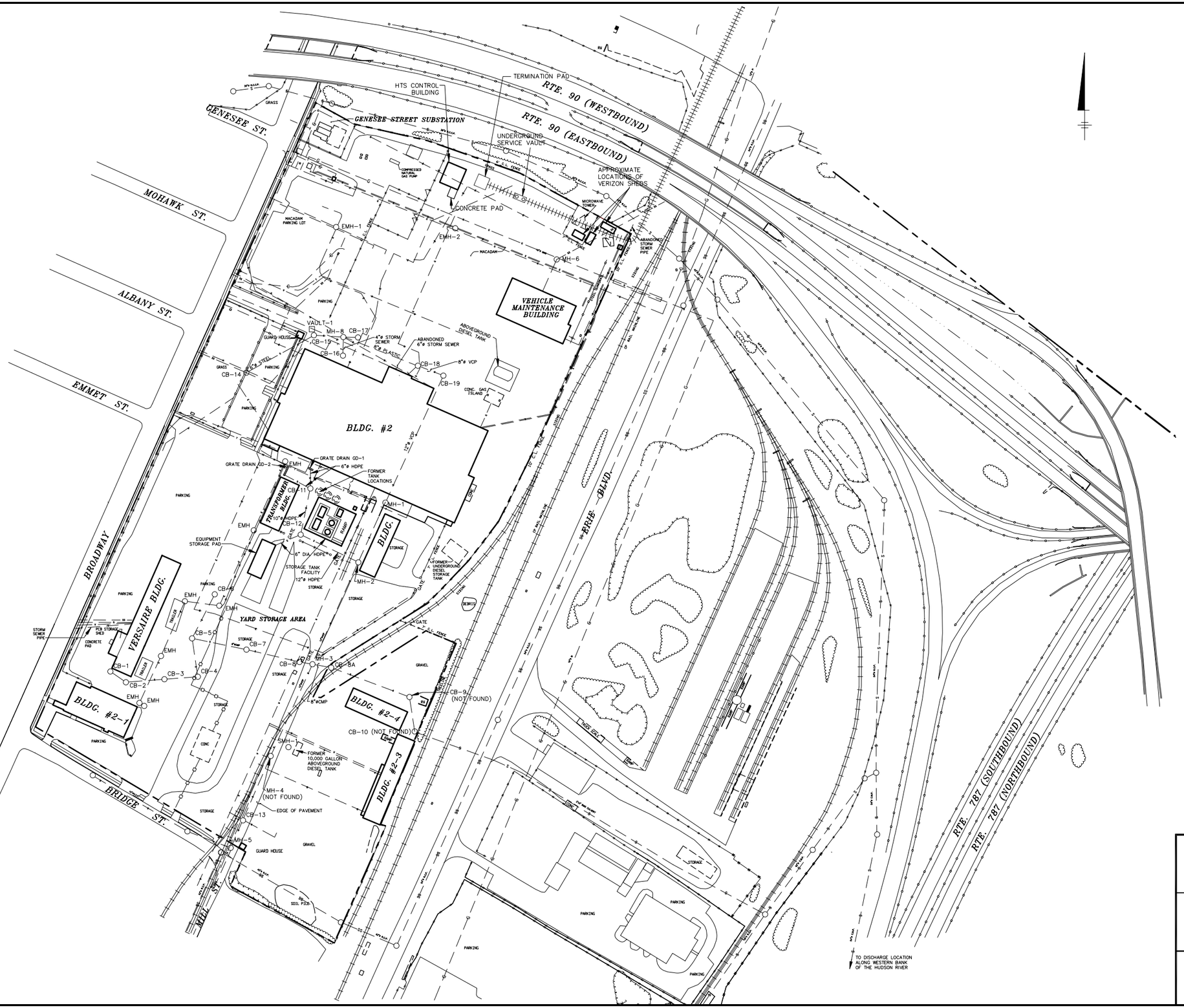
FIGURE
1

03/20/08 SYR-D85-DJH, KLS
B0036648/0000/00006/CDR/36648N02.CDR



NOTES:

