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Supplemental Remedial Investigation Report

Madison Avenue MGP Site
Elmira, New York

February 2007

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Madison Avenue MGP Site
Elmira, New York

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Table of Contents

Tables in Text

Figures in Text

Tables

Figures

Appendices

Electronic Attachments (data CD)

Executive Summary

This Supplemental Remedial Investigation (SRI) Report presents the findings of environmental investigations conducted at New York State Electric and Gas Corporation's (NYSEG's) Manufactured Gas Plant (MGP) site (the "site") located on Madison Avenue in Elmira, Chemung County, New York. Blasland, Bouck & Lee, Inc., an ARCADIS company (BBL) and others conducted the investigations on NYSEG's behalf to characterize environmental conditions at the site in compliance with an Order on Consent between the New York State Department of Environmental Conservation (NYSDEC) and NYSEG dated March 30, 1994. The findings of this report will be used to evaluate the need and scope of potential remedial alternatives.

The MGP operated for approximately 80 years (ca. 1865 to 1947) using coal, oil, and water to produce gas. Several byproducts from the MGP process, including coal, slag, cinders, ash, and purifier wastes, were either sold, disposed of offsite, or used as fill in the area of the site. Other byproducts or process fluids, such as oils and coal tar, were stored onsite in tanks or wells or may have been disposed of in a waste lagoon reputedly located in the eastern portion of the site. These byproducts, principally coal tar, are present in soils and groundwater beneath the site.

Other relatively minor impacts have been observed at the site that likely post-date the MGP. These include chlorinated solvents and PCBs which may have resulted from a transformer repair operation that was located in the eastern portion of the site. Chlorinated solvents were detected at low concentrations in shallow groundwater, and where detected, they were found commingled with MGP-related constituents. The PCB impacts were remediated during an IRM conducted in the eastern portion of the site.

The site has been the subject of seven investigations and other studies starting in 1986 and culminating with the investigation described in this report. Over the course of these investigations, approximately 84 soil borings were drilled, 29 monitoring wells and 23 temporary piezometers/wells were installed, 61 test pits were excavated, and hundreds of samples of environmental media were analyzed.

The primary objectives of the work completed to date were to adequately characterize the nature and extent of MGP-related impacts to the environment and to evaluate the risk posed to human health and the environment by those impacts. These objectives have been satisfied by the work performed during these investigations, and the information gathered will enable the evaluation of remedial alternatives for the site.

The site has also undergone a considerable amount of remediation in the past few years in the form of Interim Remedial Measures (IRMs). These include excavation and disposal of PCB-impacted soils in the eastern portion of the site (1996); demolition of the former gas house (2003); excavation and removal of former holders 1 and 2 and associated impacted subsurface materials (2003 and 2004); and excavation and disposal of an apparent purifier waste disposal area (2004). These IRMs have significantly reduced the amount of MGP-impacted material at the site.

The primary byproduct responsible for most of the impacts is coal tar, which is a dense non-aqueous phase liquid (DNAPL). DNAPLs are heavier than water and tend to sink below the water table if released in sufficient quantities. Coal tar contains many organic compounds, a number of which have toxic properties and are regulated by the NYSDEC. Chief among these are benzene, toluene, ethylbenzene, and xylenes (BTEX) and a more general class of organic compounds called polycyclic aromatic hydrocarbons (PAHs). These two groups of compounds, along with NAPLs, proved most useful in characterizing the nature and extent of site-related impacts. There is evidence that petroleum hydrocarbons, which are light NAPLs, were also released during MGP operations, chiefly in the eastern portion of the site, where a waste lagoon may once have been located.

To clearly summarize the results of this RI, we divided the work into two categories:

- ***Soil, Soil Vapor, and Groundwater Investigations; and***
- ***Risk Evaluation.***

The following paragraphs describe the work performed under these categories and the findings generated.

Soil, Soil Vapor, and Groundwater Investigations

These investigations characterized site hydrogeology, the nature and extent of site-related impacts to the subsurface, and the potential for soil vapor intrusion into buildings near the site. These investigations found that the most important geologic unit beneath the site is the sand and gravel. The sand-and-gravel unit, while generally less than 40 feet thick, produces the most groundwater and contains the most site-related constituents. Above the sand and gravel beneath portions of the site lies an alluvial silt-and-clay unit, which is less permeable than the sand and gravel. This unit is important because it influences shallow groundwater movement. Where present, the unit causes the water table to "mound" which in turn encourages lateral movement of groundwater away from the mound. When this shallow, mounded groundwater reaches the edge of the alluvial unit, it moves into the sand-and-gravel unit. Groundwater in the sand and gravel unit flows south to the Chemung River, east to Newtown Creek, and to a lesser extent, into an underlying till. Groundwater in the till also flows toward the River.

NAPLs, chiefly coal tar, have been released at the site and have migrated a small distance to the south and east through the sand-and-gravel unit, predominantly below the water table. The extent of soils containing NAPL in the western portion of the site has been reasonably delineated and appears limited to within a few feet outside of the site boundary. NAPL in the eastern portion of the site appears limited to within the site boundary. Soils that contain NAPLs will likely exceed NYSDEC Standards that are used to establish cleanup goals. NAPLs below the water table will slowly dissolve and thereby adversely affect the quality of groundwater. The time required for the NAPL to dissolve could be on the order of decades. It is possible that the NAPL is still moving; however, the investigations found no clear evidence of this. Due to the physical properties of the NAPL and the complex nature of the alluvial silt-and-clay and sand-and-gravel units beneath the site, the distribution of the NAPL is highly irregular.

Given the relatively low concentrations of VOCs detected in sub-slab soil vapor samples collected beneath buildings near the site, the soil vapor evaluation concluded that the potential for soil vapor intrusion into these buildings is relatively low. The evaluation also concluded that further vapor intrusion assessment was not required for these properties or any of the other surrounding properties.

The extent of groundwater affected by the site appears to be chiefly limited to the sand-and-gravel unit and extends about 100 feet downgradient (generally south) of the western portion of the site. Affected groundwater in the eastern portion of the site is limited to within the site boundary. An evaluation of geochemical data indicates that natural attenuation processes are occurring, and these processes help to explain the limited extent of dissolved phase constituents associated with the site.

Municipal water supply wells are located approximately one mile north of the site. Since groundwater is directed south of the site and not toward the municipal water supply wells, the site will not affect the quality of groundwater drawn from the municipal supply.

Risk Evaluation

This evaluation assessed the potential risks posed to human health and the environment by site-related constituents. Potential risks posed to wildlife were evaluated by conducting a Fish and Wildlife Resource Impact Analysis (FWRIA). Potential risks posed to human health were evaluated through a Human Heath Exposure Evaluation (HHEE).

The FWRIA found that no threatened or endangered plant or animal species inhabited the site or the immediate surrounding areas, and that use of the site by wildlife is limited. Based on this information, and the analytical results of site soil and groundwater samples, the FWRIA concluded that there were no complete ecological exposure pathways at the site, and thus, no risk to wildlife.

The HHEE found that levels of site-related constituents (primarily BTEX, PAHs, and cyanide) in some soils and groundwater affected by the site exceeded appropriate screening criteria. As such, potentially complete exposure pathways for site-related constituents were evaluated. The evaluation found that the greatest potential for exposure is via direct contact with subsurface soils and groundwater that may be encountered during construction/excavation work. This potential exposure could be mitigated by using properly trained personnel and personal protective equipment.

Conclusion

With the findings presented in this report, NYSEG has adequately characterized the nature and extent of the former MGP's impacts on the environment, evaluated risks posed by the site to human health and the environment, and fulfilled the requirements of the Order on Consent. Following approval of this report by the NYSDEC, NYSEG will begin to evaluate appropriate remedial measures for the site.

1. Introduction

1.1 Overview

This document reports the work performed for and the findings of a Supplemental Remedial Investigation (SRI) conducted from 2003 to 2006 at the Former Manufactured Gas Plant (MGP) site located on Madison Avenue in Elmira, Chemung County, New York. The SRI was performed in accordance with an Order on Consent (Index Number D0-0002-9309) between the New York State Department of Environmental Conservation (NYSDEC) and New York State Electric & Gas Corporation (NYSEG). The SRI was conducted by Blasland, Bouck & Lee, Inc., an ARCADIS company (BBL) on behalf of NYSEG to meet the objectives described in the NYSDEC-approved August 2003 SRI Work Plan (BBL, 2003). A copy of this work plan is included on the Electronic Attachments data CD included with this report.

This version of the SRI Report includes modifications to the Draft SRI Report which was submitted to the NYSDEC in May 2005. The modifications were based on correspondence between NYSEG and NYSDEC as documented in the following letters:

- NYSDEC's July 25, 2005 comments on the Draft SRI Report;
- NYSEG's August 25, 2005 responses to NYSDEC's comments on the Draft SRI Report;
- NYSDEC's September 22, 2005 responses to NYSEG's August 25, 2005 letter; and
- NYSEG's October 5, 2006 responses to NYSDEC's September 22, 2005 letter.

Copies of these letters are provided on the attached CD.

In addition, NYSEG has also completed three additional investigations subsequent to the May 2005 Draft SRI Report. These additional investigations were detailed in the following NYSDEC-approved work plans:

- Proposed Scope of Additional Work for the Area East of the Site dated April 11,2005;
- Concrete Pipe Investigation dated July 20, 2005; and
- Soil Vapor Sampling (SVS) Work Plan dated March 2006.

The results of these additional investigations have been incorporated in to this report. Copies of the work plans are also included on the attached CD.

Where appropriate, this report also incorporates the work and findings of environmental investigations completed prior to the SRI, including the following:

- Task I Preliminary Site Evaluation, conducted in 1986;
- Task II Site Investigation, completed in 1987;
- Task III Site Investigation, completed in 1990; and
- Task IV Risk Assessment, completed in 1990.

Though principally concerned with the work and findings of the SRI, this report includes details from prior site investigations that relate to the SRI's objectives. These objectives are discussed in Section 3. The overall purpose of this and prior investigations has been to characterize the nature and extent of the former MGP's impacts on the environment to enable sound remedial decision-making.

1.2 Report Organization

The report is organized as follows:

- **Section 1: Introduction** – discusses the site setting and history;
- **Section 2: Summary of Previous Investigations** – reviews prior work completed at the site, including interim remedial measures, and recent work completed east of the site by the City of Elmira;
- **Section 3: Objectives** – states the general purpose and specific data gathering objectives that shaped the SRI;
- **Section 4: Investigation Activities** – describes the tasks performed and general methods followed to meet the investigation's objectives;
- **Section 5: Investigation Findings** – presents and interprets field observations and laboratory results relating to the four principal components of the field work: investigations of soil, soil vapor, and groundwater, and an evaluation of non-aqueous phase liquid (NAPL);
- **Section 6: Risk Evaluation** – presents the results of a Fish and Wildlife Impact Analysis (FWIA) and a Human Health Exposure Evaluation (HHEE) completed for the site; and
- **Section 7: Summary and Conclusions** – presents a summary of the findings of the SRI and the conclusions drawn.

The text of this report is supported by a variety of attachments, including tables, figures, boring logs, and other items. The CD included with this report contains additional documentation, including the laboratory data reports. For the reader's convenience, scanned copies of the previous investigation reports are included on the attached CD. A complete list of these items can be found in the table of contents.

1.3 Site Setting and History

The site is located in the City of Elmira, Chemung County, New York. The city occupies the floor of a glacially carved valley, flanked on the east and west by steep bedrock hills rising greater than 500 feet above the valley floor. The city itself is largely flat, sitting in the flood plain of the Chemung River, which flows west to east through the city, before turning toward the southeast and its junction with the Susquehanna River.

Figure 1.1 - Site Map: 3-D view of the City of Elmira (looking north) located in glacially carved valley. Modified from 1969 USGS topographic quadrangle. Scale varies in this perspective.

The former MGP occupied most of a city block, bounded by East Clinton Street, Madison Avenue and East Fifth Street. The site is approximately 1,500 feet west of Newtown Creek, a tributary to the Chemung River which is just over 3,000 feet to the south. The site is largely flat-lying, with a small topographic rise in the eastern corner, near the intersection of East Fifth and East Clinton Streets (Figure 1).

The MGP was built between 1865 and 1869 beside the Junction Canal, a waterway connecting the Chemung and North Branch Canals (see Figure 1). The original site boundary on the south side was the canal, which was used to transport coal. The canal was backfilled and replaced by a railroad in the late 1800s. Previous reports suggest that the canal was backfilled with ashes, trash, garbage, brush trees, sawdust, and anything else available (TRC, 1986). Given the site's substantial distance from major surface water bodies (i.e., Chemung River and Newtown Creek), it is assumed that water used in the operations of the MGP was likely obtained from onsite well(s). Two 8-inch diameter, steel-cased wells were found inside a vault near the southern end of the former gas house during an IRM completed in 2003. These wells are shown as "VW-1" and "VW-2" on Figure 1. The wells were measured to be approximately 10-feet (possibly obstructed) and 70-feet deep.

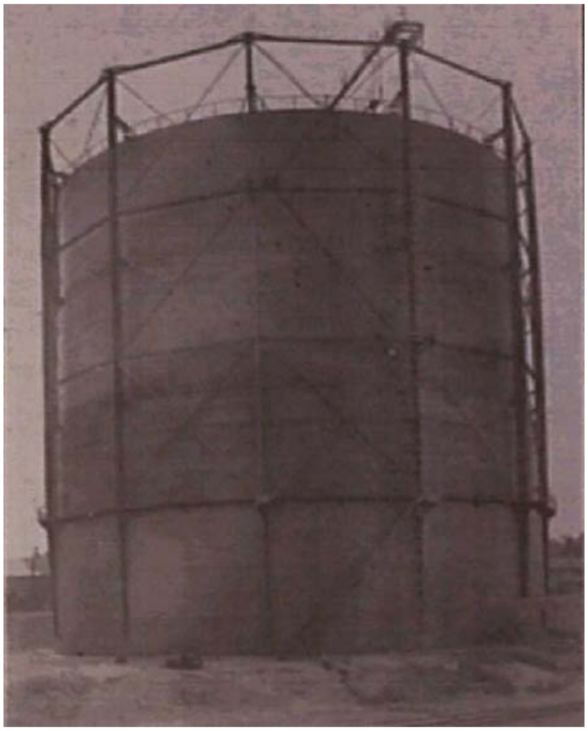

Figure 1.2 - 1922 Photo of Distribution Holder: Photograph of the 1,000,000 ft^3 Distribution Holder. Water-Light Beacon, 1922.

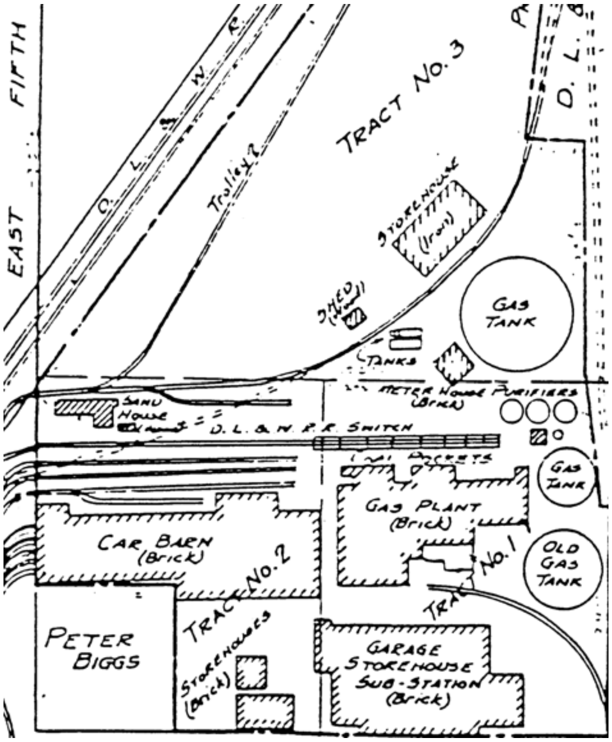

Figure 1.3 - 1932 Plant Drawing: 1932 drawing showing MGP structures. Modified from TRC (1986).

The MGP initially produced coal gas, then water (or blue) gas, and finally carbureted water gas between 1910 and 1930 (Radian Corporation 1985). Three gas holders were built during the life of the plant; the latest and largest had a 1-million cubic foot capacity. At different stages of operation, the site also contained the following major structures: a gas house, coal house, liquid purifiers, purifier boxes, retorts, governor house, reputed waste lagoon, and tar separators and vessels, generator house, and oil tanks.

With plant closure in 1947, most of the above-ground MGP structures were dismantled. The last remaining MGP structure, the former gas house, was demolished by NYSEG during an IRM completed in 2004. The approximate locations of the historical MGP structures are shown on Figure 1. These locations are based on a review of City Atlases, plant drawings, and Sanborn Maps covering a period of 1876 to 1946.

After 1947, NYSEG used the entire site as a service center for its electric and gas crews. Activities at the site included storage of various utility supplies such as wire, insulators, line hardware, treated wood poles, cross-arms and oil-filled electrical equipment. Some of the electrical equipment contained PCBs. Minor equipment maintenance was done at the Transformer Repair Building located north of the former railroad line, which is adjacent to the concrete slab shown on Figure 1. Electrical equipment was stored on the concrete pad adjacent to the building.

NYSEG ceased active use of the site in 1975 when it moved its operation to its current service center in Horseheads, New York. The Transformer Repair Building continued to be used for storage of various supplies, but was not used for equipment maintenance. The western portion of the site, including all the remaining buildings, was sold to I.D. Booth, Inc., an industrial supply wholesaler in 1977. I.D. Booth used several of the old buildings as warehouses, augmenting their larger operations across Madison Avenue to the west. NYSEG retained ownership of the eastern portion of the site, where it currently maintains an electrical substation and a storage yard, until 2003. In 2003, NYSEG re-acquired the MGP-portion of the property owned by I.D. Booth, and transferred ownership of the storage yard (to the west of the substation) to I.D. Booth.

Land use in the area is mixed, with industrial and commercial operations immediately south and west, a public park to the northeast, and residential properties not immediately adjacent, but within 1,000 feet of the site in all directions. The parcel immediately south of the site is owned by Trayer Products, Inc. (Trayer), a metal-parts manufacturer.

There is no localized groundwater usage in the immediate area of the site; all businesses and residences near the site are supplied by City water. A production well field is located approximately 1 mile north and upgradient of the site, on Sullivan Street.

2. Summary of Previous Investigations

2.1 Overview

This section summarizes the scope and general findings of the environmental investigations that preceded the SRI. Scanned copies of the final reports documenting this work are included on the attached CD.

2.1.1 Groundwater Investigation for Trayer Products, Inc.

Trayer completed a limited groundwater investigation of its property, located immediately south of the site. The investigation started as a routine geotechnical boring program. Four borings were drilled in an area of the Trayer property located south of former gas holders 1 and 2 (Figure 1), in advance of building an addition to the Trayer facility. The investigation expanded to include the drilling and sampling of four monitoring wells (TMW-1 through TMW-4), apparently in response impacted soils that were observed while drilling the borings. The groundwater samples were analyzed for VOCs, SVOCs, metals, and PCBs. The results of the groundwater investigation, summarized in a June 15, 1984 letter from Clark Engineers, P.C. to the NYSDEC, showed that groundwater collected (on May 4, 1984) from monitoring well TMW-1 contained benzene (2 parts per billion [ppb]) and the sample collected from TMW-3 contained benzene, toluene, ethylbenzene, and xylenes (BTEX) (42 ppb, total), naphthalene (121 ppb), 1,2,4-trimethylbenzene (9 ppb), 1,3,5-trimethylbenzene (2 ppb), and various naturally-occurring metals. The NYSDEC re-sampled the wells on May 31, 1984. Only one compound was detected in the samples: di-n-butyl-phthalate at 35 ppb in the sample from TMW-3.

2.1.2 Four-Phase Investigation

TRC Environmental Consultants, Inc. (TRC) performed a four-phase environmental investigation of the site, including a human health and environmental risk assessment, between 1986 and 1990. The purposes of the investigation were to characterize the nature and extent of site-related impacts and assess the risks posed to public health and the environment by the site. NYSEG performed this work voluntarily, outside the purview of the NYSDEC. The following subsections summarize the findings of TRC's investigations as presented in the Task I through IV reports.

2.1.2.1 Task I Report – Preliminary Site Evaluation, March 21, 1986

Task I consisted of researching the site history and regional geologic and hydrogeologic information, and conducting an electromagnetic survey using a Geonics EM-31 meter to identify potential areas of MGP-residuals. The following bullets list the salient findings of Task I:

- MGP residuals were identified in the subsurface on NYSEG's and Trayer's properties.
- Potential sources of impacts include: leaking tar tanks, materials disposed of in the canal, spills during operations, spills resulting from flooding, ash disposal in the eastern plant area, purifier chips burning or disposal in the eastern area, and the lagoon and trench in the eastern part of the site.

- Inadequate data exists for the types of holders, which are a potential source of MGP-residuals.

- Coal-tar-like odors were only observed during the excavation of the foundation for the Trayer building addition.

- Absence of coal-tar-like odors suggests that there is no immediate respiratory hazard at the site; however, further studies are warranted.

- Several offsite sources of MGP-residuals exist.

- The site is underlain by at least 80 feet of unconsolidated glacially-derived sediments.

- Based on Trayer's groundwater investigation, groundwater flow is toward the east.

- Groundwater within approximately one mile is used extensively, including the Sullivan Street Well Field approximately 1 mile north of the site.

The Task I Report recommended performing additional investigations. NYSEG performed these additional investigations during the Task II investigation.

2.1.2.2 Task II Report – Investigation of the Former Coal Gasification Plant Site, Elmira, NY, June 18, 1987

The Task II investigation included a limited assessment of the nature and extent of MGP residuals at the site. The investigation consisted of:

- Excavating 22 test pits (TP-1 to TP-22);
- Drilling two shallow soil borings (B-5S and B-9S);
- Installing one deep and six shallow overburden monitoring wells (MW-1D, MW-2S, MW-3S, MW-4S, MW-6S, MW-7S, and MW-8S);
- Monitoring air quality;
- Collecting four surface-soil samples (SS-1 to SS-4);
- Performing three rounds of groundwater sampling; and
- Collecting two storm-water samples (SW-1 and SW-2).

The findings of the Task II activities included the following:

- The site is underlain by more than 80 feet of unconsolidated materials divided into upper and lower aquifers that are separated by a silt layer. The upper aquifer is comprised of silty sand; the lower aquifer of sand and gravel. The silt layer is not present at the center of the site.

- The water table occurs between 8 and 10 feet below the ground surface (bgs), and shallow groundwater moves toward the south-central portion of the site at a rate of approximately 0.5 to 4.0 feet per day (ft/day). The groundwater flow direction in the deep aquifer was not determined; however, the flow velocity of deep groundwater was estimated to be approximately 54 ft/day. The vertical hydraulic gradient is downward.

- Several former MGP structures, including the two smaller gas holders and tar separators, were uncovered during test pit excavations. These structures appeared to be sources of MGP residuals to the subsurface.

- Surface-soil sample results indicate moderate concentrations of MGP residuals in a widespread area of the site. A sample collected from an area of visible purifier waste (southeast of the distribution holder) had high concentrations of PAHs, organic nitrogen, and cyanide.

- Groundwater sampling indicated that the sources of groundwater impacts are primarily above the water table.

- Storm-water sampling results were inconclusive.

- Several potential risks were identified, including direct contact or inhalation of surface soils; ingestion of groundwater from the Sullivan Well Field; inhalation of VOCs entering basements from groundwater; and inhalation or direct contact from groundwater being pumped for industrial usage.

The Task II Report provided recommendations for performing additional investigations. NYSEG performed these additional investigations during the Task III investigation.

2.1.2.3 Task III Report – Investigation of the Former Coal Gasification Plant at Elmira, NY, July 1990

The Task III investigation was conducted to further characterize nature and extent and to provide sufficient data for a risk evaluation. Task III field investigation was conducted in three phases between December 1986 and March 1989, and included:

- Excavating 22 test pits (TP-101 to TP-122);
- Installing 20 piezometers (18 were installed in the test pits during backfilling);
- Installing five shallow and four deep monitoring wells (MW-1S, MW-9S, MW-10S, MW-11S, MW-12S, MW-2D, MW-8D, MW-9D, and MW-12D);
- Collecting analyzing 16 subsurface soil samples from the test pits and one from the soil boring for MW-8D;
- Collecting and analyzing 15 surface soil samples (SS-101 to SS-115), eight surface water samples (ZZ-1 to ZZ-6, including one duplicate and re-sampling of three locations), and eight sediment samples at the surface water sampling locations; and
- Conducting four rounds of groundwater sampling from monitoring wells.

The findings of the Task III activities included the following:

- The site is underlain by as much as 100 feet of unconsolidated deposits consisting of an upper alluvial sand or sand and gravel (18 to 80 feet thick) with discontinuous silt layers. The depth to the sand and gravel increases in the western portion of the site, and the sand and gravel is underlain by a dense silt and clay layer.

- The water table occurs in the sand and gravel at approximately 10 feet bgs.

- A shallow groundwater divide exists in the eastern portion of the site whereby shallow groundwater diverges north and south from the divide. The shallow groundwater flow gradient is approximately 0.02 in both directions; the average linear horizontal flow velocity in the shallow sand and gravel is approximately 304 to 608 feet/year.

- Groundwater flow in the deeper sand and gravel is to the north. The average linear horizontal flow velocity is approximately 164 feet/year.

- The average linear horizontal flow velocity in dense silt and clay is approximately 0.2 feet/year.

- The vertical hydraulic gradient is generally downward across the site.

- Surface soil samples contained PAHs, metals, and cyanide and exposure pathways existed for these constituents.

- Subsurface soils contain varying concentrations of PAHs. The PAHs are primarily concentrated near the former MGP structures and the former lagoon.

- VOCs, PAHs, and cyanide were detected in shallow groundwater. Groundwater samples from many of the wells contained at least one constituent exceeding State regulatory levels.

- Trace concentrations of non-MGP related VOCs were detected in three of the deep monitoring wells in at least one sampling event.

- The results of four rounds of groundwater sampling do not indicate that MGP residuals have migrated offsite.

- A potential for exposure to PAHs exists for workers conducting subsurface activity.

- A potential for exposure to PAH-containing surface soil exists through dermal contact, ingestion, or windborne dust.

The Task III Report recommended performing a risk assessment as part of the subsequent Task IV investigation.

2.1.2.4 Task IV Report – Risk Assessment for the Former Coal Gasification Site, Elmira, NY, August 1990

The primary objective of the Task IV investigation was to examine exposure pathways and concentrations and estimate the risk posed to human health by MGP-residuals at the site. The Task IV report concluded that:

- A HASP should be developed to protect workers who may be conducting excavations at the site.

- Paving the outdoor I.D. Booth storage area would reduce production of fugitive dusts due to vehicular activity and wind erosion.

- Construction of fences around the eastern portion of the site would reduce access by area residents to surface soils in the former lagoon area.

- Risks should be reassessed if relevant site conditions change.

2.1.3 Results of PCB Soil Sampling Program, NYSEG Substation, Elmira, NY, June 22, 1989

A PCB soil-sampling program was completed by TRC during the week of May 22, 1989. The purpose of the soil-sampling program was to determine if PCB residues were present onsite from past site activities. The program consisted of collecting 48 surface-soil samples, 35 subsurface soil samples from the one-foot depth interval, and six soil samples from two feet bgs and analyzing them for PCBs. The results of the program indicated that PCBs were detected in low concentrations in several soil samples collected from across the site. In particular, PCBs were detected in all but one surface soil sample. It was concluded that the ubiquitous distribution of PCBs across the site could be due in part to the regrading of the site. The areas with the highest PCB concentrations were all linked to former transformer storage areas. All of the areas samples, with the exception of the I.D. Booth loading dock had decreasing PCB concentrations with depth.

2.1.4 USEPA Final Site Inspection Report – NYSEG Former Service Center, Elmira, NY

The United States Environmental Protection Agency (USEPA) performed a Sampling Site Inspection (SSI) on June 3 and 4, 1993. The SSI consisted of sampling groundwater from five monitoring wells (MW-1D, MW-2D, MW-3S, MW-9D, and MW-12D). Collected samples were analyzed for TCL organic compounds and TAL inorganic compounds, including cyanide. The results of the sampling indicated the presence of arsenic in deep monitoring wells MW-1D and MW-2D, and the presence of numerous metals and VOCs in shallow monitoring well MW-3S. Since a background sample was not collected from the shallow groundwater zone, it was not possible to determine if the shallow groundwater impacts were site-related or from an upgradient source.

2.1.5 PCB Interim Remedial Measure – Final Engineering Report – NYSEG Former Service Center, April 1997

After the MGP was decommissioned in 1947, NYSEG used the site as an electric and gas service center until 1975. On behalf of NYSEG, Westinghouse Remediation Services, Inc. (Westinghouse) completed a PCB IRM in summer 1996 to remediate PCB-impacted materials associated with the service center. The objective of the IRM was to remove all soil with PCB concentrations of more than 10 parts per million (ppm). Any soil that had a PCB concentration between 1 and 10 ppm was covered with a minimum of 12 inches of clean soil or 2A modified crushed stone. The IRM consisted of excavating and removing PCB-impacted material in several areas, demolition of a concrete slab, and decontamination and demolition of a building in the northern and northeastern portions of the site (the fenced-in area around the substation shown on Figure 1 of this SRI Work Plan). The areas addressed by the IRM included the Concrete Slab Area, Runoff Corridor Area, Runoff Dispersion Area, Lawn Area, Storm Drain Manhole, Transformer Repair Building, Active Substation Area, Loading Dock Area, and Parking Area. These areas are shown on Figure 1-2 of the Final Engineering Report (also included in the attached CD). All waste generated by the IRM was shipped to Chemical Waste Management's (CWM's) secure landfill facility in Model City, NY or to High Acres Landfill in Fairport, NY.

2.1.6 2003 and 2004 IRMs

NYSEG completed IRMs in 2003 and 2004 consisting of removing and disposing the contents and foundations of former gas holders 1 and 2 (and the associated impacted nearby surrounding soils), demolishing and disposing of the former gas house, and excavating and disposing impacted soils associated with the purifier waste area. A brief description of observations made during the holder IRMs provided below.

Figure 2.1 - Photo of Gas Holder No. 1 IRM:
October 21, 2003. Excavating contents of Gas Holder No. 1, looking northwest.

In general, the materials inside of gas holder 1 appeared to be moderately impacted by MGP-related wastes, principally coal tar. The heaviest impacts were observed beneath the floor of the holder, specifically around the outer edge of the holder. The holder wall was approximately 4 feet thick and was constructed of brick and mortar. The wall was extremely competent and appeared to not have any cracks. The floor of the holder, found at approximately 12 feet below grade, was also constructed of brick and mortar and was approximately 1 to 2 feet thick. The floor was dumpling shaped as the center of the floor was approximately 2 feet higher than the edges. Minor cracking was observed in the floor. During the IRM excavation, groundwater was observed to enter the holder through a few cracks in the floor; however, the overall condition of the holder appeared to be very competent.

The materials inside of gas holder 2 and soils immediately surrounding the holder appeared to be moderately to highly impacted by MGP coal tar. The condition of gas holder 2 was poor as compared to that of gas holder 1. The walls and floor of gas holder 2 were also constructed of brick and mortar. The floor of the holder was encountered at approximately 14 feet below grade. Numerous cracks were observed in the holder floor and walls and water was observed to enter the holder during excavation. The water observed inside of gas holder 2 contained a heavy sheen and dark brown oil, presumed to be coal tar.

NYSEG removed purifier waste to a depth of approximately 3 feet below grade from an area located south and east of the former distribution holder (see “Purifier Waste Area” on Figure 1). The excavation for this area included the area between the fence line along the property boundary and Trayer’s building foundation. Visual observations of the exposed materials guided the excavation effort. The excavated material was taken offsite for disposal.

NYSEG conducted post excavation confirmatory soil sampling in the IRM areas (gas holders 1 and 2 and the purifier waste area). Confirmatory samples were analyzed for VOCs and SVOCs. The confirmatory sample locations and results can be found on the attached CD. More details regarding the 2003 and 2004 IRMs will be provided in the Final Engineering Report which we expect to submit to the NYSDEC in 2005.

2.1.7 City of Elmira Brownfields Investigation

Stantec Consulting Group, Inc. (Stantec) conducted a Brownfields investigation of the Kennedy Valve Railroad Spur on behalf of the City of Elmira in 2004. Some of their work is focused on the area immediately east of the site. Stantec provided the results of their investigation in a September 29, 2004 submittal to NYSEG. The NYSDEC was copied on the submittal. The submittal contained boring logs, tables, and figures summarizing the results of the investigation. Based on NYSEG's review of the submittal, their investigation consisted of installing four monitoring wells (B-8/MW-8 to B-11/MW-11), collecting and analyzing soil and groundwater samples from each well location, and measuring water levels in the new monitoring wells. A copy of the submittal is provided on the attached CD.

Stantec observed minor impacts in soils recovered from approximately 18 to 24 feet below ground surface (bgs) at the B-9/MW-9 location. The soils from this interval were described as having a "strong coal tar odor" and "iridescent sheen". In addition, analytical testing results for a soil sample and a groundwater sample collected at this location showed slightly elevated concentrations of volatile compounds (toluene, ethylbenzene, and xylenes) and semi-volatile compounds (PAHs). Given that the data provided in the submittal suggested a potential MGP impact at the B-9/MW-9 location, NYSEG requested that Stantec ship a soil sample from the impacted interval at B-9/MW-9 to Woods Hole Group (WHG) for alkylated PAH and TPH analysis. Stantec shipped a soil sample recovered from approximately 18 to 20 feet bgs at this location.

BBL's forensic chemist evaluated the results of WHG's testing (provided on the attached CD) and the analytical results in the summary tables provided in the submittal and concluded that the soils encountered by Stantec at the B-9/MW-9 location contained material having a PAH signature consistent with coal carbonization (CC) tar. As discussed in Section 5 of this SRI Report, the majority of the impacted soil samples collected during the SRI contained a signature consistent with a carbureted water gas (CWG) source. The only samples collected during the SRI that had a signature consistent with CC tar were collected from an onsite manhole and an offsite abandoned clay sewer pipe. The clay pipe sampling location was within the area investigated by Stantec.

Given the findings discussed above, NYSEG developed a scope of work to assess whether the impacts are site related. The scope of work was detailed in an April 11, 2005 letter to NYSDEC. This scope of work and related correspondence is provided on the attached CD. As discussed in Section 5, the results of this additional work indicate that minor isolated MGP-related impacts are present in soil east of the site.

3. Objectives

3.1 Objectives of the Order on Consent

The NYSDEC and NYSEG entered into a multi-site Order on Consent (Index #D0-002-9309), effective March 30, 1994, which outlined a general objective to be met to satisfactorily complete remedial investigations (RIs) at the listed sites (including the Elmira site). The general objective states that an RI should include all the appropriate elements set forth in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA); the National Contingency Plan (NCP) of March 8, 1990; the United States Environmental Protection Agency (USEPA) guidance document entitled, *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*, dated October 1988; and appropriate USEPA and NYSDEC technical and administrative guidance documents, so that, when completed, the RI and the preceding work would meet the regulatory definition of an RI.

3.2 SRI Objectives

The overall objectives of the SRI were to: 1) complete the characterization of the site by establishing the nature and extent of site-related impacts on and adjacent to the site, in compliance with the Order on Consent; 2) evaluate the potential risk posed to human health and the environment by those risks; and 3) lay the groundwork for a future remedial design. Based on these overall objectives, the following specific objectives were developed for the SRI:

- Determine the approximate vertical and horizontal extent of site-related impacts to soil and groundwater, on, and adjacent to, the site;
- Better characterize the shape, thickness, and distribution of the various unconsolidated deposits beneath the site, including the surface topography and continuity of potential confining units;
- Develop a three-dimensional (3-D) solid-body model depicting relevant geology and the distribution of NAPL and polycyclic aromatic hydrocarbons (PAHs) in unconsolidated material beneath the site;
- Better characterize groundwater movement in the deeper overburden;
- Better locate the limits of the former waste lagoon;
- Investigate the condition, configuration, and extent of piping associated with the former liquid waste pipeline;
- Obtain waste-characterization data for MGP-impacted soils; and
- Conduct a Fish and Wildlife Resource Impact Analysis (FWRIA) and Human Health Exposure Evaluation (HHEE).

The work performed to meet these objectives was divided into three investigations: Soil Investigation, Soil Vapor Investigation, and Groundwater Investigation. Section 4 outlines the scope of these investigations and the methods used to complete them. Section 5 presents the findings of that work.

BBL used the findings of this work, coupled with data collected during previous investigations, to conduct a qualitative risk assessment. The purpose of the assessment was to identify and evaluate potential risks posed by the site to fish, wildlife, and human health. Section 6 describes the risk-assessment process and its findings.

4. SRI Investigation Activities

4.1 Overview

The SRI consisted of three distinct field programs designed to meet the investigation objectives discussed in Section 3:

- Soil Investigation;
- Soil Vapor Investigation; and
- Groundwater Investigation.

The SRI Work Plan outlined the scope of these investigations and the procedures to be used to perform them. This section describes the work completed, including minor, necessary deviations from the work plan that were approved by the NYSDEC during the course of the SRI. BBL conducted the field work between September 2003 and April 2004. Several other firms contributed work integral to the field effort, as follows:

- Drilling services by Lyon Drilling of Tully, New York;
- Analytical services by Severn Trent Laboratories of Edison, New Jersey; PW Labs of Syracuse, New York; Microbial Insights of Rockford, Tennessee; Chemtec of Mountainside, New Jersey; Clarkson University of Potsdam, New York; and Woods Hole Group of Raynham, Massachusetts; and
- Consulting services regarding the sampling and analysis program for cyanide, and interpretation of the cyanide analytical results by Ish, Inc. of Raleigh, North Carolina.

4.2 Soil Investigation

The soil investigation consisted of three forms of field exploration: drilling, test pit excavation, and surface-soil sampling. In most cases, this work provided two types of data: visual classification of geology and site-impacts and analytical samples to identify and quantify site-related impacts to soil. The investigation method, sampling location, and suite of samples collected varied from point to point in order to meet the different objectives listed in Section 3. This section describes the varied tasks included in the soil investigation, including the general methods applied and specific objectives addressed.

Additional details on the soil investigation can be found in the following places:

- Figure 1 depicts soil-boring, test-pit, and surface-soil sample locations.

- Appendix A contains boring and test-pit logs.

- Table 1 summarizes the analytical sample locations and analytes, and Table 2 summarizes analytical results. These results are discussed later in Section 5.

- The attached CD contains laboratory reports for analyses performed to characterize selected physical properties of the soils.

4.2.1 Soil Borings

Soil borings were drilled to provide physical or chemical data about the subsurface and, in some cases, to install monitoring wells or piezometers. Sixty soil borings were drilled during the SRI between September 2003 and May 2004. The borings ranged in depth from 10 to 86 feet bgs and were generally drilled to the top of the till unit. Exceptions are those borings drilled to confirm the thickness of the till, to install deep monitoring wells screened in the till, or that encountered but could not penetrate shallow obstructions. Nine of the borings were completed as groundwater monitoring wells, three were completed as NAPL monitoring wells, and three were completed as temporary monitoring wells. The wells are discussed later in Section 5.

4.2.1.1 Drilling Methods

Borings were drilled and sampled using hollow-stemmed augers and split-spoon samplers, following the drilling procedures outlined in the SRI Work Plan. Borings were advanced following a consistent methodology, as follows:

Figure 4.1 - Operating Drilling Rig: Drilling soil boring SB-242 on Trayer's property, looking northwest toward substation.

- Soil samples were retrieved continuously from grade to the total boring depth.
- Recovered soil samples were observed and described by a supervising geologist, and screened for VOCs using a photoionization detector (PID).
- Selected samples were submitted for various laboratory analyses, as described in Section 4.2.1.3.
- Upon completion, borings were tremie-grouted to grade (with the exception of those meant for monitoring wells).
- Boring locations were later surveyed for position (New York State Plane Central [3012] coordinate system) and surface elevation (NAD 88).

4.2.1.2 Boring Location and Rationale

Borings Near the MGP

BBL drilled 31 borings in the operations area of the MGP. The boring locations were chosen to investigate the numerous former MGP structures in the area and to better characterize the geology and distribution of MGP byproducts, particularly coal tar DNAPL. Several of these borings were also completed to delineate the lateral and vertical extent of MGP byproducts in subsurface soil. Table 4.1 lists each boring completed and the feature or area it investigated. In addition to the locations noted, borings were also drilled to install monitoring wells MW-0301S, MW-0304D, MW-0403S, MW-0404S, MW-0404D, MW-0405S, and NAPL monitoring wells NMW-0401S and NMW-0402S.

Table 4.1 Borings Near the MGP

Boring Identification	Boring Depth (ft)	Location/Rationale
SB-210	40	Former Distribution Holder
SB-211	80	Former purifier boxes
SB-212	45	Former Gas Holder No. 1
SB-213	37	Former Gas Holder No. 2
SB-214	24	Southeast end of former gas house/vertical extent of MGP residuals
SB-215	28	North end of former gas house/northern extent of MGP residuals
SB-216	44	Eastern extent of potential MGP-residuals associated with former distribution holder
SB-217	20	Former tar storage vessel
SB-218	40	Purifier waste area and downgradient from MGP
SB-219	10	Purifier waste area
SB-220	10	Purifier waste area
SB-221	24	Western extent of MGP residuals
SB-222	21	Western extent of MGP residuals
SB-223	59	Extent of MGP residuals south of former gas holder 1
SB-224	59	Extent of MGP residuals south of former gas holder 1
SB-225	71	Extent of MGP residuals south of former gas holder 2
SB-226	60	Extent of MGP residuals south of former gas holder 2
SB-227	40	Eastern extent of potential MGP-residuals associated with former distribution holder
SB-231	20	Former tar storage vessel
SB-236	60	Extent of MGP residuals southwest of former gas holder1
SB-237	86	At location of MW-0403S, extent of MGP residuals south of distribution holder
SB-238	68	At location of MW-0404S/D, extent of MGP residuals south of former gas holders 1 and 2
SB-239	70	At location of MW-0405S, extent of MGP residuals south of former gas holders 1 and 2

Borings East of the MGP

BBL drilled 29 borings east of the former MGP, including:

- The storage yard immediate west of the substation;
- South, southeast, and east of the substation;
- On Trayer's property to the southeast of the site; and
- East of the site, along East Fifth Street.

The boring locations were chosen to investigate a reputed former waste lagoon associated with the former MGP and to better characterize the geology and distribution of potential site-related impacts in these areas. Several of these borings were also completed to delineate the lateral and vertical extent of a thin zone of yellowish oil observed near the water table in this area. Four borings were advanced to confirm and delineate the findings of the Stantec investigation east of the site. Table 4.2 lists each boring completed and the area it investigated. In addition to the locations noted, borings were also drilled to install NAPL monitoring wells NMW-0403S, monitoring well MW-0402S (Trayer's property) and temporary wells TW-0401S, TW-0402S, and TW-0403S (Chemung County ARC's and the City's property). Temporary well TW-0402S was later abandoned and replaced with monitoring well MW-0401S. Monitoring well MW-0506S was installed in soil boring SB-245 to the east of the site to further investigate Stantec's findings.

Table 4.2 Borings East of the MGP

Boring Identification	Boring Depth (ft)	Location or Feature Investigated/Rationale
SB-201	24	Former canal, east of Trayer's buildings/eastern extent of site-related impacts
SB-202	24	Eastern extent of site-related impacts associated with reputed lagoon
SB-203	70	Eastern extent of site-related impacts associated with reputed lagoon/confirm thickness of clay/till
SB-204	32	Distribution of site-related impacts associated with reputed lagoon
SB-205	24	Former canal, north of Trayer's buildings
SB-206	42	Potential waste lagoon area/distribution of related impacts
SB-207	42	Storage yard/northern limits of impacts associated with reputed lagoon
SB-208	45	Former oil tanks
SB-209	30	Investigate elevated concentration of cyanide detected in monitoring well MW-6S.
SB-228	44	Distribution of observed yellowish oil near water table/east of concrete slab and former oil tanks
SB-229	42	Distribution of observed yellowish oil near water table/east of concrete slab and former oil tanks
SB-230	49	Southeast of substation/distribution of observed yellowish oil near water table
SB-233	36	Storage yard/northern limits of observed yellowish oil
SB-234	30	Storage yard/northern limits of observed yellowish oil
SB-235	30	Storage yard/northern limits of observed yellowish oil
SB-240	28	East of substation/eastern extent of observed yellowish oil
SB-241	22	Storage yard/northern limits of observed yellowish oil
SB-242	20	Trayer's property/southern limits of observed yellowish oil
SB-243	18	Trayer's property/southern limits of observed yellowish oil
SB-244	21.1	Investigate Stantec's elevated PAH results east of the site
SB-245	18.5	Investigate Stantec's elevated PAH results east of the site
SB-246	13.8	Investigate Stantec's elevated PAH results east of the site
SB-247	21.3	Investigate Stantec's elevated PAH results east of the site

4.2.1.3 Soil Analyses for Evaluating Nature and Extent

Selected soil samples from each boring were submitted for laboratory analysis. The majority of these samples were analyzed for BTEX, PAHs, and total cyanide – the primary chemical components associated with MGP residues. Selected samples were also analyzed for PCBs and diesel range organics (DRO) to assess the potential presence of these constituents in the impacted materials observed in the borings. As discussed in Appendix B, a selected number of soil samples were also analyzed for metal-cyanide complexes and free-cyanide species. Analytical methods, sample-handling procedures, and laboratory protocols are outlined in the SRI Work Plan. Sample analyses followed the NYSDEC ASP-2000 analytical protocol and include quality assurance/quality control (QA/QC) samples as required by the Quality Assurance Sampling and Analysis Project Plan (QA/SAPP) included with the SRI Work Plan. Table 1 lists the soil samples collected and the analyses run.

At least two soil samples were analyzed from each soil boring, if feasible. Sample intervals were chosen in the field on a case-by-case basis, depending on the subsurface conditions and data needs. At most boring locations, a sample was collected from the most impacted interval observed. The field geologist inferred impacts if NAPL, sheens, or staining were observed, or if headspace readings were significantly above background. At selected locations, samples were also submitted from the first visibly unimpacted interval in order to delineate the vertical extent of impacts. If no impacts were noted in a boring, samples were collected from the approximate elevation at which impacts were observed in neighboring borings.

4.2.1.4 Additional Soil Sampling and Analysis

Additional analyses were performed on selected samples to provide further information on the physical properties of the unconsolidated materials beneath the site, help evaluate natural attenuation of affected groundwater, and identify regions of soil that, if excavated, may constitute a hazardous waste. Table 4.3 identifies the samples collected and the analyses performed and Table 2 presents the analytical results.

To help identify regions of soil that, if excavated, may meet the definition of a hazardous waste, eight soil samples were collected and analyzed for: Toxicity Characteristic Leaching Procedure (TCLP) benzene, reactivity (cyanide and sulfide), and total sulfur. It is important to note that, in New York State, the NYSDEC has issued Technical Administrative Guidance Memorandum (TAGM) 4061 entitled, "*Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants (MGPs)*". TAGM 4061 outlines criteria by which coal-tar waste and soils/sediments that have been impacted by coal tar from MGP sites that exhibit only the toxicity characteristic for benzene (Waste Code D018 [e.g., "fails" TCLP benzene analysis and is, therefore, a Federal and New York State RCRA characteristic hazardous waste]) may be conditionally excluded from the RCRA characteristic hazardous waste regulations if these wastes are destined for permanent thermal treatment. This TAGM only applies to MGP sites being remediated under NYSDEC oversight, and allows for onsite or offsite thermal treatment at a facility permitted to receive non-hazardous contaminated soil.

Table 4.3 Additional Soil Analyses

Boring	Interval (ft)	Material
Waste Characterization Samples		
NMW-0403S	6.8 - 9	Sandy Silt and Gravel (Fill)
SB-206	4 – 6	Fine to Medium Sand (Fill)
SB-208	10 - 11	Silty Sand and Gravel
SB-214	6 – 8	Silt, trace Clay
SB-218	2 – 4	Clayey Silt
SB-219	4 – 6	Clayey Silt
SB-220	0 – 2	Clay, Coal, Ash, Cinders
SB-223	20 – 21.3	Sand and Gravel
Total Organic Carbon Samples		
TW-0401S	12 – 16	Sand and Gravel
TW-0402S	19 – 23	Sand and Gravel
TW-0403S	16 – 17.5	Sand and Gravel
SB-202	22 -24	Sand and Gravel
SB-203	24 – 26	Sand and Gravel
SB-216	16 – 17.4	Sand and Gravel
Grain Size Samples		
SB-201	10 – 12	Silt and Clay
SB-203	62 – 64	Silty Till
SB-208	15 – 17	Sand and Gravel
SB-208	28 – 29.7	Sandy Till
SB-208	35 – 36.5	Silty Till
SB-210	38 – 39.5	Sandy Till
SB-216	40 -41.6	Silt and Clay
SB-218	32 – 34	Fine Sand
Vertical Hydraulic Conductivity Sample		
SB-216	42 – 44	Silt and Clay

The waste-characterization samples were collected from depths between 0 and 21 feet bgs in borings drilled at the site. Sample intervals generally targeted the most heavily impacted materials.

To help evaluate natural attenuation of dissolved MGP-constituents, six samples of sand and gravel were analyzed for total organic carbon. To quantify the particle-size distribution of the different geologic units penetrated, eight samples were analyzed for grain size (including hydrometer). To help evaluate movement of groundwater through a silt-and-clay deposit beneath the site, an undisturbed sample was collected and analyzed for vertical hydraulic conductivity.

4.2.2 Test Pits

Twenty-six test pits were excavated during the SRI. Originally, test pits were planned to investigate the area of the former canal south of the gas holders 1 and 2, and to locate and assess the condition of the abandoned, vitrified clay sewer pipe located east of the site and the concrete pipe southeast of the site (refer to the Concrete

Pipe Work Plan on the attached CD). The vitrified clay sewer pipe was previously identified by TRC during the excavation of test pit TP-114 (refer to TRC's Task II Investigation Report in the Electronic Attachments CD). In preparing to excavate the test pits south of the holder, BBL determined that they could not be excavated due to the presence of nearby utilities. For these reasons, borings SB-223, SB-224, SB-225, and SB-226 were used to investigate this area instead. The NYSDEC provided their concurrence of this change in scope in a January 20, 2004 conference call.

While drilling near the storage yard and south/southeast of the substation, BBL identified a yellowish-colored NAPL near the water table that did not resemble coal tar. BBL decided to excavate test pits in this area to better characterize the nature and extent of the oil impacts.

The test pits were excavated using a rubber-tired backhoe operated by Lyon Drilling of Tully, New York. A BBL geologist supervised the excavations, collected samples for analysis, and prepared test-pit logs summarizing the pit dimensions and materials encountered. These logs are included in Appendix A.

Figure 4.2 - Test Pit Excavation: Excavating test pit TP-200 in the eastern area of the site, looking northwest.

Abandoned Vitrified Clay Sewer Pipe

BBL excavated nine test pits (TP-A through TP-I, see Figure 1) to locate and assess the condition of the abandoned vitrified clay sewer pipe. The pipe is located on City property to the east of the site, near Sullivan Street. Test pits varied in length depending on whether the clay pipe was encountered. The pipe was encountered in five of the nine test pits at approximately 2-to-6 feet bgs. The pits were generally 3-to-5 feet wide, extended to approximately 10-to-14 feet deep, and each was excavated two feet below the water table. BBL collected a sample of black sludge found inside the pipe and analyzed it for BTEX and PAHs. At the time of sampling, the black sludge was interpreted by BBL's geologist and the onsite NYSDEC representative (Mr. Eric Knapp) to represent decayed organic matter rather than MGP-impacted material based on its earthy, rather than MGP-like odor, and its lack of an iridescent sheen. The analytical results for this sample can be found in Table 2.

As discussed previously under Section 2.1.7, NYSEG is continuing to investigate whether this pipe leads back to the site, and if it does, whether the pipe contains MGP-related residuals.

Concrete Pipe

BBL conducted an investigation in August 2005 to evaluate the alignment of a concrete pipe previously encountered in the southeastern portion of the site (Figure 1). The investigation consisted of excavating one test pit (TP-100), conducting a geophysical survey along several transects using ground-penetrating radar (GPR), inspecting nearby sewer manholes and reviewing available sewer mapping from the City of Elmira. BBL collected a sample of black sludge found inside the pipe (Pipe-100) for analysis for BTEX, PAHs and cyanide. The analytical results for this sample can be found in Table 2.

Yellowish Oil Delineation

BBL excavated 16 test pits (TP-200 through TP-216, see Figure 1) in the storage yard and to the south and southeast of the substation to help delineate the extent of the yellowish oil. Each test pit was generally 8-to-10 feet long, 3-to-5 feet wide, and 12-to-14 feet deep, and each was excavated two to four feet below the water table. Samples were collected from these test pits and analyzed for PAHs, PCBs, and/or DRO. The DRO analyses were selected to assist in assessing the potential source of the yellowish oil (e.g., coal tar related or petroleum related). Table 1 lists the soil samples collected and the analyses run and the analytical results can be found in Table 2.

4.2.3 Surface-Soil Sampling

To characterize the quality of surface soils, BBL collected and analyzed 13 surface soil samples. Eleven of the samples were analyzed for TCL VOCs, TCL SVOCs, TAL metals, and cyanide. The remaining two samples, which were specifically requested by the NYSDOH, were collected inside the area where the PCB IRM was performed, and analyzed for PCBs only. Table 4.4 summarizes the location of each surface-soil sample:

Table 4.4 Surface Soil Samples

Sample ID	Background	Location
SS-201	√	Median near corner of Madison Ave. and East Fifth St
SS-202	√	East end of Trayer's Property
SS-203	√	ARC Property, north of the site
SS-204	√	Median along High St., south of site
SS-205	√	Median along Oak St., southeast of site
SS-206		Onsite, near former purifier boxes
SS-207		Onsite, west of former gas holder 1
SS-208		Onsite, west of former gas house
SS-209		Onsite, northeast of former distribution holder
SS-210		Onsite, east of former distribution holder
SS-211		Onsite, south of substation
SS-212		Storage Yard
SS-213		Storage Yard

Analytical methods, sample handling, and laboratory protocols are outlined in the SRI Work Plan. The surface-soil samples were composites of eight individual grab samples collected from the top 2 inches of soil within a 1-square-meter area. The vegetative sod layer, gravel, or sub base material was removed prior to collecting the sample. BBL's field geologist described the color, texture, and moisture content of each sample. The surface soil analytical results can be found in Table 12.

4.3 Soil Vapor Investigation

BBL collected six sub-slab soil vapor samples (SV-1 through SV-6, see Figure 1) to assess the potential for volatile constituents to migrate into buildings near the site. The selected buildings consisted of the warehouse/storage building owned by I.D. Booth in the western portion of the site, and the largest Trayer building long the southern edge of the site. The SVS Work Plan (provided on the attached CD) provides a detailed scope of work for conducting the soil vapor sampling. The SVS Report is Attachment D of this report.

4.4 Groundwater Investigation

The groundwater investigation consisted of the following five tasks:

- Installing nine new groundwater monitoring wells;
- Installing three temporary wells;
- Installing three NAPL monitoring wells;
- Gauging fluid levels; and
- Sampling groundwater.

These tasks provided two principal types of data needed to meet the SRI objectives: water quality data to quantify and delineate the nature and extent of site-related constituents in groundwater, and potentiometric data to better quantify groundwater flow patterns. Though not truly a part of the groundwater investigation, the NAPL monitoring wells are part of the same field program and are, therefore, discussed here.

4.4.1 Monitoring Well Installation

The intent of the wells installed for the SRI varied by type and location. Table 4.5 summarizes the purpose of each.