1. BASE MAP (INCLUDING BUILDING LOCATIONS AND PSA/IRM SAMPLING LOCATIONS) DEVELOPED FROM ELECTRONIC FILE OF NIAGARA MOHAWK POWER CORPORATION (NMPC) DRAWING NO. C–29736–C, DATED JULY 1994, ENTITLED NORTH ALBANY SERVICE CENTER HAZARDOUS WASTE MANAGEMENT PERMIT APPLICATION, TOPOGRAPHIC MAP – INDEX SHEET.
2. LOCATIONS OF UNDERGROUND UTILITIES (INCLUDING ON–SITE STORM SEWERS, SANITARY SEWERS, TELEPHONE LINES, ELECTRICAL LINES, GAS LINES, WATER LINES, AND CABLE) WERE DIGITIZED FROM NMPC DRAWING NO. D–29734–E, FILE INDEX NO. 20.3–A1.1–82, DATED JUNE 27, 1994, ENTITLED NORTH ALBANY SERVICE CENTER SITE PLAN – PAVING (OUTSIDE FENCE). LOCATIONS OF NATURAL GAS MAINS ARE APPROXIMATED BASED ON FIELD OBSERVATIONS DURING UTILITY LOCATING ACTIVITIES. ACTUAL LOCATIONS OF UNDERGROUND GAS UTILITIES MUST BE DETERMINED PRIOR TO IMPLEMENTING SUBSURFACE WORK ACTIVITIES.
3. LOCATIONS OF MANHOLES AND CATCH BASINS WERE OBTAINED FROM A SURVEY CONDUCTED BY NMPC DURING JULY/AUGUST 1997.
4. LOCATIONS OF OFF–SITE STORM AND SANITARY SEWERS WERE DIGITIZED FROM CITY OF ALBANY DRAWINGS AND ARE APPROXIMATE.
5. LOCATIONS OF SOIL BORINGS SB–179 AND SB–180 WERE MEASURED IN THE FIELD AND ARE APPROXIMATE.