Table 4.5 Monitoring Well Installation

ID	Screen Interval (ft. bgs)	Location	Purpose
MW-0301S	12 – 22	Near north entrance to site, from East Fifth Street	Define the northern extent of cyanide previously detected in groundwater from monitoring well MW-6S.
MW-0304D	50 – 60	Paired with existing monitoring well MW-4S	Monitoring well used to evaluate the groundwater flow direction in the deep overburden. This well, combined with existing well MW-4S, also provides vertical-hydraulic-gradient data in this area.
MW-0401S	14 – 24	East of site, between MW-11S and MW-12S	Evaluate the potential presence of MGP-residuals in shallow groundwater east of the site, and fill the data gap between MW-11S and MW-12S.
MW-0402S	13 – 23	South of site, south of Trayer's manufacturing building	Downgradient monitoring wells, intended to be in advance of the apparent south trending plume.
MW-0403S	30 – 40		
MW-0404S	19 – 29		
MW-0404D	50 – 60		
MW-0405S	26 – 36		
TW-0401S	14 – 24	East of site, between MW-11S and MW-12S	Groundwater sampling results from these temporary monitoring wells were used to fine-tune the location of permanent monitoring well MW 0401S.
TW-0402S	14 – 24		
TW-0403S	8.5 – 18.5		
NMW-0401S	10.5 – 15.5	West of former gas house, near former oil and tar separator	NAPL monitoring wells, installed to gauge NAPL mobility and recoverability.
NMW-0402S	20 – 30	South of former gas holder 1	
NMW-0403S	5.6 – 20.6	South of substation	
MW-0506S	16 - 26	East of site, south of Former Clay Sewer Pipe	Assess the extent of groundwater impacts observed at MW-9 in the southeast direction.

Well locations are shown on Figure 1 and boring and well construction logs are included in Appendix A. Monitoring well specifications are also summarized in Table 3.

Monitoring Well Installation

The nine new groundwater monitoring wells (identified with the prefix MW) each provide hydraulic and water-quality data to meet specific objectives (noted in Table 4.5 above). With some minor deviations, the monitoring wells were installed as follows:

- Borings were drilled to their target depths following the practices described in Section 4.2.1.1.
- All wells were constructed of 2-inch Schedule 40 PVC with 10-foot long, 0.020-inch slotted screens.
- Appropriately-sized silica sand packs were installed in the annular space around the screened interval and generally extended 2 feet above the screen top.
- Above the sand pack, the well annulus was filled with 1 to 2 feet of bentonite chips to provide a seal. The chips were hydrated, and a cement/bentonite grout was placed on top of the seal, using tremie pipe, to approximately 2 feet bgs.
- Each well was protected at the surface with an 8-inch flush-mount curb box. Each well was also fitted with a 2-inch locking J-plug cap.
- The top of the PVC riser of each well was marked, and the elevation was determined by survey to the nearest 0.01 foot.
- Completed wells were surveyed for position, surface, and measuring-point elevation.

At least 24 hours after installation, the monitoring wells were developed by surging/purging using a Waterra positive displacement pump and dedicated polyethylene tubing. The wells were surged using a surge block and developed until the water removed from the well was reasonably free of visible sediment (50 nephelometric turbidity units [NTUs]), or until the turbidity levels stabilized following the removal of 10 well volumes.

Temporary Monitoring Well Installation

Three temporary monitoring wells (identified with the prefix TW) were installed, sampled, and abandoned during the week of March 7, 2004. The temporary wells were installed equally spaced between MW-11S and MW-12S. Groundwater was sampled from each well for BTEX, PAHs, and total cyanide. The temporary wells were constructed as follows:

- Borings were drilled to their target depths following the practices described in Section 4.2.1.1.
- All wells were constructed of 1-inch Schedule 40 PVC with 10-foot long, 0.010-inch slotted screens.
- The native soils were allowed to collapse around the wells.
- The top of the PVC riser of each well was marked, and the elevation was determined by survey to the nearest 0.01 foot.

- Completed wells were surveyed for position, surface, and measuring-point elevation.

- A minimum of three well volumes were removed from each well prior to sampling. A disposable bailer was used to purge and sample each well.

- Upon sampling, each well was abandoned by tremie grouting the well in place, then pulling the well materials from the borehole. The resulting borehole was topped off with grout and topsoil was placed in the upper 1-foot.

NAPL Monitoring Well Installation

Three NAPL monitoring wells (identified with the prefix NMW) were installed at boring locations where potentially mobile NAPL was observed in the subsurface (based on the presence of a significant quantity of NAPL observed in retrieved soil samples). Each well was constructed like a conventional groundwater monitoring well (as described above), with the following exceptions:

- A 5-foot screen was installed at NMW-0401S and a 15-foot screen was installed at NMW-0403S. Different screen lengths were installed to target NAPL-impacted intervals. In the case of NMW-0403S, the 15-foot screen was used to monitor for accumulations of a deeper NAPL (potentially DNAPL) and a shallow yellowish NAPL (potentially LNAPL).

- DNAPL sumps were added. The sumps are 2-foot-long unslotted sections of casing beneath the screened interval, designed to collect DNAPL if it enters the well. To prevent DNAPL from accumulating outside the sump, the annular space was filled with a cement/bentonite grout.

4.4.2 Water-Level Measurement

Following well installation and development, two complete rounds of groundwater levels were collected, one on March 10, 2004 and the other on April 20, 2004. During these gauging events, the field staff measured static fluid levels, fluid interfaces (i.e., NAPL/water interface), and total depths.

4.4.3 Groundwater Sampling

During the weeks of April 19 and 26, 2004 and on June 10, 2005, BBL collected groundwater samples from 30 monitoring wells, including all new and existing monitoring wells. All groundwater samples were analyzed for TCL VOCs, TCL SVOCs, and total cyanide using NYSDEC ASP-2000 protocol. Several samples were also analyzed for selected natural-attenuation parameters. Fourteen of the samples were analyzed for iron and manganese (total and dissolved), methane, sulfide, ammonia, alkalinity, nitrate, sulfate, and orthophosphate. Four samples were analyzed for phospholipid fatty acids (PLFA). As discussed in Appendix B, a selected number of groundwater samples were also analyzed of metal-cyanide complexes and free-cyanide species. Table 1 lists all of the samples analyzed, and what chemical parameters each were analyzed for.

Sampling was performed using the low-flow technique outlined in the SRI Work Plan. Groundwater sampling logs can be found in the attached CD. At each of the new monitoring wells, the low-flow sampling procedures were modified to allow slightly more drawdown, thus generating time-drawdown data suitable for determining specific capacity. Generally, drawdown of approximately 0.1 to 0.5 feet was achieved during the purging of each well, depending on the yielding capacity of the particular well. As reported in Section 5, these data have been used to estimate the hydraulic conductivity of the formation screened by the wells.

4.5 Data Usability Summary Report

BBL prepared a data usability summary report (DUSR) of the soil, soil vapor, and groundwater analytical results following the SRI field activities. Quality Assurance/Quality Control (QA/QC) information is contained and examined in the DUSR. The analytical summary tables presented in Section 5 include the data qualifiers identified in the DUSR.

4.6 Decontamination

BBL decontaminated all equipment following the procedures outlined in the Field Sampling Plan (FSP) of the SRI Work Plan. In general, all non-disposable equipment, in particular all drilling tools and groundwater sampling equipment, was decontaminated prior to first use onsite, between each investigation location, and prior to demobilization. The integrity of the decontamination procedures was checked periodically with equipment rinse blanks, as required by the SRI Work Plan.

4.7 Waste Handling

All investigation-derived waste (IDW) was contained onsite for appropriate characterization and disposal. Soil cuttings, personal protective equipment (PPE), and spent disposable sampling materials were segregated by waste type and placed in New York State Department of Transportation (NYSDOT)-approved 55-gallon steel drums. All decontamination water and purged groundwater water was stored in polyethylene tanks. All storage vessels were labeled with the contents, generator, location, and date. Contained wastes were properly disposed by NYSEG.

4.8 Survey

NYSEG completed a detailed survey of all investigation locations, including position, surface elevation, and, in the case of monitoring wells, measuring-point elevations. The elevations shown in this report are given relative to the North American Vertical Datum of 1988 (NAVD 88). Surface coordinates are referenced to the North American Datum of 1983 (NAD 83), State Plane New York Central (3102).

5. Investigation Findings

5.1 Overview

This section reports the cumulative findings of site investigations into the nature and condition of the site soils, groundwater and sediments at and near the Elmira site. The discussion is divided into the following categories:

- Geology and physical setting (Section 5.2);
- Groundwater flow (Section 5.3);
- NAPL evaluation (Section 5.4);
- Soil-quality evaluation (Section 5.5);
- Soil vapor evaluation (Section 5.6); and
- Groundwater-quality evaluation (Section 5.7), including a preliminary evaluation of natural attenuation (Section 5.8).

Findings of the Fish and Wildlife Impact Analysis (FWIA) and Human Health Exposure Evaluation (HHEE) are reported in Section 6.

5.2 Geology and Physical Setting

The following discussion of the geology and physical setting of the site and surroundings is divided into four subsections. The first two subsections (5.2.1 and 5.2.2) provide an overview of the regional and site-specific geologic settings. The third subsection (5.2.3) identifies and describes the site stratigraphy in terms of hydrostratigraphic units. Hydrostratigraphic units are groups of geologic deposits that have similar water-transmitting properties.

5.2.1 Regional Geologic Setting

The city of Elmira is located in the Appalachian Plateaus physiographic province, a region of similar geologic history stretching in a band from south of the Finger Lakes in central New York to northeastern Pennsylvania. The region is underlain by gently folded rock of Paleozoic age. Bedrock in the Elmira area has been mapped as the Upper Devonian-aged Portage Formation (shale and sandstone with thinly-bedded impure limestone). Glacial drift of pre-Wisconsin and Wisconsin age covers the northern and central parts of the region (Denny & Lyford, 1963). Active streams have been dissecting this plateau since its uplift at the end of the Paleozoic, producing the steep-sided valleys with high relief that characterize the topography of the region today.

Prior to Pleistocene Glaciation

The shales and sandstones which form the bedrock of the area were probably deposited as sediments in shallow inland seas or large lakes sometime in the late Devonian. The rock is nearly flat lying, regionally dipping gently to the southwest (Nugent, 1960). Most of the rocks form broad, open folds that trend northeast and are spaced about 5 to 10 miles apart (Denny & Lyford, 1963), and in general, the structural axes plunge slightly southwestward. Since the end of the Paleozoic, streams have been eroding and dissecting this region, creating strong topographic relief.

The Pleistocene Glaciation

Several glacial advances and retreats have moved across the region, the last during the late Wisconsin stage approximately 17,000 years ago. The glacier carried unconsolidated material (clay, silt, sand, gravel, cobbles, and boulders) with it as it moved southward, and deposited this material on the land. Unsorted deposits, referred to as till, were deposited beneath the ice, or at the edge of melting ice, while deposits exhibiting a higher degree of sorting (i.e., stratified drift) were deposited by glacial meltwater in rivers and lakes formed while the glacier slowly melted. Till and colluvium, an unconsolidated deposit of rock debris ground by glaciers and moved by the force of gravity, are what cover much of the Elmira region. Most present-day streams and rivers show some sign of glaciation. The valley floors of the Chemung and Susquehanna rivers, as well as those of their major tributaries, are essentially smooth, flat surfaces; partially filled with Pleistocene glacio-fluvial deposits of silt and clay on till or bedrock (Nugent, 1960). More extreme glacial effects include glacial diversion of river channels and drift-infilling of valleys of pre-Pleistocene streams. One such occurrence includes the deflection of the Chemung River. The Chemung River once flowed southward through Horseheads and Elmira, but ice blockage during the Wisconsin deglaciation forced the Chemung River to its present course farther west and south.

Post Glaciation

The present day surficial geology and topographic expression of the Elmira area formed as the glacier receded from the area 10- to 15,000 years ago. The area is blanketed by glacial deposits which fill the valley. Streams and rivers have gradually cut into the deposits, carrying the material downriver to be deposited again as alluvium. The unconsolidated materials deposited since the last glaciation are primarily sand, silt, and clay left by the rivers and their tributary streams.

Table 5.1 Generalized Geologic Column

Upper Contact Elev.(ft. AMSL)	Thickness (ft)	Stratigraphic Unit
852	2 - 15	**Fill –** silt, sand, gravel, ash, cinders, slag. Also includes demolition debris, foundation remnants, and buried utilities.
850	0 - 12	**Alluvial Silt and Clay** – brownish gray silt and clay, occasional lenses of fine sand and peat, abundant root scars.
845	5 - 48	**Outwash Sand and Gravel** – generally fine-to-coarse sand, fine-to-coarse gravel, occasional lenses of fine sand, silt, and clay.
825	0 - 14	**Lacustrine Silt and Clay** – gray, uniform, cohesive, massively bedded.
820	30-40	**Sandy/Silty Till** – dense sand and silt matrix containing embedded sand and gravel, rounded to angular, mostly multi-colored rock fragments.

Note: elevations and thicknesses approximated for center of site.

5.2.2 Site Geologic Setting

The site is situated on relatively flay-lying land approximately 850 feet above mean sea level. Site investigations have identified the five principal geologic units beneath the site described in Table 5.1. These units show a sequence of events specific to the site's geologic history:

- Dense sand/silty basal till deposited by the Pleistocene glacier(s);
- Remnants of a lacustrine silt and clay likely deposited in a glacial meltwater lake;
- Outwash deposit of sand and gravel with few discontinuous interspersed fine sand, silt, and clay lenses deposited by meltwater rivers as the glacier receded;
- Alluvial sequence of silt and clay with sand stingers and peat; and
- Fill and an assortment of man-made structures, originating from the site's industrial history.

Section 5.2.3, below, describes the nature and hydrogeologic function of these geologic units in detail.

5.2.3 Hydrostratigraphy

Hydrostratigraphic units comprise one or more geologic units of similar hydrogeologic properties (e.g., hydraulic conductivity) that may be grouped together to aid interpretation and simplify the discussion of groundwater flow. The hydrostratigraphic units at the site are discussed individually below, and their relationship to one another is depicted in cross-section on Figure 2. The lines of section are shown on Figure 1.

Alluvial Silt-and-Clay Unit

As its name implies, the alluvial silt-and-clay hydrostratigraphic unit consists of the alluvial deposit of silt and clay. The unit can generally be described as a brownish-gray silt and clay, with occasional fine sand and peat lenses. Although this unit lies below the fill, it is discussed first because the fill is combined with the sand-and-gravel hydrostratigraphic unit, discussed below.

The alluvial unit is found across much of the western half of the site. This unit is thickest in the area of the MGP and to the south of the MGP, and is relatively thin or absent beneath the rest of the site. Figure 5 depicts the lateral extent of the unit where it is thicker than four feet and is generally continuous. The unit is thin or absent outside the regions shown on the figure. The unit is also depicted in cross section on Figure 2. The unit appears thickest beneath the former gas house, coal house, purifier boxes, and south of the MGP, beneath the eastern end of the Trayer building.

The top of this unit likely formed the original land surface prior to development of the area. Its surface is currently covered by fill, and is highly irregular due to construction excavations and apparent grading undertaken throughout the site's industrial history. It is apparent that much of the unit was re-worked as the site was developed, especially in the eastern portion of the site where the unit is largely absent. The foundations of former gas holders 1 and 2 penetrate through the silt and clay into the sand and gravel.

The silt-and-clay unit is significant hydrogeologically because it limits recharge to the sand and gravel unit by restricting infiltration of precipitation, and because its presence affects local shallow groundwater flow conditions. Groundwater flow is discussed in detail in Subsection 5.3.

No wells are screened entirely in the unit; therefore, no direct measurements of its hydraulic conductivity are available. The results of the specific capacity test conducted at well MW-4S; however, provide an upper-end estimate of the hydraulic conductivity of the unit. This well screens primarily the alluvial unit; however, the bottom few feet of material screened by the well begin to coarsen, grading into the sand-and-gravel unit. The calculated hydraulic conductivity for well MW-4S is 0.2 feet per day (ft/d), using the method of Walton (1962). This value is consistent with the range of hydraulic conductivity for silt provided by Brassington (1988) of 3.4 to 0.07 ft/d. Hydraulic conductivity test results for site wells are included in Table 3.

Sand-and-Gravel Unit

Though somewhat variable, the outwash sand-and-gravel and fill units are best described as a single hydrostratigraphic unit (referred to hereafter as the "sand-and-gravel unit"). This is because they both have similar water-transmitting properties and, except for where the alluvial unit is present, they are in contact with one another. There is a small thickness of saturated fill above portions of the alluvial unit. As discussed later in Section 5.3.2.1, this water "spills off" the edge of the alluvial unit into the sand-and-gravel unit. This unit is bound by the water table above (where the alluvial silt and clay is absent), and by the lower silt-and-clay and sandy/silty till units below. The sand-and-gravel hydrostratigraphic unit is the most significant at the site due to its ability to yield and transmit groundwater and store and transport site-related constituents. This unit is laterally continuous across the site and, based on regional subsurface data and literature collected during this and previous investigations, is inferred to continue across most of the valley floor. At the site, the thickness of the unit averages about 30 feet, and was observed to range from approximately 5 feet (at NMW-0402S) to 40 feet (at MW-9S/D).

The compositional variability of the sand-and-gravel unit is demonstrated by the results of the grain-size analyses and hydraulic-conductivity testing, summarized in Tables 5.2 and 5.3. The actual composition of the unit varies considerably with depth and location, comprising silt, sand, gravel and cobbles in varying proportions. Some intervals within the unit are nearly all coarse sand and gravel, while others have significant percentages of fine sand and silt, with bulk grain-size distributions not unlike the till (discussed later in this section).

The heterogeneity of the sand and gravel is evident in the hydraulic-conductivity test results (Table 5.3). Hydraulic-conductivity values ranged from approximately 6 to 228 ft/d. A reasonable estimate of the bulk hydraulic conductivity of the sand and gravel is provided by the geometric mean of the values, about 67 ft/d.

Table 5.2 Sieve Analyses Results Sand-and-Gravel Unit

Location	Depth of Sample (ft. bgs)	Percent of Total Sample			
		gravel	sand	silt	clay
SB-208	15-17	59.4	34.9	5.1	0.7
SB-218	32-34	4.8	77.8	11.1	5.7

Note: More detailed results are presented in the Electronic Attachments CD.

Table 5.3 Estimated Hydraulic Conductivity Sand-and-Gravel Unit

Location	Screened Interval (ft. bgs)	Hydraulic Conductivity (ft/day)
MW-0301S	12 – 22	NA
MW-0401S	14 - 24	>112
MW-0402S	13 – 23	55.5
MW-0403S	30 – 40	114
MW-0404S	19 – 29	59.5
MW-0405S	26 – 36	NA
NMW-0401S	10.5 – 15.5	>130
NMW-0402S	20 – 30	NA
NMW-0403S	5.6 – 20.6	NA
MW-1S	9 – 14	40.5
MW-2S	8.6 – 18.6	6.30
MW-6S	5 – 25	>114
MW-7S	8 – 38	>70.0
MW-8S	5 – 15	NA
MW-9S	4.5 – 15.5	228
MW-10S	8 – 24	41.0
MW-11S	6 – 26	27.7
MW-12S	9 – 25	>123
Geometric Mean:		66.6

Note: Hydraulic conductivity based on specific-capacity tests performed by BBL during the SRI. No drawdown observed at locations with a ">" symbol. The calculated value is based on an assumed drawdown of 0.01 feet; therefore the actual hydraulic conductivity value is greater than the given calculated value. NA = specific capacity data not valid due to irregular drawdown.

Lacustrine Silt-and-Clay Unit

The lacustrine silt-and-clay unit was identified in several of the deeper borings completed in the eastern half of the site. Where present, this unit lies between the sand-and-gravel unit and till unit. The unit appears to pinch out near the center of the site (just west of boring SB-216) and southeast of the substation (near SB-202, SB-204, and SB-230). The approximate western boundary of this unit can be visualized by extending a line from monitoring well MW-0404S/D to MW-9S/D to soil boring SB-216 to SB-229 to SB-207. The greatest thickness of lacustrine silt and clay that was identified in borings at the site was 14 feet at MW-9S/D, located southeast of the distribution holder. A thickness of 22 feet was also observed at the location of monitoring well MW-12D,

Table 5.4 Sieve Analysis Results Lacustrine Silt-and-Clay Unit

Location	Depth of Sample (ft. bgs)	Percent of Total Sample			
		gravel	sand	silt	clay
SB-216	40-41.6	0.0	1.9	36.5	61.6

More detailed results are presented on the Electronic Attachments CD.

Table 5.5 Sieve Analyses Results
Till Unit

Location	Depth of Sample (ft. bgs)	Percent of Total Sample			
		gravel	sand	silt	clay
SB-208	28 – 29.7	34.3	56.6	7.8	1.3
SB-208	35 – 36.5	39.3	40.2	13.5	6.9
SB-210	38 – 39.5	40.9	41.2	11.0	6.9
SB-203	62 – 64	15.9	34.7	23.0	26.4

Note: More detailed results are presented in the Electronic Attachments CD.

Table 5.6 Estimated Hydraulic Conductivity
Till Unit

Location	Screened Interval (ft. bgs)	Hydraulic Conductivity (ft/day)
MW-0304D	50 - 60	17.8
MW-0404D	50 - 60	175
MW-1D	52 – 62	103
MW-2D	55 – 65	97.6
MW-8D	60 – 70	11.8
MW-9D	62 – 72	0.740
MW-12D	66 – 77	0.003
Geometric Mean:		7.0

Note: Hydraulic conductivity based on specific-capacity tests performed by BBL during the SRI.

northeast of the site. The results of grain-size analysis, summarized in Table 5.4, show little to trace proportions of material larger than silt and clay.

The lacustrine silt-and-clay unit is considered poorly permeable, particularly when considered relative to the overlying sand-and-gravel unit. Where present, this unit separates the sand and gravel from the till. Groundwater preferentially flows around this unit and through the more permeable adjacent sand-and-gravel and till units. A vertical hydraulic conductivity test (based on laboratory analyses using a flexible-tube permeameter) of the unit supports this observation. Testing of an undisturbed (Shelby tube) sample collected from this unit yielded a vertical hydraulic-conductivity estimate of 1.95×10^{-3} ft/d. The detailed results of the permeameter test are provided on the attached CD.

Till Unit

Till was encountered in every deep boring drilled at the site. The till's composition was somewhat variable across the site, though the unit was generally very dense, with a matrix of sand and silt and varied amounts of gravel and clay. Typical blow count N-values for the unit were greater than 50 and split-spoon refusal in this unit was also very common. As is typical of till, the results of the grain-size-distribution analyses (summarized in Table 5.5) show considerable range of composition, including substantial fractions of silt and clay, sands, and gravel.

The topography of the till surface in the area of the site is depicted on Figure 3. The figure shows the following:

- The till surface has strong, irregular relief. This is consistent with the nature of its deposition, and the erosional contact between the till and the overlying outwash sand and gravel deposit.

- The till surface is highest in the extreme eastern and western portions of the site, and lowest north, east and south of the former distribution holder. The low area of the till surface could represent a north-south trending outwash channel.

- The general slope of the till surface converges toward the south-central portion of the site, in the direction of the depressed area.

The dense nature of the till suggests that it is a lodgment till. Lodgment till is deposited by ice at the base of the glacier, and is typically very compact due to the great weight of the overlying glacier that deposited it. At some locations, the uppermost portion of the till contained similar fractions of unsorted materials but was not as dense or cohesive. These intervals are interpreted to result from melt-out or ablation till, deposited as the glacier melted, and suspended materials were released from the ice.

In general, the till unit is poorly permeable, particularly when considered relative to the overlying sand-and-gravel unit. Hydraulic conductivity testing of the unit supports this observation. As is demonstrated by the variability in grain size (Table 5.5), the k of the till also has considerable variability. Table 5.6 summarizes lateral hydraulic-conductivity estimates, drawn from single-well specific-capacity tests. As shown in Table 5.6, values of k were found in a range from approximately 0.003 to 175 ft/d. The geometric mean k value of the till is an order of magnitude less than that of the sand and gravel. This suggests that the till unit in combination with the lacustrine silt and clay act as confining layers in the regional groundwater-flow system, and that the majority of groundwater beneath the site moves through the overlying, more permeable hydrostratigraphic units (i.e., the sand and gravel unit).

5.3 Groundwater Flow

5.3.1 Regional Groundwater Flow

Elmira overlies a portion of a valley-fill aquifer, consisting mainly of glacial outwash sand and gravel underlain by till. The sand and gravel aquifer provides a municipal water supply to several communities. Locally, the aquifer extends more than 6 miles north of the site up the course of Newtown Creek and less than a mile south to the Chemung River. The aquifer is variously constrained by several geologic units of lesser permeability: till and bedrock below and on the valley slopes, and pockets of alluvial and lacustrine clay and silt. The principal groundwater flow direction is southward toward the Chemung River (United States Geological Survey, 1982).

The hydrostratigraphic units described at the site appear to be representative of the regional groundwater flow system. The most permeable, and therefore the most significant unit for groundwater transport or supply, is the sand-and-gravel unit. The alluvial and lacustrine silt and clay that is found above and below the sand and gravel unit near the site are comparatively impermeable. Underlying the sand-and-gravel and lacustrine silt-and-clay units is a till that is less permeable than the sand-and-gravel unit. Groundwater flow is downward and toward the Chemung River. This assumption is upheld by the site data (discussed below), but it also the common model of flow for groundwater in major river valleys.

5.3.2 Site Groundwater Flow

Groundwater movement beneath the site can best be described in terms of three distinct hydrostratigraphic units. In descending order these are:

- Alluvial silt-and-clay unit, referred to hereafter as the “alluvial unit;”
- Sand-and-gravel unit, periodically including zones of coarse fill; and
- Till unit.

This section discusses apparent groundwater flow patterns in these units. The discussion draws from several sources of information:

- The regional hydrogeologic model (presented above);
- Site-specific hydrogeologic data, including observations and analyses relating to the water-bearing properties of the subsurface soils, and hydraulic-conductivity testing completed at site wells (as described in Section 5.2.3); and
- Water-level data collected at available monitoring wells located at and near the site.

The most comprehensive round of water-level data was collected April 20, 2004. These data and one other semi-complete round (March 10, 2004) are presented in Table 4. To aid interpretation of site groundwater flow, a water table contour map (Figure 4) was prepared using the April 20, 2004 groundwater elevation data set.

5.3.2.1 Shallow Groundwater Occurrence and Flow

To examine shallow groundwater flow beneath the site, BBL prepared a water-table map (Figure 4). General horizontal groundwater-flow directions are illustrated on figure using blue-colored arrows. When combined with the understanding of site geology described in Section 5.2.3, the figure shows that the water table occurs in the sand-and-gravel unit (recall that the sand-and-gravel unit includes fill placed at the site). Beneath the western half of the site, the water table is mounded above the alluvial silt-and-clay unit, and therefore occurs in the fill. The mounding is caused by the low vertical hydraulic conductivity of the alluvial unit. This condition suggests that the water in the fill is primarily derived from infiltration of precipitation that falls on the site. Beneath the eastern half of the site, another, smaller groundwater mound is evident. This mound is exemplified by the tight, elongated loop made by the 844-foot contour line, which is centered along the former canal. This mounding appears related to the former canal, perhaps being caused by lower-permeability sediments lining the canal bottom.

Several important observations are noted below regarding shallow groundwater flow can be made from the water table depicted on Figure 4. Conclusions based on the observations are found after the bulleted observations.

- Where the water table occurs in or above the alluvial unit (western portion of site), groundwater moves laterally away from the apex of the mound, near monitoring well MW-6S. The magnitude of horizontal gradients here is approximately 0.013.

- Where the water table occurs in the sand and gravel (eastern half of site) lateral flow directions are east (toward Newtown Creek) and south (toward the Chemung River), with mounding centered along the southern site boundary (along length of former canal).

Table 5.7 Vertical Gradients from Water Table

Well Pair	Groundwater elevation at well pair members (ft. AMSL)		Vertical Gradient	Change (ft.)
	Shallow	Deep		
Mounded Areas				
MW-1	844.88	843.14	Down	1.74
MW-2	844.60	842.03	Down	2.57
MW-4	844.53	842.64	Down	1.89
MW-8	843.88	840.70	Down	3.18
MW-9	845.33	841.90	Down	3.43
Non-Mounded Areas				
MW-12	843.79	843.74	Down	0.05
MW-0404	841.42	841.25	Down	0.17

Data collected April 20, 2004.

- Shallow groundwater flow is to the south in the area of the MGP structures (i.e., holders, tar vessel, oil tanks, purifier boxes, gas house).

- Shallow groundwater flow south of the site is to the south, toward the Chemung River. Mounding is not apparent south of the site. The horizontal gradient here is approximately 0.014.

- Prior to the recent IRMs that removed former gas holders 1 and 2, the holder foundations likely formed barriers to shallow groundwater flow. Now that the holder foundations are removed, the barriers are gone and groundwater flow in the area of the holders is likely more uniform.

As demonstrated in Table 5.7, strong downward vertical gradients exist where the water table is mounded above the alluvial silt and clay, and in the area of the former canal. As expected, the magnitude of the vertical gradients is relatively weak in areas where mounding does not exist. Shallow groundwater in the mounded areas moves laterally on top of the lower permeable material until it reaches the edge. The mounded water then spills off the edge and moves downward into coarser material (i.e., sand-and-gravel unit). Groundwater that is "trapped" in the lower permeable alluvial silt and clay and canal sediments moves downward and essentially drips out the bottom of the units.

Based on the above observations and Figure 4, the following statements regarding shallow groundwater flow can be made:

- The majority of shallow groundwater at the western portion of the site moves radially away from the center of the groundwater mound located near monitoring well MW-6S, then spills off the edge of the alluvial unit into the sand-and-gravel unit. Once in the sand-and-gravel unit, groundwater flows to the Chemung River, Newtown Creek, and/or, to a lesser extent, into the underlying till. Groundwater in the till ultimately discharges into the Chemung River.

- A fraction of the shallow groundwater seeps vertically through the alluvial unit into the sand and gravel unit.

- An elongated mound of shallow groundwater is formed along the southern site boundary (along the length of the former canal). This elongated mound produces a damming effect for shallow groundwater moving south from the area of the storage yard and substation. Groundwater coming from these areas is forced around the mound.

- Groundwater is not mounded immediately south of the MGP structures and to the south of the site.

- The average rate at which groundwater moves in the sand and gravel unit beneath the site, known as the average linear velocity (Fetter, 1988), is calculated to be approximately 3 ft/d using a k value of 67 ft/d, the hydraulic gradient presented above, and an assumed effective porosity (n_e) of 30%.

5.3.2.2 Deep Groundwater Occurrence and Flow

This discussion of deep groundwater occurrence and flow primarily focuses on groundwater in the till unit. Groundwater flowing in the till unit beneath the site is derived primarily from three possible sources:

- Flow in the till unit from upgradient sources;
- Downward flow to the till unit from the overlying sand-and-gravel unit; and
- Presumed upward flow to the till unit from the underlying bedrock.

Seven monitoring wells screen this unit: MW-1D, MW-2D, and MW-8D, MW-9D, MW-12D, MW-0304D, and MW-0404D. The water-level data collected during the SRI from these wells are shown in Table 4. Figure 6 presents the potentiometric surface of the till unit, using the April 20, 2004 data set. Review of the figure reveals the following about groundwater movement in the unit:

- Unlike shallow groundwater movement, deeper groundwater moves relatively uniformly south-southeastward, toward the Chemung River. Deep groundwater does not move to the north, toward the Sullivan Street Wellfield, as previously reported in TRC's "Task" reports.

- The hydraulic gradient across the site is slight, approximately 0.004 ft/ft.

- The average linear velocity of the groundwater in the unit is calculated to be approximately 0.1 ft/d using a k value of 7 ft/d, the hydraulic gradient presented above, and an assumed effective porosity (n_e) of 30%.

Due to relatively low permeability of the till, the net groundwater flow is believed to be small with respect to the volume of water flowing in the overlying sand and gravel. This gives it a relatively minor role in the occurrence and flow of groundwater at the site.

5.4 NAPL Evaluation

Due to their immiscible nature, NAPLs can persist for many years in the subsurface environment, where they act as continuing sources of constituents to groundwater as they slowly dissolve. This is particularly true with DNAPLs, which tend to migrate below the water table, rather than float on top of it. NAPLs can also diffuse into low-permeability zones, such as silt or clay layers, which then also act as continuing sources of constituents to groundwater. For these reasons, characterizing the nature and extent of NAPLs at sites such as the Elmira site, where a considerable volume of NAPL is present in the subsurface is an important, challenging component of remedial investigation.

5.4.1 NAPL Characterization

Observations made of NAPL-containing soils during the field work suggested that there may be several different types of NAPL beneath the site. To further examine this, BBL performed a forensic evaluation of soil samples collected during the SRI. The evaluation used PAH analytical results to gain insight into the source(s) of PAHs in the NAPL contained in the sample. In this section, we describe the results of that evaluation, and then combine them with the observed distribution of NAPLs in the subsurface (discussed further in Section 5.4.2.2) to characterize the nature of NAPLs in the subsurface and estimate likely sources of these NAPLs.

The forensic evaluation, or "PAH source evaluation" consisted of assessing PAH diagnostic ratios (i.e., Fluoranthene/Pyrene [Fl/Py] and benzo(a)anthracene/chrysene [BAA/C]), examining analytical chromatograms, and reviewing TPH results for 70 soil samples. The diagnostic ratios were plotted on scatter plots to help identify PAH source signatures in site samples with the highest PAH concentrations and differentiate PAH signatures associated with other sources. The PAH source evaluation results are summarized in the bullets below. Figure 7 shows a plot of BAA/C versus Fl/Py which essentially summarizes the results of the PAH source evaluation using diagnostic ratios. A detailed discussion of the entire PAH source evaluation is presented in Appendix C.

- Soils near the former MGP (near and south of the gas house and three gas holders) exhibited a lower-temperature-process coal tar signature, likely from carbureted water gas (CWG).

- Soils in the eastern area of the site (north and east of the distribution holder) exhibited a signature suggestive of a mixture of CWG coal tar and mid-distillate-range petroleum (i.e., No.2 and No. 6 fuel oils).

- Only two samples exhibited a high-temperature-process coal tar signature, likely from coal carbonization (CC) or similar process(es). These samples were collected from inside the clay pipe east of the site property and from inside a manhole located onsite (southwest of the substation).

The important information that can be gleaned from the above evaluation is following:

- The NAPL identified in soils beneath the MGP operations area (the main plant area), were the gas was manufactured and stored, is attributable to CWG coal tar.

- The NAPL-containing soils in the eastern portion of the site appear to contain both CWG coal tar and mid-distillate range petroleum NAPLs; this mixture of PAH signatures could be consistent with, and may indicate the location of, the reputed waste lagoon. Mid-distillate waste oils (i.e., No. 2 and No. 6 fuel oils) were commonly used during the CWG process (USEPA, 1988.).

- Because the PAH signature found in all other site soil samples was CWG, the source of PAHs in samples collected from the clay pipe and manhole may have a different origin. As discussed under Section 2.1.7, NYSEG is continuing to investigate whether the pipe is related to the site.

The results of the forensic evaluation are consistent with field observations of NAPL-containing soils. NAPL observed in the MGP operations area was generally described as an amber-brown to black colored, relatively viscous liquid with a distinct naphthalene-/coal-tar-like odor. The NAPL identified in the eastern area of the site was located nearer the water table and had a more yellowish color and an odor that included a petroleum component.

Relative to chlorinated-solvent-type DNAPLs, the coal-tar DNAPL at the site is expected to be relatively light, with a density only slightly above water at ambient groundwater temperatures. It is also expected to have a moderate interfacial tension, and be relatively viscous. Because NAPL did not accumulate in any site wells prior to or during the SRI, no further characterization of NAPL physical properties is possible.

5.4.2 NAPL Delineation

Delineating the extent of NAPLs, particularly DNAPLs, often proves challenging at MGP sites. This is due to many factors, including:

- *Lack of information*. Information on plant operations and waste-handling practices is often scant or non-existent.

- *Multiple NAPL-release points*. Typical MGP sites had numerous locations where DNAPL could have been released, many frequently undocumented.

- *Complicated behavior in the subsurface*. DNAPL often migrates in irregular ways, and its migration can be influenced by man-made features and naturally-occurring conditions.

Despite such complications, the geologic and analytical data generated by the numerous borings drilled and wells/piezometers installed at the site have permitted BBL to sufficiently characterize the extent of NAPLs for the purposes of this SRI. The balance of this section describes the approach that BBL used to delineate the horizontal and vertical extents of NAPL at the site, and describes those extents.

5.4.2.1 Approach

BBL used visual observations of NAPL and sheen in subsurface soil samples and test pits to perform the NAPL/sheen delineation. The process involved reviewing every available boring and test-pit log for the site as well as observations made during the recent IRMs, identifying intervals that contained NAPL/sheen, and tabulating those data in a database. The 3-dimensional visualization software platform MVS (Mining Visualization Software) was then used to read in, grid, and krig the NAPL/sheen-observation data. The resulting model output is a 3-dimensional representation of the approximate vertical and horizontal extents of NAPL/sheen in the subsurface.

The means by which NAPL/sheen-observation data from boring and test-pit logs were transformed into numerical values in the database was straightforward. For soil borings, BBL geologists assigned one of three numerical values to each 2-foot split-spoon recovered. A value of “0” represented a clean sample. A value of “0.5” represented a sample where no free-phase NAPL was evident, but sheen was present. A value of “1” was assigned to any sample were NAPL was present at any or all points in the spoon. Test pits were treated as soil borings located at the center of the pit. For each 2-foot depth increment in a given test pit, a BBL geologist assessed NAPL presence and assigned one of the three numerical values described above (i.e., either 0, 0.5, or 1). In all, a total of approximately 1,500 2-foot depth increments were incorporated into the model.

5.4.2.2 NAPL Extents

The modeled extent of NAPL-containing soils (including sheens) is depicted on Figure 8 in two “panes”, one plan view and one cross-sectional view. The following information is useful for interpreting the figure:

- The till surface from Figure 3 is depicted so that the viewer has a vertical frame of reference. In the plan-view pane, the till surface is depicted using topographic contours. In the cross-sectional pane, the till surface is depicted as a solid, shaded surface.

- The water table appears as a light-blue colored, opaque surface. This allows the viewer to readily distinguish between NAPL/sheen that is above the water table (yellowish color) and below the water table (greenish color).

- In some cases, the model shows disconnected regions of NAPL/sheen-containing soil, generally in areas of sparse data.

- The actual distribution of NAPL/sheen beneath the water table is expected to be highly irregular, due to the stratified, heterogeneous nature of the sand-and-gravel unit (Pankow and Cherry, 1996). As such, the limits shown should be considered as approximate and subject to uncertainty.

Several important observations can be made from the figure:

- Two distinct areas of NAPL/sheen are present at the site: one in the area of the former MGP operations (gas house, holders, tar storage/handling vessels) and the other to the north and east of the former distribution holder. Combining the NAPL/sheen distribution with the forensic evaluation (discussed above) suggests that the NAPL/sheen in the MGP operations area has a CWG signature, while the NAPL/sheen to the east has a mixed signature: CWG and mid-distillate petroleum fuel oils. The NAPL in the operations area is likely the result of spillage during tar handing processes and leakage from MGP structures. The NAPL/sheen to the east may have resulted from waste oils and tars being disposed of in the reputed waste lagoon during the MGP operations and/or leakage from oil tanks located to the north of the former distribution holder.

- The NAPL/sheen to the east appears to reside near, and a short distance below, the water table. This suggests that this NAPL may be somewhat buoyant and near the density of site groundwater. Based on the forensic evaluation, the NAPL in this area appears to have a mixed signature: coal tar (likely DNAPL) and petroleum fuel oils (likely LNAPL). The density of the NAPL in this area depends on the relative proportions of LNAPL and DNAPL in the mixture.

- NAPL/sheen beneath the operations area (i.e., the footprint of where the MGP operated) appears to have migrated deeper, and has penetrated the till in some areas. Given the deep distribution of the NAPL in this area it is reasonable to assume this coal tar NAPL is denser than water (DNAPL). The till surface appears to have little control over NAPL extent likely because the till is coarse-grained in several areas, and therefore does not provide a capillary barrier to downward NAPL migration.

- NAPL/sheen is primarily constrained to the within the site boundary. The exception is south of former gas holders 1 and 2, where a finger of NAPL/sheen appears to have migrated downgradient (south) onto Trayer's property.

- The vast majority of NAPL/sheen-containing soils occur below the water table.

- The extents of NAPL/sheen have been delineated adequately for the purposes of this SRI.

5.4.3 Conceptual Model for NAPL Migration

Although it is not possible to predict the exact paths that DNAPL will follow beneath the site, or identify every location where it is pooled, it is possible, with the information in hand, to develop a reasonable model that explains NAPL transport at the site sufficiently for remedial decision-making. This section provides such a model. First, we describe potential sources of NAPL to the subsurface, and then explain how the NAPL appears to be distributed in the subsurface, and the mechanisms that likely governed its distribution. Next, we address the potential for ongoing NAPL migration.

5.4.3.1 Explanation of Observed Distribution

Many factors govern NAPL movement, starting with where it is released to the subsurface. There are probably numerous NAPL release points at the site, given its long history and the typically poor waste-handling practices of the era; however, identifying them all is not practicable. Chief among the potential sources are former gas holders 1 and 2 (primarily DNAPL[1]), tar separators (primarily DNAPL), former oil storage tanks (primarily LNAPL), and the reputed former waste lagoon (LNAPL and DNAPL). We call these out because NAPL was either handled, generated, stored, or disposed of in these areas and such features are often found to be sources of NAPLs at MGP sites. The distribution of NAPL beneath these features (Figure 8) is consistent with releases originating at or near them.

NAPLs have moved downward, due to gravitational forces, through the unsaturated zone (primarily fill) and reached the water table. LNAPL would have floated on the water surface and spread laterally. Seasonal

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[1] Coal tar can be an LNAPL, although this is uncommon.

fluctuations in the water table can result in a “smear zone”, an interval of LNAPL-containing soils where the base of the zone is roughly equivalent to the elevation of the seasonally low water table. This, in part, may be responsible for the distribution of NAPL-containing soils in the eastern area of the site (Figure 8). DNAPL, too, would have tended to spread laterally upon encountering the water table and accumulate until the gravitational pressure developed at the base of the accrued DNAPL exceeded the entry pressure of the saturated fill, alluvial fine sand and silt, and/or sand and gravel. Once that occurred, DNAPL continued migrating downward. During its migration downward, any lower-permeability lenses in the sand-and-gravel unit would cause preferential, lateral spreading of the DNAPL in the more-permeable material above the lenses (Cohen and Mercer, 1993). Upon reaching the surface of the till, the DNAPL would again tend to accumulate and spread laterally until sufficient gravitational pressure developed at the base of the DNAPL exceeded the entry pressure of the till. The entry pressure of the till is expected to be relatively low given the relatively coarse nature of this unit. Drilling observations in the MGP operations area support this fact, as NAPL was observed several feet below the till surface in several areas. DNAPL was observed below the till surface in one boring (SB-230)in the eastern area of the site.

While playing an important role in NAPL migration below the water table, gravity is not the only factor. Because coal tar is typically only slightly denser than water, the direction of coal-tar migration can be strongly influenced by the directions of groundwater flow. The observed distribution of NAPL beneath the site (Figure 8) suggests that both factors have played a role in NAPL migration. Migration due chiefly to gravity explains why NAPL is found well below the water table in the operations area. The role of groundwater movement in NAPL migration is evidenced in the distribution of NAPL along the southern site boundary (south of former holders 1 and 2) and in the extreme eastern region of the site (southeast of the substation). As previously discussed, shallow groundwater flow in the area of the holders and tar storage vessels is to the south, while shallow flow in the east is largely controlled by a mound centered about the former canal. NAPL found away from the potential sources (holders, tar storage vessels, oil tanks, reputed lagoon) can be attributed to groundwater flow gradients away from these areas.

5.4.3.2 Potential for Ongoing Migration

Continued migration of NAPL at the site requires NAPL to be present above *residual saturation* or “pooled”. Pooled NAPL will enter a well screen that penetrates it and has the potential to be mobile. Residual NAPL is comprised of blobs and ganglia that have been cut off and are disconnected from a continuous NAPL body by water. Such NAPL is not mobile and will not enter a well that is screened across it. Much of the NAPL beneath the site appears to be residual. This is supported by the lack of measurable DNAPL observed in any site wells, particularly the NAPL monitoring wells (NMW-0401S, NMW-0402S, and NMW-0403S) that screen heavily NAPL-impacted soils. In addition, Gas Holders 1 and 2 and the visually-impacted soils immediately around the holders were removed during the recent IRMs completed by NYSEG. Removal of this material will help reduce the amount of potential mobile NAPL in the most heavily impacted areas of the site.

Mobility data on site DNAPL are not available; however, coal tars are typically known to have relatively low densities and high viscosities as compared to other DNAPLs (Cohen and Mercer, 1993; Pankow and Cherry, 1996). Given these properties of coal tar, it is possible that the DNAPL has not yet ceased migration following its initial release into the subsurface (Kueper, 2005).

5.5 Soil-Quality Evaluation

Soil samples collected from the site included both surface soil samples (from the top 2 inches) and subsurface samples from soil borings and test pits (which ranged from 10 to 86 feet bgs). At MGP sites, two types of gas-production byproducts often account for the majority of affected soils: NAPLs (primarily coal-tar DNAPL) and spent purifier wastes. Principal components of coal tar that are routinely analyzed for at MGP sites are BTEX, which are VOCs, and PAHs, which are SVOCs. Knowing the levels and distribution of these two classes of organic compounds is a useful way of identifying the nature and extent of soils affected by coal tar. Because coal tar typically contains elevated levels of these compounds, soil samples that contain it need not always be analyzed; rather it can be assumed that the levels of BTEX and PAHs will likely be above applicable Standards, Criteria, and Guidance (SCGs). Purifier wastes are typically composed of lime or a cellulose-based matrix (e.g., sawdust or wood chips) and often contain cyanide. Cyanide complexes in purifier waste typically color the waste bright blue (Prussian Blue), making it easy to detect in the field. Complexed cyanide species have been shown to be stable, thus not a toxicological concern. Purifier waste was identified at the site in several soil samples, specifically in the area along the southern site boundary to the south-southeast of the former distribution holder. The distribution of cyanide in site soil is summarized in Section 5.5.3 and discussed in more detail in Appendix B.

5.5.1 Surface Soil Results

Thirteen surface soil samples were collected, including five background samples. To evaluate analytical results in surface soils, BBL compared the analytical results to the SCGs contained in the NYSDEC's TAGM HWR-94-4046 (NYSDEC, 1994) and a follow-up NYSDEC memorandum from Michael J. O'Toole, Jr. dated December 20, 2000 (collectively hereinafter referred to as the "TAGM"). A summary of the surface soil data with a comparison to TAGM criteria is presented in Table 12. Several VOCs and SVOCs were detected in the surface soil samples. None of the VOCs were detected above TAGM values. For SVOCs, several PAHs were detected in both onsite and background samples at concentrations greater than the TAGM values. PAH concentrations in onsite samples were not significantly higher than the background concentrations. PCBs (in the form of Aroclor 1260) were detected in one onsite soil sample, but at a concentration less than the TAGM value.

Several inorganics were also detected in both background and onsite surface soil samples. As shown in Table 5.8 below, with the exception of calcium, concentrations of metals detected in onsite soils were either below or only slightly above background.

Table 5.8 Maximum Concentration of Metals in Surface Soil

Constituent	Maximum Background (mg/kg)	Maximum Onsite (mg/kg)
Aluminum	8,760	9,620
Antimony	ND	ND
Arsenic	9.1	9.7
Barium	1,300	138
Beryllium	0.45	0.5
Cadmium	2.3	0.33
Calcium	9,270	80,800

Constituent	Maximum Background (mg/kg)	Maximum Onsite (mg/kg)
Chromium	70.7	16.5
Cobalt	11.7	9
Copper	154	46.9
Iron	55,800	24,900
Lead	365	114
Magnesium	4,090	9,470
Manganese	710	680
Mercury	0.89	0.18
Nickel	417	22.2
Potassium	1,120	ND
Selenium	1.9	1
Silver	0.4	ND
Sodium	451	95.4
Thallium	ND	ND
Vanadium	16.6	15.2
Zinc	316	240

5.5.2 Subsurface Soil Samples

To evaluate the BTEX and PAH analytical results in subsurface soils, BBL used the SCGs contained in the TAGM. These SCGs, referred to hereafter as "Guidance Values", set limits for total detected VOCs and SVOCs, specifically ≤ 10 ppm VOCs and ≤ 500 ppm SVOCs. At MGP sites, the SVOCs of interest are PAHs because they typically occur in the greatest abundance. Based on these facts, the soil evaluation uses the following Guidance Values: VOCs ≤ 10 ppm and PAHs ≤ 500 ppm.

5.5.2.1 VOC and PAH Results

During the various investigations conducted at the site (including the recent IRMs), 129 samples were collected and analyzed for VOCs and PAHs, and 58 for only PAHs, as summarized in Table 5.9. Of these, the majority of samples did not exceed the guidance values for VOCs or PAHs. For the remaining samples, either the guidance value for VOCs, PAHs, or both were exceeded. As shown on Figure 5.1, most commonly, if the guidance value for VOCs was exceeded in a sample, so was the guidance value for PAHs. This is not surprising since coal tar typically contains both VOCs and PAHs. Based on this information, and because the PAH data set is the most robust for site soils (more samples were analyzed for PAHs than for any other parameters) this evaluation focuses on characterizing the extent of subsurface soils containing greater than 500 ppm of PAHs.

To evaluate the extent of soils exceeding the PAH screening value of 500 ppm, BBL used a similar approach to that used to describe the extents of NAPL/sheen-containing soils (Section 5.4.2.2). Figure 8 depicts the results of a three-dimensional model showing the regions of subsurface soil containing greater than 500 ppm of PAHs. The model incorporates total PAH results for 183 samples, representing every sample ever analyzed for PAHs at the site.

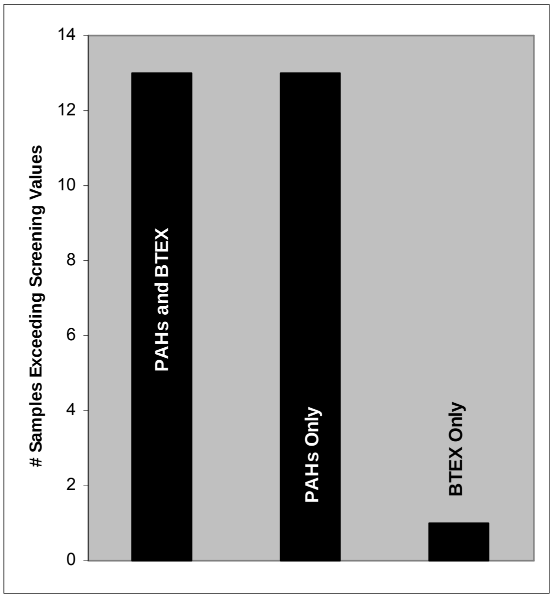

Figure 5.1 - Comparison of Soil Samples Exceeding Screening Values.

Table 5.9 Soil Quality Analytical Results

Analyses	Investigation				Totals
	Task II	Task III	SRI	IRMs[4]	
	# Samples[3]	# Samples[3]	# Samples[3]	# Samples[3]	
VOCs[1] & PAHs[1]	**0**	**16**	**71**	**42**	**129**
PAHs[1] only	**4**	**15**	**39**	**0**	**58**
Others[2]	**4**	**31**	**70**	**0**	**105**

Notes:

[1] For some investigations, samples were analyzed for an expanded list of VOCs and SVOCs.

[2] Includes selected inorganics, PCBs, TOC, and/or TPH.

[3] "# samples" does not include QA/QC or waste-characterization samples.

[4] IRM confirmatory samples for PAHs and benzene.

Review of the figure reveals that the region of subsurface soils in excess of the guidance value is considerably smaller than the region containing NAPL/sheen. There are two reasons for this difference. The first reason is that many more samples were visually examined for NAPL than were analyzed for PAH. It was not practicable to analyze every soil sample collected; therefore, the NAPL-observation data set is more robust than the PAH data set. The second reason why the "PAH > 500 ppm" region is smaller than the "NAPL/sheen-containing region" is that different types of NAPL likely have different quantities of PAHs. Recall that the forensic evaluation identified some NAPL-containing soils that contained primarily CWG tar, while others contained mixtures of CWG tar and petroleum. Petroleum products are expected to contain lower percentages of PAHs than CWG tars; therefore, soils containing CWG-tar/petroleum-NAPL mixture may have less PAHs than a similar sample containing only CWG tar.

To examine the relationship between NAPL-containing soils and PAH concentrations, we compared NAPL observations with PAH analytical results. The results of that comparison are shown on Figure 5.2. Twenty-three samples were observed in the field to contain NAPL and were also analyzed for PAHs. For these samples, the average PAH concentration was slightly above the 500 ppm guidance value. Not surprisingly, about half of these samples exceeded the guidance value, suggesting that the size of the region exceeding the PAH guidance value shown on Figure 8 may be underestimated by about 50%. We also examined samples that were not observed to contain NAPL but were analyzed for PAHs (Figure 5.2). Of those 65 samples, only 3% exceeded the guidance value. These observations indicate that soils that do not appear to contain NAPL can be expected to meet the 500 ppm PAH guidance value.

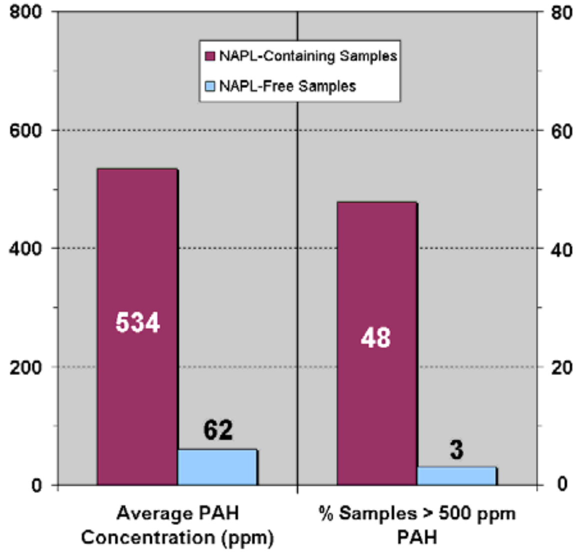

Figure 5.2 – Comparison of PAH Concentrations for Soils Observed to Contain NAPL and NAPL-Free Soils.

The volume of soil exceeding the guidance value is calculated by the MVS model to be approximately 5,100 cubic yards, with 85% of this volume being located beneath the water table. The reader should note that this volume maybe underestimated by 50% or more for these reasons previously discussed.

5.5.2.2 Cyanide Results

The following summary of cyanide results for soil samples collected during the SRI was prepared by Ish, Inc. of Raleigh, North Carolina. Appendix B provides greater detail regarding the sampling methodology and rationale for cyanide.

There were 74 surface and subsurface soil samples collected and analyzed for total cyanide by Chemtech Laboratory following the NYS ELAP procedure. Ten of those soil samples were also analyzed by Clarkson University for total cyanide, metal cyanide complexes, and free cyanide species. The soil samples analyzed by Chemtech showed total cyanide concentrations ranged from non-detect at <0.55 milligrams per kilogram (mg/Kg) to a maximum value of 72 mg/Kg. However, because of significant differences in the sample preparation step for total cyanide analysis, Clarkson University laboratory found the highest total cyanide concentration in soil samples as 2840 mg/Kg. The soil analysis for metal cyanide complexes indicated that iron cyanide complexes were the most abundant component of the total cyanide levels. Two of the soil samples also contained some copper cyanide metal complex in addition to the most abundant iron cyanide complex. The two high levels of cyanide in soils were found to be in samples that were collected from shallow depths extending from about 2.5 to 6 feet. There are no total cyanide concentration standards for soils and thus these total cyanide concentrations, mostly as iron-cyanide complexes, are of no significant concern at this site.