NATIONAL GRID
NORTH ALBANY SERVICE CENTER
ALBANY, NEW YORK

SOIL VAPOR INVESTIGATION WORK PLAN

SITE LAYOUT PLAN

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FIGURE
2

CITY:SYR DIV/GROUP:085 DB:RGB RCA WILJ LD: PIC: PM: TM: LYRON="OFF"REF"
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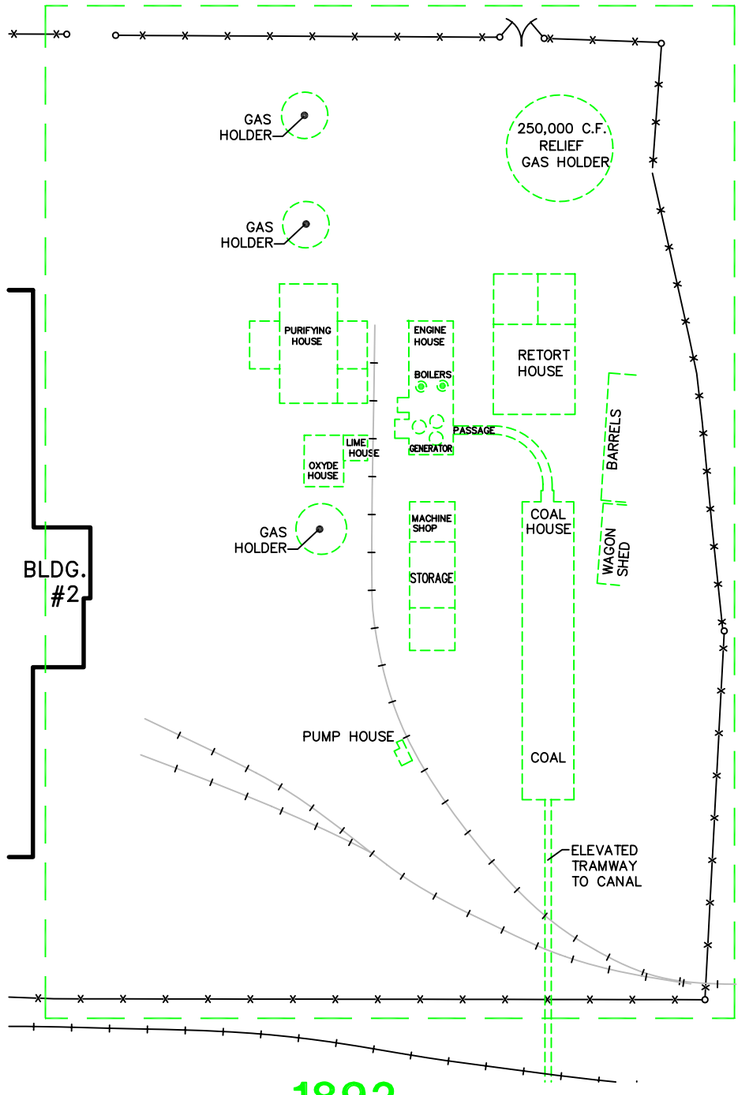
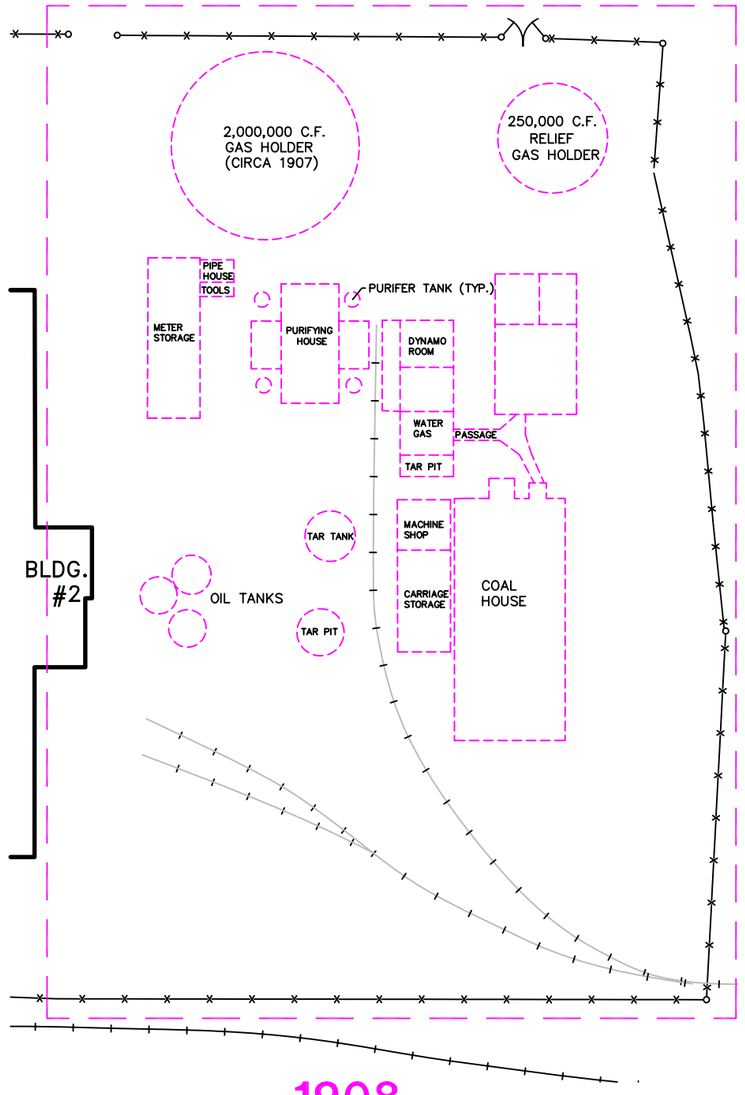
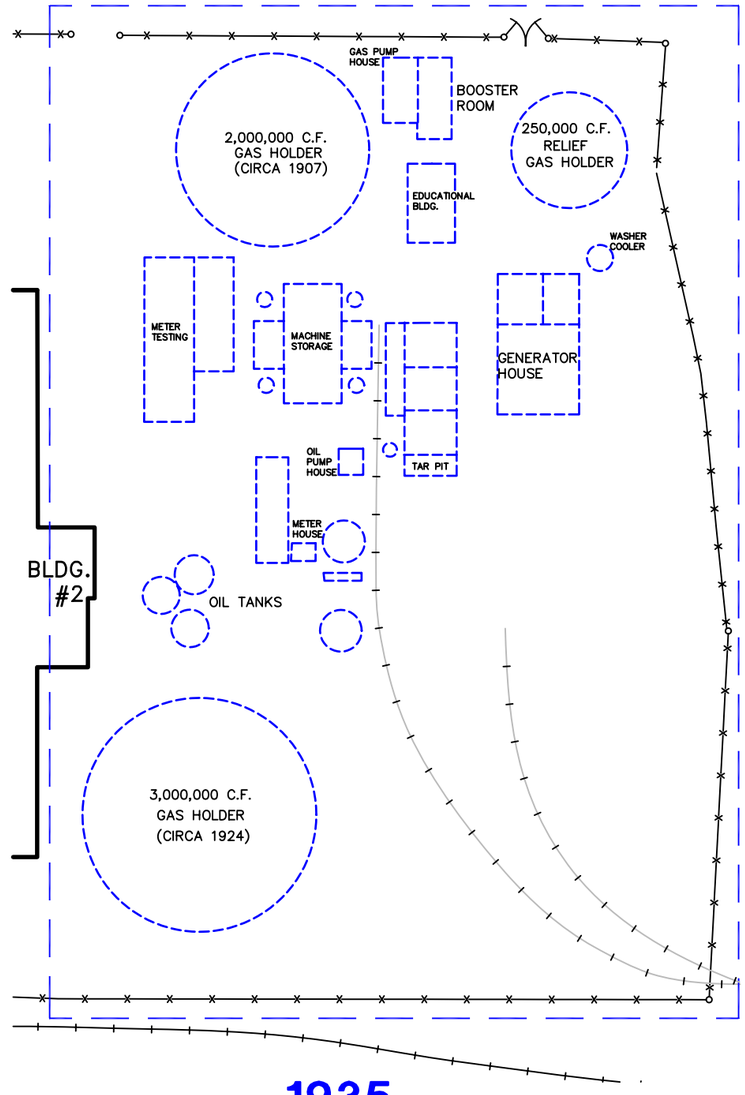
XREFS:
36648X00
36648X01
IMAGES:
PROJECTNAME: ---