5.6 Soil Vapor Evaluation

BBL collected six sub-slab soil vapor samples (SV-1 through SV-6, see Figure 1) to assess the potential for volatile constituents to migrate into buildings near the site. The selected buildings consisted of the warehouse/storage building owned by I.D. Booth in the western portion of the site, and the largest Trayer building long the southern edge of the site. The SVS Work Plan (provided on the attached CD) provides a detailed scope of work for conducting the soil vapor sampling. The SVS Report is Attachment D of this report.

Sub-slab soil vapor data were compared to generic screening levels for target shallow soil vapor concentrations presented in Table 2a of *USEPA's Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (OSWER, November 2002) and U.S. Department of Labor, Occupational Safety & Health Administration (OSHA) Permissible Exposure Limits (PELs). Forty-one VOCs were detected in sub-slab soil vapor samples collected at each sampling location. The detected compounds were from a wide variety of compound classes including chlorinated hydrocarbons (e.g., chloroform, bromodichloromethane tetrachloroethene [PCE], trichloroethene [TCE], trichloroethanes), carbon disulfide, Freons (e.g., Freon 11, Freon 12), aromatics (e.g., benzene, ethylbenzene, toluene), and non-aromatics (e.g., n-alkanes, cyclohexane). This finding is not surprising given the fact that the area's current and former land use is multi-industrial. As indicated in the attached SVS Report (Appendix E), only three compounds exceeded the indicated USEPA generic target shallow soil vapor screening levels: chloroform in SV-2 (I.D. Booth building); and 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene in SV-6 (Trayer building). None of the compounds detected exceeded their respective OSHA PEL. The PEL for the trimethylbenzenes is almost three orders of magnitude greater than the highest measured concentration (120,000 ug/m^3 vs. 180 ug/m^3). The OSHA PEL for chloroform is more than three orders of magnitude greater than the measured concentration (240,000 ug/ m^3 vs. 230 ug/ m^3).

Given the relatively low concentrations of VOCs detected in subslab samples collected beneath buildings near the site,, the soil vapor evaluation concluded that the potential for soil vapor intrusion into these buildings is relatively low. The evaluation also concluded that further vapor intrusion assessment was not required for these properties or any of the other surrounding properties. The NYSDEC and NYSDOH agreed with these conclusions as documented in the NYSDEC's August 28, 2006 e-mail to NYSEG.

5.7 Groundwater-Quality Evaluation

This section discusses the current quality of groundwater at and near the site, based on analytical results of groundwater samples collected during this investigation. Table 5.10 presents the types and quantity of data used in this evaluation. Table 5 summarizes the analytical results in terms of detected analytes.

Table 5.10 SRI Groundwater Sampling Events

Groundwater Sampling Event	No. Wells Sampled	Analytes
March 2004	3	BTEXs, PAHs, CN
April 2004	29	VOCs, SVOCs, CN, PCB, NA, Field
September 2004	2	CN
June 2005	1	BTEXs, PAHs, CN

Notes:
BTEX = benzene, toluene, ethybenzene, and xylenes.
PAH – polycyclic aromatic hydrocarbons.
VOCs = volatile organic compounds.
SVOCs = semivolatile organic compounds.
PCBs = polychlorinated biphenyls (selected samples only).
CN =cyanide (selected samples were analyzed using a variety of methods).
NA = natural attenuation indicator parameters.
Field = field analytes including pH, specific conductance, and temperature.

Considerable historical groundwater-quality data are also available for the site. We discuss those data and use them to evaluate groundwater-quality trends in Section 5.7.3.2.

Analytical results in this section are discussed in two groups, based on the screened intervals of the monitoring wells sampled:

1. Wells screened at or near the water table and in the sand-and-gravel unit ("S"-labeled wells); and
2. Wells screened below the water table and in the till hydrostratigraphic unit ("D"-labeled wells).

Where applicable, the analytical results presented in Table 5 are compared with NYSDEC Class GA Groundwater Standards. Note that the NYSDEC has not determined groundwater standards for certain compounds and inorganics that were analyzed during this investigation, most significantly PAHs.

This evaluation focuses on MGP-related constituents: BTEX (benzene, toluene, ethybenzene, and xylenes), PAHs, and cyanide. These constituents are the principal chemicals found at MGP-sites. We also briefly discuss chlorinated organic solvents and PCBs, since they have historically been detected in shallow groundwater in localized areas of the site. Chlorinated solvents and PCBs are not considered significant at this site because they have been detected at low concentrations in localized areas, and where detected, they are co-located with the BTEX, PAHs, and cyanide. Iron and manganese were also detected in shallow and deep groundwater above their respective NYSDEC Class GA Standards; however, because these constituents are often naturally occurring at elevated concentrations we do not consider them as a significant concern. Groundwater samples were analyzed for iron and manganese to support a natural attenuation (NA) evaluation. Iron and manganese and other NA indicator parameters are discussed in Section 5.7.

5.7.1 Shallow Monitoring Well Results

Groundwater samples were collected at three temporary monitoring wells during the March 2004 sampling event, at 22 permanent monitoring wells during April 2004 sampling event, and at one monitoring well in June 2005 (Table 5). As discussed in Appendix B, groundwater samples were also collected from two wells in September 2004 to confirm the April 2004 results of cyanide sampling results. The following subsections describe the sampling results, focusing on the nature and extent of BTEX, PAHs, and cyanide in shallow groundwater at the site.

5.7.1.1 BTEX

BTEX represent the VOCs that are most-commonly associated with MGP sites. When compared to other coal-tar constituents, these compounds are relatively mobile in groundwater.

BTEX were not detected at concentrations exceeding NYSDEC Class GA Groundwater Standards in the samples collected east of the site from the temporary monitoring wells sampled during March 2004 or in monitoring well MW-0506S sampled in June 2005 (Table 5).

During the April 2004 sampling event, benzene was detected in groundwater samples collected at six monitoring wells (MW-3S, MW-8S, MW-10S, NMW-0401S, NMW-0402S and NMW-0403S) at concentrations ranging from 0.0005 to 5.4 mg/L (Table 5). Benzene concentrations exceeded the NYSDEC Class GA Groundwater Standards at four monitoring wells: MW-10S, NMW-0401S, NMW-0402S and NMW-0403S (Figure 9). Neither benzene nor any of the other BTEX compounds were detected in groundwater upgradient of site source areas.

Toluene was detected in groundwater samples collected from four monitoring wells (MW-10S, NMW-0401S, NMW-0402S and NMW-0403S). Detected concentrations ranged from 0.0069 to 4.8 mg/L (Table 5), and exceeded the groundwater standard at all four sampling locations where toluene was detected (Figure 9).

Ethylbenzene was detected in groundwater samples collected from five monitoring wells (MW-8S, MW-10S, NMW-0401S, NMW-0402S and NMW-0403S) at concentrations ranging from 0.0013 to 2.2 mg/L (Table 5). Ethylbenzene concentrations exceeded the NYSDEC Class GA Groundwater Standards at four monitoring wells (MW-10S, NMW-0401S, NMW-0402S and NMW-0403S) (Figure 9).

Xylenes were detected in groundwater samples collected from five monitoring wells (MW-8S, MW-10S, NMW-0401S, NMW-0402S, and NMW-0403S). Detected concentrations ranged from 0.006 to 2.1 mg/L (Table 5), all of which exceed the groundwater standard (Figure 9).

In general, groundwater where the concentration one-or-more of the BTEX compounds exceeded standards occurs beneath two distinct locations onsite: (1) near the former gas house and former gas holder 1 foundation; and (2) at locations hydraulically downgradient from site source areas on the east end of the site between monitoring wells NMW-0403S and MW-8S (Figure 9).

5.7.1.2 Chlorinated Volatile Organic Compounds

Four chlorinated VOCs (1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, and chloroethane) were detected in groundwater at two shallow monitoring wells (MW-3S and MW-4S) at the site during the April 2004 sampling event. These wells are located near the center of the MGP operations area and within the approximate extent of the BTEX and PAH plume in this area. Although these chlorinated compounds were detected above their respective Class GA Standards, we do not consider them as a significant concern because their extent is localized and their concentrations are relatively low (7.3 to 130 μg/L for individual constituents). Although chlorinated VOCs are not typically associated with former MGP operations, they were not detected in samples collected upgradient of site source areas. This observation suggests that their presence may be related to post-MGP operations conducted at the site.

5.7.1.3 PAHs

PAHs were ND in samples collected at the temporary monitoring wells and monitoring well MW-0506S (located east of the site) sampled during the March 2004 and June 2005 (Table 5). During the April 2004 comprehensive monitoring well sampling event, concentrations of detected total PAHs ranged from 0.0012 to 11.1 mg/L with detections of PAHs occurring in groundwater samples collected at seven monitoring wells (MW-7, MW-8S, MW-10S, MW-0401S, NMW-0401S, NMW-0402S and NMW-0403S). The maximum concentration of total PAHs occurred at NMW-0402S hydraulically downgradient from site source areas (i.e., along the former canal south of the former gas house and gas holder foundation #1). Groundwater from this well contained a concentration of 0.014 mg/L of benzo(a)pyrene (BAP), which is above the Standard for this constituent. BAP was not detected in any other well onsite. Background groundwater hydraulically upgradient of site sources had ND concentrations of PAHs during the April 2004 sampling event.

Detected concentrations of PAHs during the April 2004 sampling event occurred at two locations: (1) near the former gas house and former gas holder 1 foundation; and (2) at locations hydraulically downgradient from site sources on the east end of the site, extending offsite beyond of East Fifth Street. In general, the PAH plume at the site appears to be much smaller than the BTEX plume, and where PAHs were detected, so were BTEX constituents (i.e., co-located).

5.7.1.4 PCBs

Groundwater samples from monitoring wells MW-7 and MW-9S were analyzed for PCBs because PCBs have historically been detected in groundwater at these two wells. PCBs were not detected in the samples collected from these wells.

5.7.1.5 Cyanide

The following summary of cyanide results for shallow groundwater samples collected during the SRI was prepared by Ish, Inc. of Raleigh, North Carolina. Appendix B provides greater detail regarding the sampling methodology and rationale for cyanide.

Soil complexes and species have been measured in soil and groundwater samples from former MGP sites throughout the United States. The predominant forms of cyanide compounds in the MGP residuals are iron-cyanide solids, the most abundant being Prussian Blue or Ferric-Ferrocyanide (FFC). When FFC solids are dissolved by water, primarily dissolved phase iron cyanide complexes are released. However, dissolved phase cyanide complexes and species can exist in different chemical forms ranging from free cyanide (HCN, CN-), weak acid dissociable complexes (copper cyanide, zinc cyanide, nickel cyanide), available cyanide complexes (all of weak acid dissociable complexes and also mercury cyanide), to strong-acid dissociable complexes (cobalt cyanide, iron cyanide).

Altogether, 22 shallow groundwater samples (and one duplicate sample) were collected and analyzed for total cyanide by Chemtech following the NYS ELAP procedure. Six of these shallow well samples were also analyzed by Clarkson University for total cyanide (to confirm Chemtech's results) and free cyanide concentrations. Monitoring wells MW-9S and MW-10S were re-sampled in September 2004 to resolve apparent differences in analytical data from Chemtech and Clarkson University. The re-sampling results for these two groundwater samples reconciled the differences in the data and matched the measured value reported by Clarkson University split samples in April, 2004.

The measured concentrations for total cyanide in groundwater samples from shallow monitoring wells ranged from non-detect (<0.01 mg/L) to a maximum value of 1.11 mg/L. However, the free cyanide concentrations in the shallow groundwater samples ranged from non-detect (<0.0023 mg/L) to a maximum value of 0.0057 mg/L. The NYSDEC Class GA standard for total cyanide (0.2 mg/L) was exceeded in some cases; however, the iron cyanide complexes constitute the majority of the total cyanide measured in all of the groundwater samples from the site and the iron cyanide complexes are not known to be of toxicological concern. Free cyanide is the primary chemical species of concern, but comprised little to none of the total cyanide measured in these groundwater samples. As such, it is concluded that cyanide in shallow groundwater is not a human health concern at this site.

5.7.2 Deep Monitoring Well Results

Groundwater samples were collected at all seven deep groundwater monitoring wells (MW-1D, MW-2D, MW-8D, MW-9D, MW-12D, MW-0304D and MW-0404D) during the April 2004 sampling event. A discussion of the BTEX, PAH, and cyanide results of the groundwater samples is provided below.

5.7.2.1 BTEX and PAHs

None of the deep groundwater samples collected in April 2004 had detectable concentrations of BTEX or PAHs above the laboratory detection limits (Table 5). Based on this information, deep groundwater appears to be unaffected by the site.

5.7.2.2 Cyanide

The following summary of cyanide results for deep groundwater samples collected during the SRI was prepared by Ish, Inc. of Raleigh, North Carolina. Appendix B provides greater detail regarding the sampling methodology and rationale for cyanide.

Total cyanide was only detected in one of the seven deep monitoring wells (MW-0404D) at a concentration of 0.067 mg/L, which is lower than the Class GA Standard for total cyanide. Groundwater from monitoring well MW-2D was also analyzed by Clarkson University for free cyanide concentrations. Free cyanide was not detected in this well. It appears that deep groundwater is unaffected by total cyanide concentrations which exceed the Class GA Standard.

5.8 Preliminary Natural-Attenuation Evaluation

This section presents a preliminary evaluation of monitored natural attenuation (MNA) of BTEX and PAHs in shallow groundwater at the site. Although cyanide has been proven to naturally attenuate at MGP sites, we do not discuss cyanide here because, as discussed above, free cyanide concentrations detected in groundwater at this site are well below the class GA Standard. This section summarizes the MNA data collected during site investigations, discusses the technical and regulatory bases for evaluating MNA of MGP-constituents in groundwater, and presents the results of the evaluation. As discussed in greater detail below, the results of this evaluation support the general conclusion that concentrations of MGP-chemical at the site are being attenuated in groundwater by a variety of naturally-occurring processes, including dispersion, dilution, hydrophobic sorption, and in-situ biodegradation. Based on this conclusion, it is recommended that MNA be considered as a component of the site-wide remedy during the forthcoming Feasibility Study.

MNA can be an approved component of groundwater remedies at MGP sites being managed under federal and state regulatory programs. For example, as of 2000 at least four MGP sites regulated under CERCLA included MNA as a component of their site-wide remedies (Lipson, 2002). At least one of these superfund sites is located in the state of New York. Furthermore, USEPA’s Office of Solid Waste and Emergency Response (OSWER) issued Directive 9200.4-17P that provides policy guidance to regulators on the use of MNA at Superfund and RCRA sites (USEPA, 1999). The OSWER directive states that MNA implementation depends on “…a variety of physical, chemical or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. These in situ processes include biodegradation; dispersion; dilution; sorption; volatilization; radioactive decay; and chemical or biological stabilization, transformation or destruction of contaminants.” In addition, the New NYSDEC’s Division of Environmental Remediation (DER) recently issued a draft technical guidance document that considers MNA to be a potential remedial technology for contaminated groundwater at New York State Superfund and Voluntary Cleanup sites (NYSDEC, 2002). Based on this information, it is appropriate to collect site-specific data during site investigations that can be used to evaluate the potential use of MNA as a remedy component.

This evaluation is based on the regulatory guidance documents discussed above as well as technical guidance documents issued by the National Research Council (NRC, 2000), USEPA (USEPA, 2000), and the Air Force Center for Environmental Excellence (Weidemeier, et al., 1995). It relies on current and historical site-specific groundwater analytical results, including MNA indicator parameters measured at selected wells during April 2004.

5.8.1 Technical Basis for MNA at MGP Sites

This section discusses the technical basis for MNA of chemicals in groundwater at MGP sites and provides a general framework for evaluating site-specific data. Establishing an MNA framework specific to MGP-related wastes is important because chemical migration and attenuation in groundwater at MGP sites can be complicated due to the presence of heterogeneous groundwater flowpaths and multi-component NAPLs such as coal tar. After the theoretical context in this section has been developed, site-specific data are reviewed in Sections 5.9 and 5.10 to identify predominant transport mechanisms.

The key transport and attenuation mechanisms governing chemical migration in groundwater at MGP sites has been thoroughly documented in the scientific literature. For example, Way and McKee (1981) investigated the in-situ restoration potential at coal gasification sites due to naturally-occurring groundwater flow and dispersion, and concluded that dispersion alone can reduce the peak concentrations of MGP-related chemicals in groundwater by at least one to two orders of magnitude at reasonable distances from source areas. Turney and Goerlitz (1990) investigated groundwater contamination at the Gas Works Park site in Seattle, Washington, and determined that naturally-occurring weathering processes including chemical dissolution, volatilization, and in-situ biodegradation were occurring in groundwater at that site. Theis, et al. (1994) evaluated leachate characteristics of cyanide-related wastes at MGP sites and found that cyanide solubility in groundwater was strongly correlated with pH, and increased with rises in groundwater pH. Ramaswami and Luthy (1997a; 1997b) developed a modeling framework for addressing mass transfer and bioavailability of PAHs in coal tar slurry systems, and concluded that mathematical models can be useful for evaluating the bioavailability and biotransformation rates of PAH compounds in groundwater. Haeseler et al. (1999) developed a methodology for evaluating the mobility and bioremediation potential of PAHs in groundwater at MGP sites, and found that pollutants remaining in MGP-impacted soils after biological treatment did not represent a significant threat to groundwater. Meehan et al. (1999) evaluated the fate and transport of cyanide in groundwater at two MGP sites located in southern Australia and Tasmania, and demonstrated that cyanide was being biodegraded in-situ in groundwater by both aerobic and anaerobic microbiologic processes. Williams et al. (2001) developed a conceptual biogeochemical model of a coal tar distillate plume in groundwater at a site located in the United Kingdom Midlands, and demonstrated that naturally-occurring dilution, dispersion, and in-situ biodegradation were important natural attenuation processes for MGP-related chemicals in groundwater.

Based on the results of these and many other scientific studies, the key transport and attenuation mechanisms governing chemical migration in groundwater at MGP sites include advection, hydrodynamic dispersion, dilution, hydrophobic sorption, and in-situ biodegradation. Hydrodynamic dispersion and dilution may cause decreasing chemical concentrations in groundwater due to mixing of MGP chemical-laden groundwater with unimpacted groundwater. Hydrophobic sorption of MGP chemicals onto solid organic carbon present in soil may retard the migration rate of MGP chemicals relative to the average linear groundwater velocity. In-situ biodegradation is a combination of biologically-mediated destructive processes that decrease the total mass of MGP chemicals in groundwater overtime. Each of these transport and attenuation mechanisms is described in greater detail in the following sections.

5.8.1.1 Advection

Advective transport of chemicals in groundwater, or advection, refers to the transport of chemicals by the bulk movement of groundwater, and is an important process resulting in the downgradient migration of dissolved chemicals. Groundwater advection in granular soils may be approximated by Darcy's Law (Freeze and Cherry, 1979):

$$v = \frac{KI}{n_e}$$

where v is the average linear groundwater velocity in saturated soil, K is the horizontal hydraulic conductivity of the saturated soil, I is the hydraulic gradient, and n_e is the effective porosity of the soil. Given that the geometric mean horizontal hydraulic conductivity of saturated soils (i.e., the sand and gravel) at the site is approximately 67 ft/day and the site hydraulic gradient is approximately 0.014 (see Section 5.3), and assuming the effective porosity is 0.3, the average linear groundwater velocity in saturated site soils is estimated to be approximately 3 ft/day, which is equivalent to approximately 1,100 feet per year.

Given that MGP-related chemicals were likely introduced to groundwater more than 50 years ago, the travel distance for groundwater flowing through site soils during this time would be on the order of 55,000 feet or more from the source areas. However, the horizontal extent of MGP chemicals in groundwater appears to be limited to within several feet south of the site boundary, demonstrating that the plumes of individual MGP chemicals dissolved in site groundwater have either stabilized or are shrinking. This information suggests that significant retardation and attenuation of MGP chemicals is occurring in saturated soils beneath the site.

5.8.1.2 Hydrodynamic Dispersion and Dilution

Hydrodynamic dispersion is a combination of mechanical mixing and molecular diffusion, and results in chemical plumes spreading laterally outward from the main direction of groundwater flow. Because groundwater flow in glaciated terrain can exhibit a high degree of heterogeneity due to the natural variability of soil texture and structure, groundwater flowpaths can be highly tortuous resulting in mechanical mixing of chemical-laden groundwater with unimpacted groundwater. Mechanical mixing during advective groundwater flow leads to the lowering of chemical concentrations with time and distance along a given flowpath. Chemical diffusion is considered negligible during advective transport in granular soils, but may be important in low-permeability soils such as silts and clays. With time, chemical plumes in groundwater will spread longitudinally, horizontally, and vertically as different portions of the mass are transported at different velocities.

Dilution of chemicals in groundwater can occur at the site due to the addition of water through recharge of infiltrating precipitation in unpaved areas (e.g., the western plant area). Recharge from infiltrating precipitation is the result of a complex series of processes in the unsaturated zone that results in the downward transport of water, chemicals, and nutrients to the water table. Nutrients such as nitrogen and phosphorus in recharging groundwater may be important for supporting natural in-situ biodegradation of MGP chemicals in groundwater, which is described in Section 5.10.

5.8.1.3 Hydrophobic Sorption and Chemical Retardation

Hydrophobic sorption refers to the chemical transport process whereby non-polar, hydrophobic chemicals such as organic compounds found in coal tar partition preferentially to solid organic matter present within soils. The quantity of chemicals that can partition to solid organic matter is directly proportional to the amount of solid organic matter present. The result of this process is that some quantity of the chemical mass is removed from groundwater during transport, and the rate of chemical migration in groundwater can be less than the average linear groundwater velocity. Hydrophobic sorption is therefore an attenuation process that results in chemical-plume velocities being retarded relative to the average linear groundwater velocity. This is likely one reason why the chemical plumes in groundwater at the site have not traveled as far in the hydraulically downgradient direction as would be predicted from consideration of groundwater velocities alone. This observation is supported by the observation of chemical plume retardation discussed in Section 5.8.3.

To more accurately evaluate the role that hydrophobic sorption plays in retarding chemical plume migration rates relative to the average linear groundwater velocity in site soils, chemical-specific retardation factors were estimated using the following equation (Freeze and Cherry, 1979):

$$R_c = \frac{\rho_b K_{oc} f_{oc}}{n}$$

where R_c is the hydrophobic-based retardation factor for a specific chemical (c), ρ_b is the bulk density of the soil, K_{oc} is the chemical-specific organic carbon partition coefficient, f_{oc} is the fraction of solid organic carbon in the soil, and n is the soil porosity. Table 6 presents retardation factors for each constituent in groundwater at the site based on this equation.

As shown, site-specific constituent retardation factors may range from approximately 5 for benzene, indicating moderate retardation, to more than 16,000 for benzo(a)anthracene (high retardation). This information indicates that hydrophobic-based retardation strongly influences the fate, transport, and remediability of all site constituents in groundwater.

5.8.2 In-Situ Biodegradation

In-situ biodegradation is a combination of naturally occurring, biologically-mediated destructive processes that decrease chemical mass in groundwater with time and distance. To carry out their life functions, naturally-occurring subsurface microorganisms require electron donors (organic carbon), electron acceptors, water, mineral nutrients, and appropriate environmental conditions (e.g., pressure, temperature, and pH). Natural in-situ biodegradation processes result in organic chemicals being degraded or transformed by naturally-occurring microorganisms through the use of an organic chemical as a carbon source or as an electron acceptor. By evaluating the biogeochemistry of groundwater at impacted MGP sites, it is possible to demonstrate that in-situ biodegradation is occurring and to determine which biogeochemical reactions are predominant during transport.

Most MGP-related organic chemicals can be biodegraded in-situ in groundwater by means of naturally-occurring aerobic and anaerobic microorganisms that oxidize organic compounds. Aerobic oxidation of organic chemicals requires the presence of molecular oxygen (O_2) as an electron acceptor, as well as appropriate microorganisms, nutrients (e.g., phosphorus, potassium, and nitrogen), and environmental conditions (e.g., near-neutral pH conditions and adequate temperature). Anaerobic oxidation of organic chemicals can occur via oxidation-reduction (redox) processes including nitrate reduction, iron and manganese reduction, sulfate reduction, and methanogenesis, and requires the presence of an alternate electron acceptor such as nitrate, ferric iron, manganic manganese, sulfate, and/or carbon dioxide, as well as the presence of appropriate microorganisms, nutrients, and environmental conditions. These processes are described in greater detail below.

5.8.2.1 Biodegradability of Site Constituents

Constituents found in groundwater at the site are primarily associated with coal tar, which is a complex mixture of hundreds of chemical compounds. The precise composition of coal tar can vary from site to site and even between sampling locations at a given site, depending on the nature and history of the feedstock used during MGP operations, the operational history of the site, and the post-operational history of the site. Therefore, while it is impossible to predict *a priori* the exact composition of coal tar and related MGP wastes at a site, it is possible to categorize MGP-related wastes based on general chemical characteristics. MGP-related chemicals in site groundwater are the focus of the remainder of this evaluation.

BTEX and naphthalene are readily biodegraded in groundwater under naturally-occurring conditions. For example, numerous field studies have been completed at leaking underground storage tank sites documenting in-situ biodegradation of BTEX and naphthalene (e.g., Weidemeier, et al., 1995). Furthermore, the various metabolic processes influencing in-situ biodegradation of BTEX and naphthalene have been determined in experimental laboratory studies (e.g., Chapelle, 1993). Overall, in-situ biodegradation of BTEX and naphthalene in groundwater is well understood, and in-situ biodegradation MNA has been an acceptable groundwater remedy at sites contaminated with petroleum hydrocarbons such as BTEX and naphthalene (USEPA, 1999).

The other PAHs (i.e., acenaphthene and phenanthrene) are also readily biodegraded in groundwater under naturally-occurring conditions; however, PAH biodegradation in groundwater has not received the same widespread attention as BTEX biodegradation. Nonetheless, these specific PAHs have been documented to be biodegradable in groundwater in many of the scientific literature references listed in this report and elsewhere.

In summary, all of the site constituents can be biodegraded in-situ in groundwater to innocuous byproducts by means of redox processes mentioned above. The following examples show in-situ biodegradation reactions for some site constituents:

Aerobic Respiration and Biodegradation of Benzene (C_6H_6)

$$C_6H_6 + 7.5O_2 \rightarrow 6CO_2 + 3H_2O$$

Denitrification and Biodegradation of Toluene ($C_6H_5CH_3$)

$$C_6H_5CH_3 + 7.2NO_3^- + 7.2H^+ \rightarrow 7CO_2 + 3.6N_2 + 7.6H_2O$$

Iron Reduction and Biodegradation of Ethylbenzene ($C_6H_5C_2H_5$)

$$C_6H_5C_2H_5 + 42Fe(OH)_3 + 84H^+ \rightarrow 8CO_2 + 42Fe^{2+} + 110H_2O$$

Manganese Reduction and Biodegradation of Xylene [$C_6H_4(CH_3)_2$]

$$C_6H_4(CH_3)_2 + 21MnO_2 + 42H^+ \rightarrow 8CO_2 +21Mn^{2+} + 26H_2O$$

Sulfate Reduction and Biodegradation of Naphthalene ($C_{10}H_8$)

$$C_{10}H_8 + 6SO_4^{2-} + 12H^+ \rightarrow 10CO_2 + 6H_2S + 4H_2O$$

Methanogenesis and Biodegradation of Benzene (C_6H_6)

$$4.5H_2O + C_6H_6 \rightarrow 2.25CO_2 + 3.75CH_4$$

These chemical equations are presented for illustrative purposes only, and to provide a framework for evaluating the site natural attenuation data which included analysis of many of the reactants, intermediates, and final byproducts of these and other reactions. For example, review of these chemical equations leads to the following implications:

- Each of these redox reactions, except methanogenesis, results in the formation of reduced inorganic compounds as byproducts and, therefore, analyses of certain inorganic compound concentrations in groundwater samples can serve as specific indicators for evaluating in-situ biodegradation of MGP-constituents in site groundwater; and

- Methanogenesis results in the formation of methane as a byproduct and therefore analyses of methane concentrations in groundwater samples can serve as a specific indicator for the presence, absence, and relative magnitude of in-situ biodegradation of MGP-constituents via methanogenesis in site groundwater.

The general approach to evaluating groundwater data for in-situ biodegradation assessments typically involves comparing analytical results for site constituents and selected biogeochemical indicator parameters from groundwater samples collected within the constituent plume with background groundwater samples collected hydraulically upgradient from the source area. This is known as the “background comparison approach.” Changes in concentrations of constituents and biogeochemical parameters between background groundwater and plume groundwater can provide insights into the predominant redox processes that are occurring near the sampling points. Biogeochemical indicator parameters include electron acceptors such as nitrate, sulfate, solid forms of iron and manganese; nutrients such as nitrogen and phosphorus; and degradation byproducts such as carbon dioxide and methane. Each of these parameters is involved in the redox reactions detailed above. Parameter selection is typically based on the biologic principle that microorganisms consume electron acceptors, organic carbon, and nutrients, and generate byproducts while metabolizing organic pollutants (Chappelle, 1993). In-situ biodegradation indicator parameters are discussed in greater detail in the following subsections.

5.8.2.2 Environmental Conditions

Environmental conditions of groundwater that affect microbial growth and in-situ biodegradation include groundwater pH, temperature, alkalinity, and oxidation reduction potential (ORP). Near-neutral pH values indicate favorable pH conditions for microbiologic growth and biodegradation. Alkalinity can buffer acid that may be generated during some biogeochemical reactions and well-buffered groundwater is favorable for microbial growth and biodegradation. An optimal groundwater temperature range for microbial growth is generally above 10°C and less than 30°C. ORP values provide a gross measure of whether groundwater conditions are generally oxidizing or reducing. Reducing geochemical conditions are generally associated with anaerobic oxidation of the site-specific constituents.

5.8.2.3 Electron Acceptors

Microorganisms require the presence of electron acceptors during metabolic reactions involving in-situ biodegradation of site-related constituents. Naturally occurring electron acceptors typically monitored in groundwater include dissolved oxygen (DO), nitrate, nitrite, manganic manganese, ferric iron, sulfate, and carbon dioxide. Each of these electron acceptors is associated with a different oxidation/reduction process known to degrade the site constituents in groundwater, as follows.

- Aerobic degradation is a biologically mediated oxidation/reduction (redox) reaction in which aerobic microorganisms use oxygen as an electron acceptor, oxidize the site constituents, and produce carbon dioxide and other inorganic compounds as byproducts.

- Denitrification is an anaerobic redox reaction in which denitrifying microorganisms use nitrate and nitrite as electron acceptors, oxidize the site constituents, and produce carbon dioxide, ammonia, and other inorganic compounds as byproducts.

- Manganese reduction is an anaerobic redox reaction in which manganese reducing microorganisms use manganic manganese (Mn^{4+}) as an electron acceptor, oxidize the site constituents, and produce carbon dioxide, manganous manganese (Mn^{2+}), and other inorganic compounds as byproducts.

- Iron reduction is an anaerobic redox reaction in which iron reducing microorganisms use ferric iron (Fe^{3+}) as an electron acceptor, oxidize the site constituents, and produce carbon dioxide, ferrous iron (Fe^{2+}), and other inorganic compounds as byproducts.

- Sulfate reduction is an anaerobic redox reaction in which sulfate reducing microorganisms use sulfate as an electron acceptor, oxidize the site constituents, and produce carbon dioxide, sulfides, and other inorganic compounds as byproducts.

- Methanogenesis is an anaerobic redox reaction in which methanogenic bacteria use carbon dioxide as an electron acceptor, ferment the site constituents, and produce carbon dioxide, methane, and other inorganic compounds as byproducts.

Each of these redox reactions requires certain electron acceptors. Electron acceptor availability and usage can be evaluated by comparing onsite concentrations with background groundwater conditions.

5.8.2.4 Electron Donors

All of the site constituents can provide the primary source of organic carbon (i.e., electron donors) required for microbiologic growth and in-situ biodegradation in site groundwater. The availability of organic carbon can be directly correlated with constituent concentrations measured in site groundwater samples.

5.8.2.5 Nutrients

Nitrogen and phosphate are macronutrients required by microorganisms for cell growth and maintenance. The availability of these nutrients can be evaluated along with naturally-occurring carbon sources to determine whether sufficient quantities of macronutrients are available to support in-situ biodegradation of site constituents. Deficiencies of these macronutrients can limit microbiological growth and in-situ biodegradation.

5.8.2.6 Summary

There are several naturally-occurring fate and transport processes that contribute to naturally attenuating peak concentrations of constituents in site groundwater, including hydrodynamic dispersion, dilution, hydrophobic sorption and natural in-situ biodegradation. The specific combination of these processes results in decreasing constituent concentrations over time in a predictable manner. The natural attenuation rate, defined as the rate of decreasing constituent concentrations over time due to a combination of plume attenuation processes, can be estimated in terms of a “half-life” in some cases where sufficient datasets exist. Constituent half-lives, defined as the amount of time required for constituent concentrations to decline by 50%, were estimated as described below. These fate and transport processes provide a general framework against which site-specific data may be compared in an effort to assess the relative importance of each process.

5.8.3 Preliminary Evaluation of Plume Stability

Plume stability refers to the shape and migration patterns of chemical plumes in groundwater. For example, when NAPL is released into the subsurface, its more-soluble components will preferentially dissolve into groundwater with time, forming plumes that will either:

1. Expand, whereby the extent of the plume continues to increase in directions away from the source;
2. Stabilize, whereby the extent of the plume reaches a maximum extent; or
3. Shrink, whereby the extent of the plume retracts back toward the source.

Plume behavior is governed by the nature of the chemical source, groundwater-flow characteristics, and the fate-and-transport characteristics of the specific chemicals. For example, soon after a NAPL release, chemical dissolution rates may exceed their natural-attenuation rates and the resulting chemical plumes will expand with time. As the chemical plumes expand, natural-attenuation rates will generally increase with time due to increased contact of the chemicals with soil and bedrock materials, increased contact with naturally-occurring microorganisms, and increased chemical concentration gradients. In other words, the natural-attenuation processes discussed above are scale-dependant and rates can increase with time and distance. When the chemical plumes have expanded to the point where natural-attenuation rates are equivalent to the chemical-dissolution rates at the source area, the chemical plumes will stabilize and neither expand nor shrink with time because dissolution rates are balanced by attenuation rates. As the chemical source is depleted due to dissolution and natural attenuation rates become greater than chemical dissolution rates, the chemical plumes will shrink back toward the source. Understanding the status of plume stability at MGP sites is important because active remedial actions may not be required at sites with stable or shrinking chemical plumes in order to be protective of human health and the environment.

5.8.3.1 Data Types and Quantities

Historical data used in the plume-stability evaluation were obtained from the Task II (June 1987) and Task III (July 1990) investigations by TRC Environmental Consultants and from additional analytical data provided by NYSEG. The latter were collected by NYSEG as part of a routine, in-house monitoring program. Details regarding the previous investigations, including analytical results, can be found in the reports for those investigations, which are included in the Electronic Attachments CD. Also included on the CD are NYSEG’s in-house results. The following table summarizes known historical groundwater sampling events and available data:

Table 5.11 Historical Groundwater Sampling Events

Groundwater Sampling Event	No. Wells Sampled	Analytes
March1986	9	VOCs, PAHs, Inorgs, Others
April 1986	9	VOCs, PAHs, Inorgs, Others
August 1986	9	VOCs, PAHs, Inorgs, Others
December 1987	19	VOCs, PAHs, Inorgs, Others
April 1988	19	VOCs, PAHs, Inorgs, Others
September 1988	19	VOCs, PAHs, Inorgs, Others
March 1989	19	VOCs, PAHs, Inorgs, Others
September 1991	11	Inorgs, Others, Field
December 1992	11	PAHs, Inorgs, Others, Field

Groundwater Sampling Event	No. Wells Sampled	Analytes
June 1993	5	VOCs, PAHs, Inorgs, Others, Field
December 1993	11	VOCs, PAHs, Inorgs, Others, Field
April 1994	13	VOCs, PAHs, Inorgs, Others, Field
October 1994	4	PCBs
July 1995	11	VOCs, PAHs, Inorgs, Others, Field
July 1996	11	VOCs, PAHs, Inorgs, Others, Field
July 1997	11	VOCs, PAHs, Inorgs, Others, Field
July 1998	11	VOCs, PAHs, Inorgs, Others, Field
July 1999	4	PAHs, VOCs, Others, Field
July 2000	5	PAHs, VOCs, PCBs, Others, Field
July 2001	5	PAHs, VOCs, PCBs, Others, Field
August 2002	5	PAHs, VOCs, PCBs, Others, Field

Notes:
VOCs = volatile organic compounds.
PAHs = polycyclic aromatic hydrocarbons.
PCBs = polychlorinated biphenyls
Inorgs = selected inorganic compounds.
Others = such compounds as nitrate and sulfate.
Field = field analytes including pH, specific conductance, and temperature.

5.8.3.2 Concentration Trends

One way to evaluate chemical plume stability is by assessing concentration trends measured at monitoring wells with time. The basic premise of this approach is that chemical concentrations that increase with time may indicate expanding plumes, chemical concentrations that remain stable with time may indicate stable plumes, and chemical concentrations that decrease with time may indicate shrinking plumes. Evaluating plume stability based on concentration trends requires a good understanding of the site conceptual model, specifically with regard to the location of monitoring wells in relation to the chemical plumes. For example, stable chemical concentration trends in groundwater at source-area monitoring wells may be inconclusive with regard to plume stability. On the other hand, stable chemical concentration trends in groundwater at plume-fringe monitoring wells can be a good indication of plume stability. Therefore, an evaluation of plume stability based on chemical-concentration trends must be performed in the proper context with regard to monitoring-well location.

To accomplish this, we evaluated constituent concentration trends measured at site monitoring wells for the 1985 to 2004 time period. Monitoring well locations were initially divided into three categories according to the following criteria for measured constituents in order to evaluate suitability for trend analysis: (1) locations where concentration values were historically non-detect for all sampling events; (2) locations where constituents were only detected in one sampling event; and (3) locations where constituents were detected in more than one sampling event.

Monitoring well locations where constituents were detected in more than one sampling event were selected for concentration time-series analyses. Based on this rationale, a total of seven monitoring wells were found to have datasets suitable for quantitative trend analysis. For each of these seven monitoring wells, quantitative trendlines were fit to the data to test the hypothesis that constituent concentrations were decreasing over time. These trendline analyses are presented in Appendix D.

Results of the trend analysis show that none of the site monitoring wells exhibit increasing constituent concentration trends. Five monitoring wells were found to exhibit decreasing chemical concentrations of one or more of the site constituents (Table 7). The remaining monitoring wells either had insufficient data or had constituent concentrations that were not above the NYSDEC Class GA Groundwater Standard and, therefore, did not warrant trend analysis. As shown in Appendix D, concentration trends for monitoring wells MW-8S and MW-10S clearly exhibit a decrease in all constituents over time. Since monitoring well MW-8S is located near the inferred, most hydraulically downgradient extent of shallow groundwater concentrations above the groundwater standard, decreasing concentration trends of all constituents at this location suggest constituent plumes are shrinking (Figure 9). Although constituent concentrations at some site monitoring wells appear to have fluctuated within limited ranges over short timeframes (i.e. 1 to 2 years), there appears to be a generally downward trend in constituent concentrations over a long timeframe (i.e. more than 10 years).

Remediation rate analyses were conducted for the same subset of monitoring wells where sufficient data were available (Table 7). Half lives for monitoring wells MW-8S and MW-10S were 911 and 2,240 days for total PAHs and 1,340 and 2,660 days for total xylenes, respectively.

Based on these results, the following conclusions are evident:

- The constituent plumes appear to be shrinking over time.
- One or more constituents at four monitoring wells out of the seven monitoring wells evaluated demonstrate that remedial goals have already been achieved due to natural attenuation.
- Decreasing concentration trends are expected to continue in the future in shallow groundwater near all monitoring wells evaluated in this analysis, including wells where constituent concentrations are still above standards (i.e., MW-8S and MW-10S).

5.8.4 Evaluation of In-Situ Biodegradation

This section evaluates the nature and extent of naturally-occurring in-situ biodegradation reactions of site constituents in groundwater. It includes descriptions of the types of data used to evaluate in-situ biodegradation, evaluations of redox processes established for the site and conclusions.

5.8.4.1 Data Types and Quantities

In-situ biodegradation indicator parameters were analyzed for during the April 2004 quarterly groundwater sampling event. The indicator parameters are listed in Table 8 and Table 9, and generally include concentrations of key electron acceptors, electron donors, and metabolic byproducts of biologically-mediated redox reactions associated with the in-situ biodegradation reactions listed above in Section 5.7.2.1. This in-situ biodegradation indicator data set constitutes the primary data set used to evaluate in-situ biodegradation conditions in shallow groundwater at the site.

5.8.4.2 Geochemical Conditions

The April 2004 in-situ biodegradation geochemical data were used to evaluate site geochemical conditions on naturally occurring in-situ biodegradation of site constituents (see above). This was accomplished by reviewing the site data for indicator parameters of environmental conditions, electron-acceptor availability, presence and magnitude of metabolic byproducts, and availability of nutrients.

Environmental Conditions

Naturally occurring groundwater microorganisms known to biodegrade the site constituents in groundwater require certain environmental conditions, including a suitable pH range and adequate temperature. In addition, the oxidation reduction potential (ORP) of groundwater can influence the bioavailability of certain electron acceptors, electron donors, and nutrients in groundwater, and therefore ORP can also be a good indicator of environmental conditions at contaminated sites. Groundwater temperature, pH, conductivity, DO, and ORP, measurements were made at the site using field instrumentation (see Table 9).

As noted above, ORP is an important indicator of environmental conditions in groundwater because the bioavailability of many chemicals associated with in-situ biodegradation can be influenced by ORP. As shown in Table 9, groundwater at monitoring wells near the former gas house and gas holder foundations (i.e., near monitoring wells NMW-0401S and NMW-0402S, see Figure 9) and on the eastern portion of the site near monitoring well MW-10S exhibited strongly reducing conditions in April 2004 as shown by ORP values less than -100 mV. ORP appeared to increase and change from reducing to oxidizing conditions both on the northern portion of the site and south of the former canal location, as well as between the two areas of strongly negative ORP formerly described (i.e., near monitoring wells MW-9S and MW-7).

Groundwater temperatures in the shallow zone recorded during the April 2004 sampling event ranged from about 8.4^{o}C to 16.7^{o}C (Table 9), indicating that groundwater temperatures at the site were adequate for in-situ biodegradation at the time of sampling.

Groundwater pH measurements recorded in April 2004 ranged from approximately 4.3 to 7.3 standard units. Two sampling locations had pH measurements below 6.0 standard units (monitoring wells MW-7 and MW-9S). The remainder of the sampling locations had pH measurements between 6.0 and 7.3 standard units, indicating favorable conditions for in-situ biodegradation at most sampling locations.

Alkalinity can be important in an in-situ biodegradation context because it indicates the pH buffering capacity of groundwater. Groundwater alkalinity concentrations measured in April 2004 ranged from approximately 209 mg/L to 479 mg/L, indicating that the buffering capacity of site groundwater was adequate to buffer potential pH changes that may be associated with in-situ biodegradation and other chemical reactions occurring in groundwater at the time of sampling (Table 8).Alkalinity measurements were unavailable at monitoring wells MW-2S, MW-3S, MW-7, MW-9S, MW-10S, MW-0301S, MW-0401S, TMW-01 and TMW-02. As shown, elevated alkalinity concentrations in groundwater occurred along the western portion of the site near the former gas house and gas holder foundations (i.e., near monitoring wells NMW-0401S and NMW-0402S).

Electron Acceptor Availability

The primary electron acceptors that could potentially support in-situ biodegradation of constituents in site groundwater are discussed above. The availability of these electron acceptors in groundwater can be indicated by measuring concentrations of DO, nitrate, total iron (as an indicator of ferric iron), total manganese (as an indicator of manganic manganese), and sulfate in site samples. DO concentrations were analyzed at the site using field instrumentation while concentrations of the other electron acceptors were analyzed at a certified laboratory.

Field-measured DO concentrations measured at site wells in April 2004 ranged from non-detected (ND) to 8.8 mg/L (Table 9). In contrast, the solubility limit of oxygen in water at the average site groundwater temperature

(12.1 ºC) is approximately 11 mg/L. Results indicate that site groundwater in April 2004 was generally depleted in DO, suggesting that DO was rapidly being consumed as an electron acceptor.

Nitrate concentrations measured in select groundwater samples in April 2004 are shown in Table 8. As shown, nitrate was ND in groundwater samples collected at monitoring well MW-1S, located hydraulically upgradient from site source areas, and at monitoring wells MW-4S, NMW-0401S and NMW-0402S located near and hydraulically downgradient from site source areas. Nitrate concentrations were elevated at monitoring wells MW-6S (1,900 ug/L) and MW-12S (4,600 ug/L) which were hydraulically upgradient and crossgradient, respectively, from site source areas, as well as at monitoring wells MW-0404S (3,700 ug/L), MW-0403S (2,800 ug/L) and MW-0402S (3,800 ug/L) which were hydraulically downgradient from site source areas (i.e., south of former canal) (Figure 9). This may indicate a source of nitrogen near monitoring well MW-6S at the time of sampling. Nitrate consumption is associated with denitrification and in-situ biodegradation of site constituents. The decrease in nitrate concentrations along the central east-west portion of the site may indicate that nitrate was being consumed as an electron acceptor during transport at the time of sampling, particularly since exceedences of BTEX and PAHs occur in the same location north of the former canal (Figure 9).

Total iron concentrations measured in site groundwater samples collected in April 2004 ranged from ND to 18.3 mg/L and total manganese concentrations ranged from ND to 7.7 mg/L (Table 8). Subtracting the measured filtered phase concentrations of each of these electron acceptors from their measured total unfiltered concentrations yields concentrations of up to 18.2 mg/L of ferric iron and up to 0.07 mg/L of manganic manganese. This information indicates that ferric iron and manganic manganese were available as electron acceptors in site groundwater during the April 2004 sampling event. This finding is reasonable because iron and manganese are naturally abundant in many types of rocks and minerals found in the glacially-derived soils of upstate New York.

Sulfate concentrations measured in all groundwater samples during April 2004 are shown in Table 8. As shown, sulfate concentrations ranged from ND to 257 mg/L. The maximum sulfate concentration occurred at monitoring well MW-6S located hydraulically upgradient from site source areas. Sulfate concentrations were lower in hydraulically downgradient directions from monitoring well MW-6S, suggesting a source of sulfate was present near this sampling location. Sulfate was not detected at monitoring well NMW-0402S along the former canal, suggesting that sulfate was being consumed as an electron acceptor in this area at the time of sampling. This information indicates that sulfate was present in background groundwater entering the site in April 2004, some sulfate was introduced to groundwater near the MW-6S sampling location, and sulfate was consumed as an electron acceptor at some localities within the constituent plumes.

In summary, DO, nitrate, ferric iron, manganic manganese, and sulfate appeared to be available as electron acceptors in background groundwater entering the site at hydraulically upgradient monitoring well locations, and were depleted at certain locations near and downgradient from site constituent source areas during the April 2004 sampling event. In addition, carbon dioxide was also available as an electron acceptor (as indicated by direct measurement and elevated alkalinity concentrations measured in some source area samples) in site groundwater at some locations during the April 2004 sampling event. Overall, there appeared to be sufficient quantities of electron acceptors in site groundwater to support in-situ biodegradation of site constituents at the time of sampling.

Presence of Metabolic Byproducts

As shown above, the primary metabolic byproducts of the above-listed in-situ biodegradation redox reactions include ammonia, ferrous iron, manganous manganese, sulfide, methane, and carbon dioxide. These metabolic byproducts are produced in groundwater during in-situ biodegradation of site constituents, and therefore elevated concentrations of these chemicals in samples can be used to indicate the presence, absence, and magnitude of in-situ biodegradation reactions. Concentrations of these chemicals in site samples collected in April 2004 were analyzed in a certified laboratory (Table 8). The data are discussed below.

Ammonia concentrations measured in all groundwater samples are shown in Table 8. As shown, ammonia concentrations in groundwater samples ranged from ND to 68.2 mg/L, with ND ammonia concentrations occurring both hydraulically upgradient in background groundwater entering the site and hydraulically downgradient from site source areas (i.e., south of former canal). Ammonia concentrations appeared to increase in groundwater beneath the former gas house and gas holder foundations (i.e., near monitoring wells NMW-0401S and NMW-0402S) and decrease hydraulically downgradient from the site, indicating that ammonia was being produced as a metabolic byproduct in groundwater near the source areas. As discussed above, ammonia is a metabolic byproduct produced during denitrification and in-situ biodegradation of dissolved coal-tar related organic chemicals.

Ferrous iron concentrations measured in all groundwater samples are shown in Table 8. As shown, ferrous iron concentrations in groundwater samples ranged from ND to about 3.4 mg/L, with the ND concentrations occurring both hydraulically upgradient in background groundwater entering the site and hydraulically downgradient from site source areas (i.e., south of former canal). Ferrous iron concentrations appeared to increase in groundwater beneath the former gas house and gas holder foundations (i.e., near monitoring wells NMW-0401S and NMW-0402S), as well as near monitoring well NMW-0403S to the east where the maximum concentrations was detected. These observations confirm that iron reduction and in-situ biodegradation of site constituents was occurring in site groundwater at this location at the time of sampling.

Table 8 lists concentrations of manganous manganese measured in all groundwater samples. As shown, manganous manganese concentrations in groundwater samples ranged from ND to 7.6 mg/L, with the ND and other lowest concentrations occurring in background groundwater hydraulically upgradient from site source areas. Manganous manganese concentrations appeared to increase in groundwater beneath the former coal and gas houses (i.e., near monitoring wells MW-4S and NMW-0401S) and decrease hydraulically downgradient from the site, confirming that manganese reduction and in-situ biodegradation of site constituents was occurring in site groundwater at this location at the time of sampling. Manganous manganese also appeared to increase hydraulically downgradient of the site beneath two isolated sampling locations (i.e., near sampling locations NMW-0404S and MW-0402S) south of the former canal. These two areas may represent additional zones of manganese reduction and in-situ biodegradation.

Sulfide concentrations in site groundwater samples were ND everywhere sampled (Table 8). Sulfide is a metabolic byproduct of sulfate reduction and increased sulfide concentrations beneath source areas can confirm the presence of sulfate reduction in groundwater at a site. However sulfide can also participate in other geochemical reactions such as pyrite precipitation, and therefore ND sulfide concentrations are inconclusive with regard the presence, absence, and magnitude of sulfate reduction.

Table 8 lists concentrations of methane measured in all groundwater samples. As shown, methane concentrations in groundwater samples ranged from ND to about 2.2 mg/L, with the ND methane concentrations occurring both hydraulically upgradient in background groundwater entering the site and hydraulically downgradient from site source areas (i.e., south of former canal). Elevated methane concentrations were observed in groundwater samples collected near the former gas house, with the maximum concentration occurring near the NMW-0401S sampling location. Methane concentrations were lower in hydraulically downgradient areas, indicating that methane was being produced as a metabolic byproduct in groundwater near source areas. This information confirms the presence of methanogenesis and in-situ biodegradation of site constituents in groundwater near monitoring well NMW-0401S at the time of sampling.

Nutrient Availability

Nitrogen and phosphorus are macronutrients required by subsurface microorganisms for cell growth and maintenance. The availability of nitrogen as a nutrient in site groundwater can be indicated by concentrations of parameters such as nitrate and ammonia in site samples, while the availability of phosphorus can be indicated by concentrations of orthophosphate. Analytical results for these chemicals are presented in Table 8. As shown, ammonia concentrations ranged from ND to 68.2 mg/L, nitrate concentrations ranged from ND to 4.6 mg/L, and orthophosphate concentrations ranged from ND to 0.2 mg/L, with ND concentrations for all three compounds occurring both hydraulically upgradient in background groundwater entering the site and hydraulically downgradient from source areas (i.e., south of former canal). These concentrations indicate that adequate quantities of nitrogen and phosphorus were available to support in-situ biodegradation of site constituents in groundwater during April 2004.

In addition to the environmental conditions discussed above, we evaluated site-wide changes in oxidation-reduction (redox) processes that were occurring within the shallow groundwater zone during the April 2004 sampling event. Anaerobic oxidation of organic chemicals (e.g. site constituents) can occur in-situ via the redox processes described above (i.e., nitrate reduction, iron and manganese reduction, sulfate reduction, and methanogenesis). For such biogeochemical processes to occur in shallow groundwater onsite, the presence of certain alternate electron acceptors (e.g. nitrate, sulfate and solid forms of iron and manganese), nutrients (e.g. nitrogen and phosporous), degradation products (e.g. carbon dioxide and methane) and favorable environmental conditions are required. Our evaluation of the geochemical conditions in shallow groundwater onsite (see above) confirmed the existence of sufficient quantities of in-situ biogeochemical indicator parameters to support in-situ biodegradation reactions.

5.8.4.3 Geochemical Conceptual Model

Figure 10 presents a geochemical conceptual model which illustrates the delineation of six biogeochemical redox zones interpreted to be present at the site during the April 2004 sampling event. As shown, redox zones appeared to be confined to a narrow northeast-trending corridor on the north side of the former canal consistent with the approximate extent of site constituents. Nitrate and manganese reduction zones occur over much of the central portion of the site and span eastward from the western site boundary and source area to the east end of the site (i.e., east of monitoring well MW-11S) in a hydraulically downgradient direction north of the former canal. In addition, isolated occurrences of manganese reduction occur south of the former canal. The iron reduction zone spans the source area in the western portion of the site eastward in a hydraulically downgradient direction to the NMW-0403S, MW-10S and MW-7 sampling locations. The sulfate reduction zone appeared to be confined to the vicinity surrounding the NMW-0402S sampling location. The methane reduction zone is similarly confined to the vicinity surrounding the MW-3S and NMW-0401S sampling locations.

Our goal was to delineate the occurrence of predominant redox processes that were occurring at the time of sampling (Figure 10). As shown, the data were sufficient to delineate the following redox zones:

- Aerobic Zone;
- Nitrate Reduction Zone;
- Iron Reduction Zone;
- Manganese Reduction Zone;
- Sulfate Reduction Zone; and
- Methanogenesis Zone.

Aerobic Zone

In order to delineate the extent of a zone of aerobic respiration, we evaluated the relationship between measured concentrations of DO >4.0 mg/L and site locations with strongly negative measured values of ORP (>200 mV). The overlapping region between these in-situ biogeochemical indicator parameters was sufficiently small to conclude that aerobic respiration is minimal in shallow groundwater onsite.

Nitrate Reduction Zone

The nitrate reduction zone is shown on Figure 10. We evaluated concentrations of nitrate, ammonia, and ORP values to delineate the extent of the nitrate zone. Nitrate concentrations that were <1.0 mg/L in site monitoring wells across the entire site along a central northeast-trending corridor north of the former canal provided the primary basis for delineating this zone.

Iron Reduction Zone

The iron reduction zone is shown on Figure 10. To determine the extent of the iron reduction zone, we used concentrations of ferrous iron, methane, alkalinity and carbon dioxide. Elevated concentrations of ferrous iron (>2.0 mg/L) provided the primary basis for delineating this zone. Carbon dioxide concentrations >80 mg/L also occurred near NMW-0401S at the time of sampling (as mentioned above) and represent byproducts of iron reduction.

Manganese Reduction Zone

The manganese reduction zone is shown on Figure 10. Concentrations of manganous manganese, sulfate, nitrate, methane, alkalinity, DO and dissolved carbon dioxide were evaluated to determine the extent of the manganese reduction zone. Elevated concentrations of manganous manganese (>1.0 mg/L) in site monitoring wells across the entire site along a central northeast-trending corridor north of the former canal provided the primary basis for delineating this zone. Regions of elevated alkalinity (>300 mg/L) and elevated carbon dioxide (>80 mg/L) coincide the manganese reduction zone.