1892



1908



1935

NOTES:

1. BUILDING 2 AND EXISTING FENCE LOCATION DIGITIZED FROM NIAGARA MOHAWK POWER CORPORATION DRAWING NO. D-24687-E, FILE NO. INDEX 20.3-A1.1-B2, DATED 10/29/85.
2. HISTORIC STRUCTURE LOCATIONS ARE BASED ON ENGINEERING-SCIENCE FIGURE NO. 3.2, "MGP SITE PLAN" AND HISTORICAL MAPS INCLUDING SANBORN FIRE INSURANCE MAPS. SITE FEATURE LOCATIONS ARE APPROXIMATE.
3. C.F. = CUBIC FEET

LEGEND

- EXISTING FENCE
- EXISTING RAILROAD
- FORMER RAILROAD

100' 0 100'

SCALE: 1" = 100'

NATIONAL GRID
NORTH ALBANY SERVICE CENTER
ALBANY, NEW YORK

SOIL VAPOR INVESTIGATION WORK PLAN

HISTORICAL SITE FEATURES

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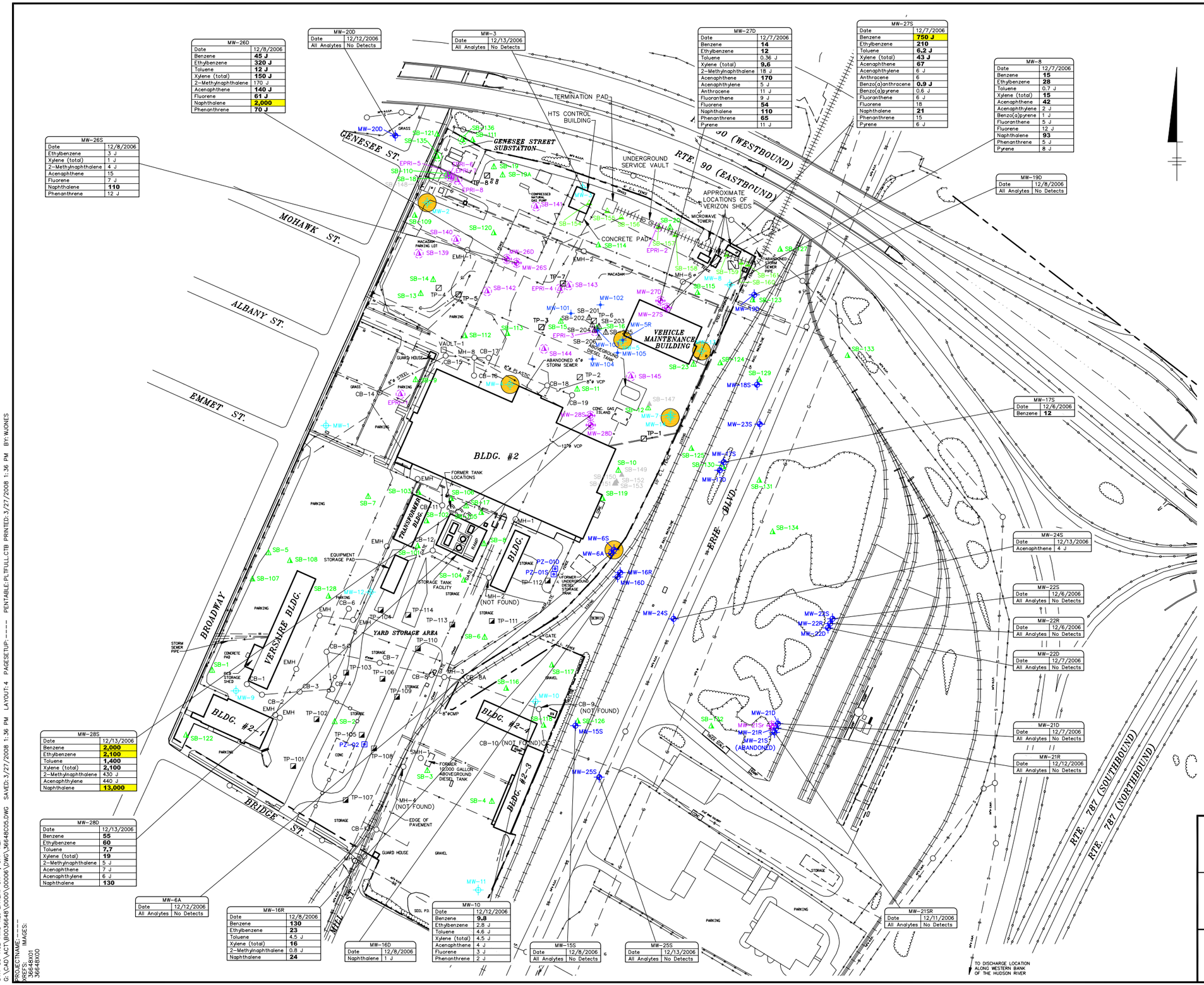
FIGURE 3