Sulfate Reduction Zone

The sulfate reduction zone is shown on Figure 10. To determine the extent of the sulfate reduction zone, we used concentrations of sulfate, alkalinity, ferrous iron, manganous manganese, methane, carbon dioxide, microbial biomass, nitrate, and ORP values in shallow groundwater. For example, the ND sulfate concentration at the NMW-0402S sampling location is a good indicator of sulfate reduction. Elevated sulfate concentrations were assumed to be beyond the sulfate reduction zone. At the NMW-0402S sampling location, concentrations of byproducts from other redox process (i.e., manganous manganese, ferrous iron and methane) were either ND or at low concentrations (<0.7 mg/L) and high concentrations of microbial biomass (about 35,800 PLFA/mL) were also available. The elevated alkalinity concentration (464 mg/L) at this location was likely associated with the production of carbon dioxide (e.g., 70 mg/L) as a metabolic byproduct of in-situ biodegradation of site constituents at the time of sampling. Strongly negative values of ORP of -186 mV indicated strong reducing conditions at monitoring well NMW-0402S. As a result of the above evaluation, a hand-contoured line of sulfate concentration at 50 mg/L (which was centered on monitoring well NMW-0402S) was used to delineate the outermost extent of the sulfate reduction zone.

Methanogenesis Zone

The methanogenesis zone is shown on Figure 10. We evaluated concentrations of methane, microbial biomass, alkalinity, nitrate, DO, carbon dioxide and ORP values to delineate the extent of the methanogenesis zone. Elevated concentrations of methane (>0.5 mg/L) occurring near the former gas house (i.e., near monitoring wells MW-3S and NMW-0401S) provided the primary basis for delineating this zone. Strongly negative values of ORP (e.g. -151 mV) measured at the NMW-0401S sampling location, low concentrations of DO (<0.5 mg/L) near monitoring well NMW-0401S, and elevated concentrations of microbial biomass ($>1\text{x}10^6$ PLFA/mL) also support delineation of the methanogenesis zone.

5.8.4.4 Summary of In-Situ Biodegradation Evaluation

In summary, evidence that in-situ biodegradation of site constituents was occurring in-situ in portions of the shallow groundwater zone at the site in April 2004, includes:

- Environmental conditions, including pH, temperature, and oxidation-reduction potential were conducive for in-situ biodegradation reactions to occur;
- pH buffering capacity was sufficient to buffer potential pH changes associated with in-situ biodegradation and other in-situ chemical reactions; and
- Sufficient quantities of electron acceptors, electron donors, and nutrients appeared to be available in site groundwater to support in-situ biodegradation reactions.

Metabolic byproducts of in-situ biodegradation reactions were present in site groundwater samples, indicating the presence of denitrification, iron reduction, manganese reduction, sulfate reduction, and methanogenesis at locations correlated with the location of the site constituents.

6. Risk Evaluation

This evaluation included a Fish and Wildlife Resource Impact Analysis (FWRIA) and Human Health Exposure Evaluation (HHEE) to assess the potential risks posed to humans and the environment posed by site-related constituents.

6.1 Fish and Wildlife Resource Impact Analysis

6.1.1 Introduction

This section presents the FWRIA that was conducted as part of the SRI. This FWRIA was conducted in accordance with the NYSDEC (1994) guidance entitled *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites* and Section 3.10 of the *Draft DER-10 Technical Guidance for Site Investigation and Remediation* NYSDEC (2002). The objectives of the FWRIA are to identify the fish and wildlife resources that exist on and near the site and to evaluate the potential for exposure of these resources to site-related constituents in environmental media. Results of the FWRIA are generally used to aid in remedial decision-making.

In accordance with the NYSDEC (1994; 2002) guidance, FWRIAs are conducted in a step-wise manner. Specifically, this report includes up to Step IIA. Step I characterizes the terrestrial and aquatic ecology of the site and surrounding areas and develops a list of potential ecological receptors. The specific components of Step I include: IA) site description and maps, IB) description of fish and wildlife resources, IC) description of fish and wildlife resource value, and ID) identification of applicable fish and wildlife regulatory criteria. Step IIA is the pathway analysis, which uses the receptor information generated in Step I to evaluate potential exposure pathways based on site ecology and the location of site-related constituents.

6.1.2 Ecological Characterization

Topographic maps were reviewed to identify the general physical and ecological features of the site and surrounding areas. A site visit was performed on October 29, 2003 to describe the ecological features of the site and develop a covertype map for the site and surrounding areas within a 0.5-mile radius. The covertype map (Figure 11) classifies these areas based on vegetative assemblages and landscape features (e.g., mowed lawn, commercial/industrial/residential, hardwood forest) as described in the NYSDEC document entitled *Ecological Communities of New York State, Second Edition* (Edinger et al., 2002). As part of the ecological characterization, significant natural resources (e.g., rivers and wetlands) located within a 2-mile radius of the site were also identified. This information helped evaluate wildlife habitat value and human resource value for the site and surrounding areas.

6.1.2.1 Vegetative Covertypes

The site is classified as an industrial covertype. The majority of the surrounding areas to the north, west, and south are classified as a mixed commercial/industrial/residential covertype. Additional covertypes present to the north and east include mowed lawn, managed floodplain, mixed scrub-shrub and early successional hardwood forest, riparian scrub-shrub, and perennial stream.

Table 10 lists the typical vegetative species observed for each covertype. A map depicting the spatial distribution of these covertypes within a 0.5-mile radius of the site is presented in Figure 11. Individual covertypes are described below.

Commercial/Industrial/Residential Covertype

Most of the surrounding areas to the north, west, and south of the site are characterized as commercial/industrial/residential covertype. This covertype generally consists of commercial businesses, industrial facilities, residential houses, paved and gravel lots, public roads, and limited amounts of cultivated vegetation (i.e., lawns, ornamental trees and shrubs).

Mowed Lawn Covertype

The mowed lawn covertype is dominated by clipped grasses that are maintained with regular mowing. Several species of ornamental trees are present within this covertype, including pines and hardwoods, although total cover of these trees is less than 30%. The mowed lawn covertype is present immediately north of the site and is associated with Parker Field.

Mixed Scrub-Shrub and Early Successional Hardwood Forest Covertype

This covertype is characterized by a mixture of scrub-shrub and herbaceous vegetation, with several species of mature trees. This covertype is present in a relatively small area northeast of the site and along the Erie-Lackawanna railroad corridor that runs along the northern boundary of the site. Dominant vegetation within this covertype includes sugar maple (*Acer saccharum*), box elder (*Acer negundo*), quaking aspen (*Populus tremuloides*), eastern cottonwood (*Populus deltoides*), tartarian honeysuckle (*Lonicera tatarica*), bull thistle (*Cirsium vulgare*), goldenrod (*Solidago* spp.), and cow vetch (*Vicia cracca*).

Riparian Scrub-Shrub Covertype

The riparian scrub-shrub covertype is present along an approximately 10-foot wide corridor along Newtown Creek. The corridor generally spans the banks of Newtown Creek and consists of two zones: an upper vegetated zone and a lower zone characterized by riprap. Herbaceous vegetation within this covertype includes knotweed (*Polygonum* spp.), goldenrod, cow vetch, teasel (*Dipsacus sylvestris*), blackberry (*Rubus allegheniensis*), tartarian honeysuckle, tree-of-heaven (*Ailanthus altissima*), and sugar maple.

Managed Floodplain Covertype

The managed floodplain covertype is generally characterized by grasses and several stands of mature trees. The grasses appear to be maintained with regular mowing. This covertype is located in a relatively small area along the western side of Newtown Creek. Mature trees present within this covertype include box elder and eastern cottonwood.

Perennial Stream Covertype

A perennial stream, Newtown Creek, is present approximately 0.2 miles east of the site. Newtown Creek flows south past the site and into the Chemung River, which is located approximately 0.6 miles south of the site. This stream is relatively shallow with a mixed rock and sand substrate, and exhibits typical pool and riffle stream morphology. The banks of Newtown Creek are lined with riprap and contain limited vegetation.

6.1.2.2 Surface Waters

The Chemung River is located approximately 3,000 feet south of the site. According to Title 6 of New York Codes, Rules, and Regulations (NYCRR), the NYSDEC best usage classification for the stretch of the Chemung River near the City of Elmira is Class A (6 NYCRR §811.5). Best usages for Class A streams are a source of water supply for drinking, culinary or food processing purposes, primary and secondary recreation, and fishing (6 NYCRR §701.6).

Newtown Creek, a perennial stream, is located approximately 800 feet east of the site. The NYSDEC best usage classification for Newtown Creek is Class C (6 NYCRR §810.3). According to 6 NYCRR §701.8, the best usage for Class C streams is fishing. Class C waters are suitable for fish propagation and survival, and primary and secondary recreation (6 NYCRR §701.8).

6.1.2.3 Wetlands

The presence of regulated wetlands in the vicinity of the site was evaluated during the site survey and by review of New York State Freshwater Wetlands Maps and National Wetlands Inventory (NWI) Map for the Elmira quadrangle (Figures 12 and 13, respectively). New York State Freshwater Wetlands Maps present approximate boundaries of state-regulated wetlands, which are typically 12.4 acres in size and are regulated by the NYSDEC. National Wetlands Inventory (NWI) maps were developed by the U.S. Fish and Wildlife Service (USFWS) using aerial photographs to evaluate waterfowl habitat. NWI maps usually indicate the presence of federal wetlands that fall under the jurisdiction of the U.S. Army Corps of Engineers, but their presence generally requires field verification.

Based on the New York State Freshwater Wetlands Maps for the Elmira quadrangle, there are no existing state wetlands within a 0.5 mile radius of the site. Two Class II wetlands (EL-1-27, EL-1-28) are mapped within a 2-mile radius of the site. These wetlands are north of the site and encompass roughly 28 acres (Figure 12). According to Title 6, §663.5 of the New York Codes, Rules, and Regulations (6NYCRR), “Class II wetlands provide important wetland benefits, the loss of which is acceptable only in very limited circumstances” (6NYCRR, 1985). These wetlands do not appear to be hydraulically connected to Newtown Creek. Based on the NWI Maps for the Elmira quadrangle, numerous federal wetlands are mapped within a 2-mile radius of the site, including emergent (PEM1), scrub-shrub (SS1E), and riverine and palustrine open waters (R3UB/PUB) types (Figure 13). None of these wetlands appear to be hydraulically connected to the site.

6.1.3 Fish and Wildlife Resources

The site is located within the City of Elmira amidst a mixture of commercial, industrial, and residential areas. Surrounding land use to the north, west, and south is also a mixture of commercial, industrial, and residential. Parker Field is located immediately north of the site and is used as a recreational area by residents of the City of Elmira. Several relatively small areas of natural habitats are present east of the site and include mixed scrub-shrub and early successional hardwood forest, managed floodplain, and a perennial stream. Wildlife usage of the site is expected to be limited to species typical of urban settings, such as small mammals and passerine birds. Table 11 lists potential ecological receptors observed or expected to occur onsite or in the vicinity of the site based on available habitat, species-specific habitat requirements, and geographic range.

Commercial/Industrial/Residential Covertype

The site and the majority of the surrounding areas are classified as a commercial/industrial/residential covertype. Wildlife species that utilize this covertype generally consist of species that are capable of utilizing habitats in urban landscapes. Typical wildlife species that may use this covertype include gray squirrels, woodchucks, mice, rock doves, and house sparrows. Because this covertype is mainly characterized by buildings and impervious surfaces (e.g., roads, parking lots), it does not offer wildlife habitat that would be conducive to foraging, nesting, and/or shelter.

Mowed Lawn Covertype

There is a relatively small area immediately north of the site (Parker Field) that is classified as a mowed lawn covertype. Use of this covertype is generally limited to passerine birds (e.g., American robin, house sparrow) and small mammals such as the gray squirrel and eastern cottontail that may use this habitat for foraging. The presence of ornamental trees within the mowed lawn covertype may provide arboreal habitat to some of these species for nesting and/or shelter.

Mixed Scrub-Shrub and Early Successional Hardwood Forest Covertype

This covertype is present along the Erie-Lackawanna railroad corridor which runs along the northern boundary of the site and in a relatively small area northeast of the site. This covertype is located within the City of Elmira in close proximity to commercial, industrial, and residential areas. Wildlife species typical of this covertype include, but are not limited to, gray squirrel, eastern cottontail, striped skunk, raccoon, American robin, and gray catbird. This covertype is somewhat isolated in that it is located in the City of Elmira between commercial/industrial/residential areas and the managed floodplain of Newtown Creek. Therefore, wildlife use of this covertype is most likely limited.

Riparian Scrub-Shrub Covertype

The riparian scrub-shrub covertype consists of an approximately 10-foot wide corridor along Newtown Creek. Generally, this covertype consists of two zones: an upper vegetated zone and a lower zone characterized by riprap. Vegetation within this covertype consists of several herbaceous species, shrubs, and tree saplings, but does not include mature trees. Wildlife that may use this covertype include small mammals and passerine birds.

Managed Floodplain Covertype

The managed floodplain covertype generally consists of maintained (i.e., mowed) grasses and several stands of mature trees. This covertype is present northeast of the site along the riparian corridor of Newtown Creek. Wildlife use of this covertype is most likely limited to small mammals and passerine birds because it is located in close proximity to commercial, industrial, and residential areas.

Perennial Stream Covertype

Newtown Creek is a relatively shallow stream with typical pool and riffle morphology. This stream is most likely used by fish that may enter the creek from the Chemung River and by terrestrial wildlife as a drinking source.

6.1.3.1 Threatened/Endangered Species and Significant Habitat

Reviews of the U.S. Fish and Wildlife Service (USFWS) records and New York State Natural Heritage Program files were requested to assist in the evaluation of sensitive species or habitats in the vicinity of the site. The USFWS response letter noted that except for the occasional transient individuals, no Federally listed or proposed endangered or threatened species are known to exist in the project area (Stillwell, 2004). In addition, no habitat within the project area is currently designated or proposed "critical habitat" in accordance with provisions of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) (Stillwell, 2004).

Based on the response letter from the NYSDEC Natural Heritage Program (Krahling, 2004) several historical records exist within the surrounding area for threatened and endangered species of vascular plants. These species include: blunt-lobe grape fern (*Botrychium oneidense*), southern wood violet (*Viola hirsutula*), erect knotweed (*Polygonum erectum*), wild onion (Roth nodding onion) (*Allium cernuum*), porter's reedgrass (*Calamagrostis porteri*) and northern blazing star (*Liatris scariosa var. novae-angliae*). Of these species, only the northern blazing star has been observed presently in an area to the west of the site near Cobble Hill. The remainder of the species was last observed in the surrounding area during the 1930s to 1940s. During the site visit, a species of knotweed was observed within the riparian scrub/shrub habitat along Newtown Creek. However, the species was likely the common species of Japanese knotweed (*Polygonum cuspidatum*).

6.1.3.2 Observations of Stress

During the site visit conducted on October 29, 2003, no evidence of stressed vegetation or negative impacts on wildlife were observed for the site or surrounding areas.

6.1.4 Fish and Wildlife Resource Values

Step IC of the FWRIA consists of an assessment of: 1) the general ability of the area within 0.5-mile of the site to support fish and wildlife resources; and 2) the value of fish and wildlife resources to humans. The following subsections provide a qualitative evaluation of the value of the identified covertypes to wildlife and the value of these wildlife resources to humans.

6.1.4.1 Value of Habitat to Associated Fauna

The qualitative determination of habitat value is based on field observations, research, and professional judgment. Habitat values are assigned using the following classification system:

- **No Value** – Paved areas, buildings, and parking lots;
- **Low Value** – Areas with habitat quality that marginally supports a minimal number and diversity of low quality species;
- **Moderate Value –** Areas that support a variety of quality species with little or no stress related to anthropogenic disturbances; and
- **High Value** – Critical habitat for rare species and/or extensive undeveloped habitat supporting a great diversity and abundance of wildlife without functional restraints imposed by anthropogenic disturbance.

The site is classified as an industrial covertype. The majority of the surrounding areas to the north, west, and south are also classified as a commercial/industrial/residential covertype. Most of these areas are characterized by paved areas and buildings, which do not provide adequate food, shelter, or nesting areas for most wildlife species. However, there are some typical wildlife species (e.g., gray squirrel, eastern cottontail) that are accustomed to living in urban environments and may use residential lawns and other small patches of habitat within an urban setting. Therefore, the site and these surrounding urban areas are concluded to provide low value to wildlife.

The mowed lawn covertype (i.e., Parker Field) is located immediately north of the site and is surrounded by commercial, industrial, and residential areas. The mowed lawn covertype consists of a recreational area that is most likely used on a frequent basis by residents of the City of Elmira, which limits its attractiveness to local wildlife. The managed floodplain is also characterized by grasses that are maintained on a regular basis by mowing. These covertypes do not offer significant wildlife habitat for foraging, shelter, or nesting, and as such are concluded to provide low value to wildlife.

The only natural (i.e., recently undisturbed by human activity) terrestrial habitats within the vicinity of the site are the mixed scrub-shrub and early successional hardwood forest covertype which is present in a relatively small area northeast of the site and along the Erie-Lackawanna railroad corridor, and the riparian scrub-shrub covertype which is present along Newtown Creek. These covertypes are located adjacent to commercial, industrial, and residential areas, which most likely limits their attractiveness to local wildlife. Because these covertypes are located within an urban setting and are relatively small in size, they are concluded to provide low value to wildlife.

Because Newtown Creek is a tributary to the Chemung River, it most likely supports a fish population. Newtown Creek may also be used by local terrestrial wildlife as a drinking water source. Therefore, the perennial stream covertype is concluded to provide moderate value to wildlife.

6.1.4.2 Value of Resources to Humans

The site and the majority of the surrounding areas are classified as a commercial/industrial/residential covertype. Therefore, these areas do not offer natural resources for recreational use. Current human use of fish and wildlife resources within the vicinity of the site include use of Parker Field for recreational purposes and use of Newtown Creek for fishing. Activities associated with the Chemung River located south of the site most likely include fishing and wildlife observation.

6.1.5 Fish and Wildlife Regulatory Criteria

The following New York State laws, rules, regulations, and criteria are relevant to this FWRIA:

- Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR):
    - Part 608, Use and Protection of Waters;
    - Part 663, Freshwater Wetlands Permit Requirements;
    - Part 664, Freshwater Wetlands Maps and Classifications;
    - Part 701, Classifications—Surface Waters and Groundwaters;
    - Part 702, Derivation and Use of Standards and Guidance Values;
    - Part 703, Surface Water and Groundwater Quality Standards and Groundwater Effluent Standards; and
    - Part 800 ff., Classes and Standards of Quality and Purity Assigned to Fresh Surface and Tidal Salt Waters.

- Environmental Conservation Law—Chapter 43-B of the Consolidated Laws:
    - Article 11, Fish and Wildlife:
        - §11-0503, Polluting Streams Prohibited, and
        - §11-0535, Endangered and Threatened Species;
    - Article 15, Water Resources: Title 5, Protection of Water; and
    - Article 24, Freshwater Wetlands.

- Criteria and Guidelines:
    - NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1, “Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations” (June 1998);

- NYSDEC Division of Fish, Wildlife, and Marine Resources “Technical Guidance for Screening Contaminated Sediments” (January 1999); and
- NYSDEC “Technical and Administrative Guidance Memorandum (TAGM): Determination of Soil Cleanup Objectives and Cleanup Levels”, HWR-94-4046 (TAGM 4046) (January 1994).

6.1.6 Impact Assessment

Step II of the FWRIA includes a constituent-specific assessment to determine the impacts, if any, on fish and wildlife resources. The assessment includes a pathway analysis (Step IIA), which determines if there are complete or potentially complete ecological exposure pathways to site-related constituents, and a criteria-specific analysis (Step IIB), which uses numerical criteria to evaluate the potential significance of complete exposure pathways to ecological resources. If no fish and wildlife receptors or complete exposure pathways are present, then potential impacts to resources are considered minimal. If a “minimum impact” conclusion results from Step IIA, then it is not necessary to continue with subsequent steps of the FWRIA (NYSDEC, 1994).

6.1.6.1 Pathway Analysis

The objective of the pathway analysis is to identify constituents of concern (COCs) associated with the site, and to evaluate potential pathways by which fish and wildlife receptors may be exposed to such constituents. A complete exposure pathway exists if there is a source, a potential point of exposure, and receptors with a viable route of exposure at the exposure point. If any one of these elements is missing, then the pathway is not considered to be complete and exposure cannot occur, irrespective of chemical concentrations in environmental media.

Potential site-related COCs and exposure pathways are discussed in the following subsections. Media of interest associated with the site are groundwater and soil. Surface water is not considered a media of interest because offsite migration of COCs within the groundwater has been shown to be limited to within approximately 100 feet of the site, and the nearest surface water body (Newtown Creek) is several hundred feet east of the site.

Surface Soils

The western portion of the site is primarily covered by buildings (currently used for warehouse storage), asphalt, crushed stone, or clean fill, and the eastern portion of site is mainly covered with relatively fresh crushed stone or clean fill; however, there are some areas in the eastern portion of the site where direct contact with surface soils is a possibility. However, as discussed in Section 5.5, surface soil concentrations of VOCs, SVOCs, and metals were very low (generally less than or equal to background). In addition, wildlife (e.g., small mammals, passerine birds) are not expected to utilize the site to a significant extent given the lack of sustaining habitat. For this reason, surface soils do not represent a complete exposure pathway.

Subsurface Soils

Although subsurface soils in some areas of the site contain MGP-related constituents, they do not represent a complete ecological exposure pathway. Wildlife are not expected to utilize the site to a significant extent given the lack of sustaining habitat. In addition, the MGP-related constituents were generally detected at depths coincident with or below the water table, which is approximately 5 to 10 feet bgs, and are too deep for potential contact with ecological receptors. For this reason, subsurface soils do not represent a complete exposure pathway.

Groundwater

The depth to groundwater beneath the site and surrounding areas is about 5 to 10 feet. Groundwater itself does not represent a complete ecological exposure pathway because wildlife would generally not be exposed to groundwater at such depths during foraging, nesting, or burrowing activities. Therefore, groundwater does not represent a complete exposure pathway.

6.1.6.2 Summary and Conclusions

The FWIA for the site has been performed in accordance with NYSDEC guidance (1994; 2002) to determine the presence of ecological resources on and near the site and to evaluate the significance of complete ecological exposure pathways for site-related constituents in environmental media. Based on site observations, no threatened and endangered plant or animal species inhabit the site or the immediate surrounding areas. The site itself is considered an industrial covertype, which provides little value to wildlife. Use of the site by wildlife is also limited by the majority of the surrounding areas which are characterized as a commercial/industrial/ residential covertype.

The pathway analysis (Step IIA) identified that none of the site-related environmental media showed complete ecological exposure pathways. A complete exposure pathway must have a source of COCs, a point of exposure, and receptors with a viable route of exposure. Based on current site conditions, the source of COCs is limited based on IRMs that have addressed removal and/or isolation of impacted surficial soils for the majority of the site. The existing habitat (i.e., industrial) provides little value to wildlife for forage and inhabitance.

6.2 Human Health Exposure Evaluation

6.2.1 Introduction

This HHEE identifies elements that could constitute complete pathways of human exposure to COCs and discusses complete or potentially-complete pathways of exposure (if any). For a pathway to be complete, the following elements must be present: 1) constituents of concern in environmental media; 2) locations where human exposures could potentially occur; and 3) feasible routes of exposure at exposure points. The information used for this HHEE consists of information regarding current and foreseeable land use and available data for the site The results of this HHEE will be used, in part, to help evaluate proposed remedial actions.

6.2.2 Constituents of Concern

This evaluation defines COCs as constituents detected at concentrations above applicable screening criteria in one or more samples of soil, soil vapor, and groundwater regardless of whether they are site-derived. Analytical data for soils (surface and subsurface) were compared to criteria presented in the NYSDEC TAGM #4046 entitled *Determination of Soil Cleanup Objectives and Cleanup Levels* (NYSDEC, 1994). Sub-slab soil vapor data were compared to generic screening levels for target shallow soil vapor concentrations presented in Table 2a of *USEPA's Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (OSWER, November 2002) and U.S. Department of Labor, Occupational Safety & Health Administration (OSHA) Permissible Exposure Limits (PELs). Groundwater data were compared to values presented in the NYSDEC TOGS 1.1.1 *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (NYSDEC, 1998). Existing site data indicate that site soils and groundwater contain elevated levels of site-related constituents (e.g., PAHs, phenolics, VOCs, and several inorganics). As noted previously in this report, site groundwater does not flow toward the City of Elmira public water supply wells, which are located approximately one mile north of the site.

Detections of COCs in soil, soil vapor, and groundwater do not necessarily indicate unacceptable risks to human health. Risks to human health are dependant upon variables such as dose, exposure route, and the frequency and duration of exposure.

6.2.3 Potential Exposure Points, Receptors, and Route of Exposure

An initial step in evaluating potential human exposure is identifying complete exposure pathways. An exposure pathway has the following elements: 1) a contaminant source; 2) contaminant release and transport mechanisms; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population. If all of these elements exist, then the exposure pathway is considered complete. The remainder of this section evaluates soils (surface and subsurface) and groundwater as a possible contaminant source and identifies potential exposure points, receptors, and routes of exposure.

Soils

As presented in Table 12, several PAHs and metals were detected in surface soils at concentrations greater than the NYSDEC TAGM values. However, concentrations of PAHs and metals in soils are generally less than or similar to background concentrations. In addition, potential exposure to constituents in surface soil has been reduced through the implementation of several site IRMs (previously discussed). These IRMs have addressed site-related impacts within the area encompassing the former MGP-operations area, areas around former gas holders 1 and 2, the former purifier waste area (southern site boundary), and the PCB IRM area (primarily the storage yard and around the substation). The western portion of the site is primarily covered by buildings or asphalt. There are some areas in the eastern portion of the site where direct contact with surface soils is a possibility. However, as discussed in Section 5.5, surface soil concentrations of VOCs, SVOCs, and metals were very low (generally less than or equal to background). Given this information, there are no potentially complete exposure pathways associated with surface soils.

Subsurface soils containing MGP-related residuals have been shown to be in excess of screening criteria. Varying concentrations of PAHs are contained within the subsurface soils; which are primarily concentrated near the former MGP structures and south and west of the substation. Human exposure to subsurface soil would be limited to construction workers engaged in excavation activities. Potential exposure to construction workers exist through incidental ingestion, dermal contact and inhalation of volatiles and particulates during excavation. This potential exposure could be mitigated by using properly-trained personnel, engineering and administrative controls, and appropriate personnel protective equipment (PPE).

Soil Vapor

BBL collected six sub-slab soil vapor samples (SV-1 through SV-6, see Figure 1) to assess the potential for volatile constituents to migrate into buildings near the site. The selected buildings consisted of the warehouse/storage building owned by I.D. Booth in the western portion of the site, and the largest Trayer building along the southern edge of the site. The SVS Work Plan (provided on the attached CD) provides a detailed scope of work for conducting the soil vapor sampling. The SVS Report is Attachment D of this report.

Forty-one VOCs were detected in sub-slab soil vapor samples collected at each sampling location. The detected compounds were from a wide variety of compound classes including chlorinated hydrocarbons (e.g., chloroform, bromodichloromethane, PCE, TCE, trichloroethanes), carbon disulfide, Freons (e.g., Freon 11, Freon 12), aromatics (e.g., benzene, ethylbenzene, toluene), and non-aromatics (e.g., n-alkanes, cyclohexane). This finding is not surprising given the fact that the area's current and former land use is multi-industrial. As indicated in the attached SVS Report (Appendix E), only three compounds exceeded the indicated USEPA generic target shallow soil vapor screening levels: chloroform in SV-2 (I.D. Booth building); and 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene in SV-6 (Trayer building). None of the compounds detected exceeded their respective OSHA PEL. The PEL for the trimethylbenzenes is almost three orders of magnitude greater than the highest measured concentration (120,000 ug/m^3 vs. 180 ug/m^3). The OSHA PEL for chloroform is more than three orders of magnitude greater than the measured concentration (240,000 ug/ m^3 vs. 230 ug/ m^3).