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PROJECTNAME:----
XREFS: IMAGES:
36648X01
36648X02

LEGEND:

- APPROXIMATE LOCATION OF HIGH TEMPERATURE SUPERCONDUCTIVE CABLE
- GUARD RAIL
- FENCE
- EXISTING RAILROAD
- APPROXIMATE PROPERTY LINE
- △ SV-1 SOIL VAPOR SAMPLE LOCATION
- ▲ SS-1 SUB-SLAB VAPOR SAMPLE LOCATION
- ○ CB-2 EXISTING CATCH BASIN
- ○ MH-1 EXISTING STORM SEWER MANHOLE
- ○ EMH-1 EXISTING ELECTRICAL MANHOLE
- ○ TMH-1 EXISTING TELEPHONE MANHOLE
- ○ GMH-1 EXISTING UTILITY MANHOLE
- STORM SEWER
- SANITARY SEWER
- TELEPHONE LINE
- ELECTRICAL LINE
- GAS LINE
- WATER LINE
- CABLE LINE
- FORMER MGP STRUCTURE

NOTES:

1. BASE MAP (INCLUDING BUILDING LOCATIONS AND PSA/IRM SAMPLING LOCATIONS) DEVELOPED FROM ELECTRONIC FILE OF NIAGARA MOHAWK POWER CORPORATION (NMPC) DRAWING NO. C-29736-C, DATED JULY 1994, ENTITLED NORTH ALBANY SERVICE CENTER HAZARDOUS WASTE MANAGEMENT PERMIT APPLICATION, TOPOGRAPHIC MAP – INDEX SHEET.
2. LOCATIONS OF UNDERGROUND UTILITIES (INCLUDING ON-SITE STORM SEWERS, SANITARY SEWERS, TELEPHONE LINES, ELECTRICAL LINES, GAS LINES, WATER LINES, AND CABLE) WERE DIGITIZED FROM NMPC DRAWING NO. D-29734-E, FILE INDEX NO. 20.3-A1.1-B2, DATED JUNE 27, 1994, ENTITLED NORTH ALBANY SERVICE CENTER SITE PLAN – PAVING (OUTSIDE FENCE). LOCATIONS OF NATURAL GAS MAINS ARE APPROXIMATED BASED ON FIELD OBSERVATIONS DURING UTILITY LOCATING ACTIVITIES. ACTUAL LOCATIONS OF UNDERGROUND GAS UTILITIES MUST BE DETERMINED PRIOR TO IMPLEMENTING SUBSURFACE WORK ACTIVITIES.
3. LOCATIONS OF MANHOLES AND CATCH BASINS WERE OBTAINED FROM A SURVEY CONDUCTED BY NMPC DURING JULY/AUGUST 1997.
4. LOCATIONS OF OFF-SITE STORM AND SANITARY SEWERS WERE DIGITIZED FROM CITY OF ALBANY DRAWINGS AND ARE APPROXIMATE.
5. SAMPLE LOCATIONS WILL BE ADJUSTED BASED ON THE RESULTS OF THE BUILDING RECONNAISSANCE.

0 60' 120'
GRAPHIC SCALE

NATIONAL GRID
NORTH ALBANY SERVICE CENTER
ALBANY, NEW YORK

SOIL VAPOR INVESTIGATION WORK PLAN

FORMER MGP STRUCTURES AND PROPOSED SOIL VAPOR AND SUB-SLAB VAPOR SAMPLING LOCATIONS

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FIGURE 5

CITY:SYR DIV/GROUP:085 DB:RCB RCA WLJ LD: PIC: PM: TM: LYRON="OFF*REF"
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XREFS: 36648X00 36648X01 IMAGES: --- PROJECTNAME: ---