Given the relatively low concentrations of all the VOCs detected in subslab samples collected in buildings near the site, the potential for soil vapor intrusion into these buildings is relatively low. Further evaluation of the potential for soil vapor intrusion, therefore, is not recommended for these properties or any of the other surrounding properties.

Groundwater

VOCs, PAHs, and cyanide have been detected in shallow groundwater; with at least one constituent exceeding the NYSDEC regulatory levels. Groundwater at the site is not used for drinking. The depth to groundwater in the vicinity of the site is approximately 5 to 10 feet bgs. The greatest potential for exposure would be for excavation workers in a trench. These workers could be exposed dermally to groundwater if the excavation were deep enough to encounter groundwater. However, workers would likely be wearing appropriate personal protection equipment (PPE) (i.e., boots, gloves, etc.) and actual contact with the water would be minimal to non-existent. This potential exposure could be mitigated by using properly-trained personnel, engineering and administrative controls, and appropriate PPE.

Based on the information above, workers are expected to have a higher potential for exposure than other receptors. The magnitude of exposure to COCs would depend on the type of worker activity, the specific areas of the site used in daily activities, and the frequency and length of time spent at each area. The greatest potential for exposure (via all pathways) would be during construction/excavation activities (e.g., maintenance of underground utilities) that are conducted onsite.

7. Summary and Conclusions

The Elmira MGP site has been the subject of six investigations and other studies, starting in 1986 and culminating with the SRI investigation described in this report. Over the course of these investigations, approximately 84 soil borings were drilled, 29 monitoring wells and 23 temporary piezometers/wells were installed, 61 test pits were excavated, and hundreds of samples of environmental media were analyzed. The primary objectives of this work were to characterize the nature and extent of site-related impacts to the environment and to evaluate the risk posed to human health and the environment by those impacts. These objectives have been satisfied by the work performed during these investigations, and the information gathered will enable an evaluation of remedial alternatives for the site.

This SRI report provides a detailed evaluation of:

- The site's geology and physical setting;
- The nature and extent of impacts to soil and groundwater;
- The dynamics of groundwater and NAPL migration at the site;
- The potential for soil vapor intrusion into buildings adjacent to the site; and
- The nature of potential risks posed to human health and the environment by the site.

This section summarizes the findings of the SRI.

7.1 Site Setting

The former MGP occupied most of a city block, bounded by East Clinton Street, Madison Avenue and East Fifth Street. The site is approximately 1,500 feet west of Newtown Creek, a tributary to the Chemung River which is just over 3,000 feet to the south. The site is largely flat-lying, with a small topographic rise in the eastern corner, near the intersection of East Fifth and East Clinton Streets. Land use in the area of the site is mixed, with industrial and commercial operations immediately south and west, a public park to the northeast, and residential properties not immediately adjacent, but within 1,000 feet of the site in all directions. The parcel immediately south of the site is owned by Trayer Products, Inc., a metal-parts manufacturer.

All businesses and residences near the site are supplied by City water, and thus, there is no current use of groundwater near the site. A production drinking water well field is located approximately one mile north and upgradient of the site, on Sullivan Street.

The MGP was built between 1865 and 1869 beside the Junction Canal, a waterway connecting the Chemung and North Branch Canals. The MGP initially produced coal gas, then water (or blue) gas, and finally, between 1910 and 1930, carbureted water gas. Three gas holders were built during the life of the plant. At different stages of operation, the site also contained the following major structures: a gas house, coal house, liquid purifiers, purifier boxes, retorts, governor house, reputed waste lagoon, and tar separators and vessels, generator house, and oil tanks.

With plant closure in 1947, most of the above-ground MGP structures were dismantled. The last remaining above-ground MGP structure, the former gas house, was demolished by NYSEG during an IRM completed in 2004. NYSEG used the site as a service center until 1977, when it sold the western portion of the site, including all the remaining buildings, to I.D. Booth, Inc., an industrial supply wholesaler. NYSEG retained ownership of the eastern portion of the site, where it currently maintains an electrical substation and a storage yard. In 2003, NYSEG re-acquired the MGP-portion of the property owned by I.D. Booth, and transferred ownership of the storage yard area (west of the substation) to I.D. Booth.

The site has undergone several IRMs over the past few years: excavation and disposal of PCB-impacted soils in the eastern portion of the site (1996); demolition of the former gas house (2003); excavation and removal of former holders 1 and 2, including associated impacted subsurface materials (2003 and 2004); and excavation and disposal of an apparent purifier-waste disposal area (2004).

7.2 Hydrogeology

BBL evaluated the regional and site hydrogeology by reviewing and analyzing hydraulic and geologic data collected during the SRI and previous investigations at the site. This section summarizes the major findings of the evaluation and presents relevant conclusions regarding groundwater movement at and around the site.

Hydrostratigraphic Units

The site is situated on relatively flat-lying land at an elevation of approximately 850 feet above mean sea level. Site investigations have identified four principal hydrostratigraphic units beneath the site:

- ***Alluvial Silt-and-Clay Unit*** – This unit is the uppermost hydrostratigraphic unit at the site and is comprised of recent alluvial deposits of silt and clay and occasional peat horizons and fine sand stringers. This unit is thickest (greater than 4 to 8 feet) near and south of the MGP operations area and essentially absent in the eastern portion of the site. The hydraulic conductivity of this unit is low (1.2 ft/day). The low hydraulic conductivity of the unit significantly restricts infiltration of precipitation to the underlying sand-and-gravel unit. As such, pronounced groundwater mounding has been observed in areas where this unit is present.

- ***Sand-and-Gravel Unit*** – This unit is comprised of artificial fill and a sand-and-gravel outwash deposit. The composition of this unit is variable and contains intervals of fine sand and silt. The sand-and-gravel is thickest unit beneath the site (approximately 5 to 50 feet) and is the most significant unit at the site in terms of groundwater flow and storage/transport of site-related constituents. The hydraulic conductivity of the unit is relatively high – about 70 ft/day. The sand-and-gravel unit is continuous across the area investigated in and around the site.

- ***Lacustrine Silt-and-Clay Unit*** **-** This unit was found primarily in the eastern portion of the site and appears to pinch-out just east of the MGP operations area. Where present, this unit was observed immediately above the till unit (described below), but below the sand-and-gravel unit. This unit is thickest near the area of MW-9S/D and MW-12S/D. The unit is comprised primarily of silt and clay and has a low vertical hydraulic conductivity of approximately 2×10^{-3} ft/d. Groundwater likely flows around this unit and through the adjacent sand-and-gravel and till units.

- ***Till Unit*** – This unit is the lowest unit investigated beneath the site and is about 30 to 40 feet thick. The surface of this unit is irregular, and is typically shallower in the eastern and western portions of the site and deeper in the central portion of the site. The unit is usually very dense and is comprised of sand and silt with varying amounts of gravel and clay. The hydraulic conductivity of this unit is low (approximately 7 ft/d) compared to the sand-and-gravel unit.

Groundwater Flow

The Chemung River is a major regional groundwater discharge location. Given the site's proximity to the river, groundwater investigated beneath the site will eventually discharge to it, either directly or indirectly via flow from Newtown Creek. The following important conclusions regarding site groundwater flow are offered based on the results of the recent SRI field activities and previous reports:

- The majority of shallow groundwater at the western portion of the site moves radially away from the center of the groundwater mound located near monitoring well MW-6S, then spills off the edge of the silt unit into the sand and gravel unit. Once in the sand and gravel unit, groundwater flows to the river and/or, to a lesser extent, into the underlying till. Groundwater in the till ultimately discharges to the Chemung River.

- An elongated mound of shallow groundwater is formed along the southern site boundary (along the length of the former canal). This elongated mound produces a damming effect for shallow groundwater moving south from the area of the storage yard and substation. Groundwater coming from these areas is forced around the mound.

- Shallow groundwater is not mounded immediately south of the MGP structures and to the south of the site.

- Unlike the overlying shallow groundwater flow distribution, deeper groundwater flow appears to be uniformly distributed.

- The lateral trend in water levels in the deeper overburden (till) appears to decline from north to south with a slight bend in the flow direction to the southeast.

7.3 NAPL Evaluation

NAPL Extents

BBL used a sophisticated 3-D visualization model to depict the approximate horizontal and vertical extent of NAPL at and near the site. The model was built using soil data and NAPL observations from individual boring and test-pit sampling points. Several conclusions can be drawn from analysis of the model output:

- Two distinct areas of NAPL are present at the site: one in the area of the former MGP operations (gas house, holders, tar storage/handling vessels) and the other to the north and east of the former distribution holder. The NAPL in the MGP operations area has a CWG signature while the NAPL to the east has a mixed signature of CWG and mid-distillate petroleum fuel oils. These petroleum fuel oils may have been used as feedstocks in the CWG production process. The NAPL to the east may be related to a reputed waste lagoon that may have been located in this area; however, evidence of a definitive subsurface structure was not observed in the numerous test pits and soil borings completed in the area.

- The NAPL to the east appears to reside near, and a short distance below, the water table, located approximately 8-10 feet below ground in this area. This NAPL may be somewhat buoyant and near the density of site groundwater possibly due top mixing of LNAPL and DNAPL.

- NAPL beneath the operations area appears to have migrated deeper than at the eastern area, and has penetrated the till in some places. The till surface appears to have little control over NAPL movement.

- NAPL is primarily constrained to the within the site boundary. The exception is south of former gas holders 1 and 2, where a finger of NAPL appears to have migrated downgradient (south) onto Trayer's property.

- The vast majority of NAPL/sheen-containing soils occurs below the water table.

- The extents of NAPL have been delineated adequately for the purposes of this SRI.

NAPL Migration

NAPLs in the ground beneath the site, primarily coal-tar DNAPL, are responsible for most of the environmental impacts resulting from the former MGP. Most of the NAPL released appears to be a DNAPL, but relatively buoyant NAPL may be present to the east in the area of the reputed waste lagoon. The DNAPL in the MGP operations area has moved downward through the fill, and in some cases through and around the alluvial silt and clay, and into the sand and gravel. Upon entering the saturated sand and gravel, much of the DNAPL spreads laterally, preferentially but not exclusively, in the direction of groundwater flow (generally to the south and southeast). At several locations, the DNAPL has also migrated downward to the base of the sand and gravel and into the underlying till. The paths that it has taken are tortuous; as a result, the DNAPL is distributed very irregularly beneath the site. The till that underlies the sand and gravel appears to be an ineffective capillary barrier to prevent further downward migration of the DNAPL. The NAPL in the eastern portion of the site appears to have moved in the direction of shallow groundwater flow, without much downward migration.

The term *residual saturation* can be used to describe two important ways in which subsurface DNAPL can occur. DNAPL at or below residual saturation is immobile, trapped in soil pore spaces. DNAPL above residual saturation (i.e., pooled) has the potential to move through the subsurface and will enter properly constructed wells that screen across it. Both forms of DNAPL dissolve slowly and, until nearly completely dissolved, will affect groundwater quality nearby. Much of the DNAPL beneath the site appears to be residual because NAPL has not accumulated in any wells that were designed to collect it; however, there may still be areas of pooled DNAPL.

Because pooled DNAPL may exist at the site, and because the DNAPL is typically viscous and only slightly denser than water, it is possible that the DNAPL has not yet reached its final distribution. Nevertheless, no clear evidence of ongoing migration exists, that is, NAPL has not arrived in any onsite or offsite monitoring wells following well installation.

7.4 Soil Evaluation

The soil evaluation delineated regions of soils exceeding appropriate screening values for total PAHs using the same 3-D visualization model described in Section 7.3, above. The evaluation found the following:

- The region of subsurface soils containing total PAHs in excess of the screening value is estimated to comprise approximately 5,100 cubic yards.

- This region is considerably smaller than the region estimated to contain NAPL; however, samples observed to contain large amounts of NAPL often exceeded the screening value for PAHs. This means that the region of soils exceeding the PAH screening value, particularly below the water table, is likely larger than was estimated by the model.

- A considerable volume of soil that exceeds Guidance Values and/or contains NAPL exists below the water table.

7.5 Soil Vapor Evaluation

BBL evaluated the potential for soil vapor intrusion of VOCs in buildings near the site, including the warehouse/storage building owned by I.D. Booth in the western portion of the site, and the largest Trayer building along the southern edge of the site. Numerous VOCs were detected in low concentrations in sub-slab soil vapor samples collected at each sampling location. The detected compounds were from a wide variety of compound classes including chlorinated hydrocarbons (e.g., chloroform, bromodichloromethane, PCE, TCE, trichloroethanes), carbon disulfide, Freons (e.g., Freon 11, Freon 12), aromatics (e.g., benzene, ethylbenzene, toluene), and non-aromatics (e.g., n-alkanes, cyclohexane). This finding is not surprising given the fact that the area's current and former land use is multi-industrial. Only three detected compounds exceeded the USEPA generic target shallow soil vapor screening levels. None of the compounds detected exceeded their respective OSHA PEL.

Given the relatively low concentrations of VOCs detected in subslab samples collected beneath site-adjacent buildings, the soil vapor evaluation concluded that the potential for soil vapor intrusion into these buildings is relatively low. The evaluation also concluded that further vapor intrusion assessment was not required for these properties or any of the other surrounding properties. The NYSDEC and NYSDOH agreed with these conclusions.

7.6 Groundwater-Quality Evaluation

BBL evaluated groundwater quality by comparing analytical results from data collected during the SRI to NYSDEC Class GA Standards. Six primary constituents were identified: the BTEX compounds (benzene, toluene, ethylbenzene, and xylenes), the PAH benzo(a)anthracene, and cyanide.

The NYSDEC Class GA standard for total cyanide (0.2 mg/L) was exceeded in some cases; however, the iron cyanide complexes constitute the majority of the total cyanide measured in all of the groundwater samples from the site and the iron cyanide complexes are not known to be of toxicological concern. Free cyanide is the primary chemical species of concern, but comprised little to none of the total cyanide measured in these groundwater samples. As such, it is concluded that cyanide in shallow groundwater is not a human health concern at this site.

In addition, four chlorinated compounds (1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, and chloroethane) were detected in groundwater from two monitoring wells (MW-3S and MW-4S) located near the center of the site. The chlorinated compounds are also not considered as significant concern because they seem to be localized and occur at relatively low concentrations, although is some cases their concentrations exceed NYSDEC Class GA Standards.

The results of the groundwater evaluation have concluded the following:

- The horizontal extent of the BTEX, PAH and cyanide plumes in site groundwater have been delineated. The extent of the BTEX and PAH plume above NYSDEC Standards appears to be primarily limited to within approximately 100 feet of site boundaries. The extent of the PAH plume appears much smaller than the BTEX plume.
- The vertical extent of the BTEX, PAH, and cyanide plumes in site groundwater has been delineated and appears to be limited to within approximately 50-feet of the ground surface.
- The deep groundwater zone (i.e., groundwater deeper than about 50-feet below the ground) does not appear to have been impacted by the former MGP operations.

BBL also evaluated the potential for site constituents to naturally attenuate by reviewing data collected during the SRI and previous investigations. This preliminary evaluation found that:

- all of the organic constituents identified in site groundwater are likely subject to mass destruction in-situ via biodegradation processes facilitated by naturally-occurring subsurface microorganisms;
- organic constituents are being biodegraded in shallow groundwater onsite by means of a variety of naturally-occurring oxidation-reduction processes, resulting in harmless byproducts (e.g., carbon dioxide); and
- statistically significant decreases in constituent concentrations over time at the site monitoring well network indicate overall shrinkage of constituent plumes in shallow groundwater.

Based on these conclusions, it would be appropriate to evaluate the feasibility of using monitored natural attenuation as a component of the site-wide groundwater remedy.

7.7 Risk Evaluation

BBL performed a risk evaluation by reviewing data collected during the SRI and previous site investigations. The risk evaluation consisted of a FWRIA through Step IIA and a qualitative HHEE. The results of the FWRIA and HHEE are summarized below.

Fish and Wildlife Resource Impact Analysis

No threatened or endangered plant or animal species were found to inhabit the site or the immediate surrounding areas. The site itself is considered an industrial covertype, characterized by asphalt, gravel, and paved lots with existing buildings. Such a covertype provides little value to wildlife for forage and inhabitance. Use of the site by wildlife is also limited by the majority of the surrounding areas which are characterized as a commercial/industrial/residential covertype.

The pathway analysis (Step IIA) identified that none of the site-related environmental media showed complete ecological exposure pathways. A complete exposure pathway must have a source of COCs, a point of exposure, and receptors with a viable route of exposure. Based on current site conditions, the source of COCs is limited as a result of IRMs that were conducted to remove and/or isolate impacted surficial soils for the majority of the site.

Human Health Exposure Evaluation

Human exposure to COCs in surface soil is unlikely because much of the site has been covered with asphalt, crushed stone, or clean fill. Surface soil samples collected onsite during the SRI had concentrations of PAHs and metals generally less than or similar to background concentrations. Elevated concentrations of COCs have been detected in subsurface soils in some areas at depths generally at or below the water table. The potential for exposure to subsurface soils in these areas is most likely limited to workers engaged in construction/excavation activities.

Sub-slab soil vapor results indicate that low levels of VOCs are present in sub-slab soil vapor beneath the buildings adjacent to the site. The soil vapors are from a variety of compound classes. Given the low concentrations measured in the sub-slab samples, the potential for soil vapor intrusion into these site-adjacent buildings is relatively low.

Groundwater data collected as part of the SRI indicate that COCs are present in groundwater at concentrations that exceed appropriate NYSDEC standards or guidance values. Groundwater beneath the site is not used as a potable source, and therefore exposure via ingestion of groundwater is unlikely. Notably, site groundwater does not flow toward the municipal water supply located approximately one mile north of the site. There is, however, potential for direct contact with groundwater that may be encountered during excavation/construction activities.

Potential exposure to COCs in subsurface soils and groundwater could be mitigated by using properly-trained personnel and personal-protective equipment when conducting excavation/construction activities.

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TABLES

TABLE 1
SAMPLE SUMMARY

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Location ID	Sample Depth	Date Sampled	BTEX	PAHs	VOCs	SVOCs	PCBs	Geochemistry	Inorganics	Total Cyanide	Total Metal & Free Cyanide	Waste Characterization	TOC	DRO	PLFA	Grain Size	Vertical Hydraulic Conductivity
Groundwater																	
MW-01D	NA	4/27/2004	--	--	X	X	--	--	--	X	--	--	--	--	--	--	--
MW-01S	NA	4/27/2004	--	--	X	X	--	X	X[1]	X	--	--	--	--	X	--	--
MW-02D	NA	4/21/2004	--	--	X	X	--	--	--	X	X	--	--	--	--	--	--
MW-02S	NA	4/21/2004	--	--	X	X	--	--	--	X	--	--	--	--	--	--	--
MW-0301S	NA	4/29/2004	--	--	X	X	--	--	--	X	--	--	--	--	--	--	--
MW-0304D	NA	4/28/2004	--	--	X	X	--	--	--	X	--	--	--	--	--	--	--
MW-03S	NA	4/21/2004	--	--	X	X	--	--	--	X	X	--	--	--	--	--	--
MW-0401S	NA	4/26/2004	--	--	X	X	--	--	--	X	--	--	--	--	--	--	--
MW-0402S	NA	4/28/2004	--	--	X	X	--	X	X[1]	X	--	--	--	--	--	--	--
MW-0403S	NA	4/28/2004	--	--	X	X	--	X	X[1]	X	X	--	--	--	--	--	--
MW-0404D	NA	4/29/2004	--	--	X	X	--	X	X[1]	X	--	--	--	--	--	--	--
MW-0404S	NA	4/29/2004	--	--	X	X	--	X	X[1]	X	--	--	--	--	--	--	--
MW-0405S	NA	4/29/2004	--	--	X	X	--	X	X[1]	X	--	--	--	--	--	--	--
MW-05-06S	NA	6/10/2005	X	X	--	--	--	--	X[2]	X	--	--	--	--	--	--	--
MW-04S	NA	4/22/2004	--	--	X	X	--	X	X[1]	X	--	--	--	--	--	--	--
MW-06S	NA	4/22/2004	--	--	X	X	--	X	X[1]	X	X	--	--	--	--	--	--
MW-07	NA	4/22/2004	--	--	X	X	X	--	--	X	X	--	--	--	--	--	--
MW-07 (DUP)	NA	4/22/2004	--	--	X	X	X	--	--	X	X	--	--	--	--	--	--
MW-08D	NA	4/23/2004	--	--	X	X	--	--	--	X	--	--	--	--	--	--	--
MW-08S	NA	4/22/2004	--	--	X	X	--	X	X[1]	X	--	--	--	--	--	--	--
MW-09D	NA	4/23/2004	--	--	X	X	--	--	--	X	--	--	--	--	--	--	--
MW-09S	NA	4/27/2004	--	--	X	X	X	--	--	X	X	--	--	--	--	--	--
MW-10S	NA	4/26/2004	--	--	X	X	--	--	--	X	X	--	--	--	--	--	--
MW-11S	NA	4/29/2004	--	--	X	X	--	X	X[1]	X	--	--	--	--	--	--	--
MW-12D	NA	4/21/2004	--	--	X	X	--	--	--	X	--	--	--	--	--	--	--
MW-12S	NA	4/21/2004	--	--	X	X	--	X	X[1]	X	--	--	--	--	--	--	--
NMW-0401S	NA	4/28/2004	--	--	X	X	--	X	X[1]	X	--	--	--	--	X	--	--
NMW-0401S (DUP)	NA	4/28/2004	--	--	X	X	--	--	--	--	--	--	--	--	X	--	--
NMW-0402S	NA	4/29/2004	--	--	X	X	--	X	X[1]	X	--	--	--	--	X	--	--
NMW-0403S	NA	4/29/2004	--	--	X	X	--	X	X[1]	X	--	--	--	--	X	--	--
TMW-01	NA	4/26/2004	--	--	X	X	--	--	--	X	--	--	--	--	--	--	--
TMW-02	NA	4/26/2004	--	--	X	X	--	--	--	X	--	--	--	--	--	--	--
TW-0401S	NA	3/9/2004	X	X	--	--	--	--	X[2]	--	--	--	X	--	--	--	--
TW-0402S	NA	3/9/2004	X	X	--	--	--	--	X[2]	--	--	--	X	--	--	--	--
TW-0403S	NA	3/9/2004	X	X	--	--	--	--	X[2]	--	--	--	X	--	--	--	--
Soil																	
MANHOLE	NA	4/28/2004	X	X	--	--	X	--	--	--	--	--	--	--	--	--	--
MW-0304D	(2 - 4')	10/8/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
NMW-0403	(6.8 - 9.0')	3/22/2004	--	--	--	--	--	--	--	--	--	X	--	--	--	--	--
NMW-0403	(12 - 15')	3/22/2004	--	--	--	--	--	--	--	--	--	--	--	X	--	--	--
PIPE	NA	2/27/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-201	(10 - 12')	9/30/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	X	--
SB-201	(16 - 18')	9/30/2003	X	X	--	--	X	--	--	X	--	--	--	X	--	--	--
SB-202	(22 - 24')	9/26/2003	X	X	--	--	--	--	--	X	X	--	X	--	--	--	--
SB-203	(8 - 10')	9/24/2003	--	--	--	--	--	--	--	X	X	--	--	--	--	--	--
SB-203	(24 - 26')	9/24/2003	X	X	--	--	--	--	--	X	--	--	X	--	--	--	--
SB-203	(62 - 64')	9/24/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	X	--
SB-204	(12 - 14')	9/29/2003	X	X	--	--	X	--	--	X	--	--	--	X	--	--	--
SB-204	(26 - 28')	9/29/2003	X	X	--	--	X	--	--	X	--	--	--	X	--	--	--
SB-205	(6 - 8')	9/30/2003	X	X	--	--	X	--	--	X	--	--	--	X	--	--	--
SB-205	(16 - 18')	9/30/2003	X	X	--	--	--	--	--	X	X	--	--	--	--	--	--
SB-206	(4 - 6')	9/23/2003	X	X	--	--	--	--	--	X	X	X	--	--	--	--	--
SB-206	(14 - 16')	9/23/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-206	(24 - 26')	9/23/2003	X	X	--	--	--	--	--	X	X	--	--	--	--	--	--

See Notes on Page 3.

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Location ID	Sample Depth	Date Sampled	BTEX	PAHs	VOCs	SVOCs	PCBs	Geochemistry	Inorganics	Total Cyanide	Total Metal & Free Cyanide	Waste Characterization	TOC	DRO	PLFA	Grain Size	Vertical Hydraulic Conductivity
Soil (Cont'd.)																	
SB-206	(40 - 42')	9/23/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-207	(30 - 32')	9/22/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-208	(10 - 11')	9/18/2003	X	X	--	--	--	--	--	X	--	X	--	--	--	--	--
SB-208	(14 - 14.5')	9/18/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-208	(15 - 17')	9/18/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	X	--
SB-208	(28 - 29.7')	9/18/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	X	--
SB-208	(35 - 36.5')	9/18/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	X	--
SB-209	(2.7 - 3.5')	9/19/2003	--	--	--	--	--	--	--	X	X	--	--	--	--	--	--
SB-209	(6 - 7')	9/19/2003	--	--	--	--	--	--	--	X	X	--	--	--	--	--	--
SB-209	(22 - 23.4')	9/19/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-210	(28.5 - 29.3')	9/17/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-210	(38 - 39.5')	9/17/2003	X	X	--	--	--	--	--	X	X	--	--	--	--	X	--
SB-211	(6 - 8')	9/11/2003	X	X	--	--	--	--	--	X	X	--	--	--	--	--	--
SB-211	(20 - 22')	9/11/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-212	(32 - 33.2')	2/17/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-212	(42 - 45.2')	2/17/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-213	(26 - 26.8')	2/16/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-213 (DUP)	(26 - 26.8')	2/16/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-213	(30 - 31.3')	2/16/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-214	(6 - 8')	10/6/2003	X	X	--	--	--	--	--	--	--	--	--	--	--	--	--
SB-214	(6 - 8')	10/7/2003	--	--	--	--	--	--	--	X	--	X	--	--	--	--	--
SB-214 (DUP)	(6 - 8')	10/6/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-214	(10 - 12')	10/6/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-215	(4 - 6')	9/9/2003	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-215	(8 - 10')	9/9/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-216	(16 - 17.4')	9/16/2003	--	--	--	--	--	--	--	--	--	--	X	--	--	--	--
SB-216	(34 - 36.4')	9/16/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-216	(40 - 41.6')	9/16/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	X	--
SB-216	(42 - 44')	9/16/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X
SB-217	(14 - 16')	9/10/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-217	(18 - 20')	9/10/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-218	(2 - 4')	10/1/2003	--	--	--	--	--	--	--	--	--	X	--	--	--	--	--
SB-218	(22 - 24')	10/1/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-218	(32 - 34')	10/1/2003	X	X	--	--	--	--	--	--	--	--	--	--	--	X	--
SB-219	(4 - 6')	10/1/2003	--	--	--	--	--	--	--	--	--	X	--	--	--	--	--
SB-220	(0 - 2')	10/2/2003	--	--	--	--	--	--	--	--	--	X	--	--	--	--	--
SB-221	(16 - 18')	10/2/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-222	(4 - 6')	10/2/2003	X	X	--	--	--	--	--	X	X	--	--	--	--	--	--
SB-222	(8 - 10')	10/2/2003	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-223	(20 - 21.3')	3/15/2004	X	X	--	--	--	--	--	X	--	X	--	--	--	--	--
SB-223	(36 - 38.6')	3/16/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-224	(28 - 28.8')	3/11/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-224	(40 - 41')	3/12/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-225	(20 - 21.2')	3/9/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-226	(48 - 49.5')	3/8/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-226	(52 - 54.4')	3/8/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-227	(2.0 - 2.3')	2/19/2004	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-227	(8 - 10.5')	2/19/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-227	(34 - 35.2')	2/19/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-228	(12 - 13.3')	2/18/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-228	(36 - 36.9')	2/19/2004	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-228	(36 - 39')	2/19/2004	X	X	--	--	--	--	--	--	--	--	--	--	--	--	--
SB-229	(30.0 - 31.6')	3/1/2004	X	X	--	--	--	--	--	--	--	--	--	--	--	--	--
SB-230	(24.0 - 27.1')	3/3/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-233	(12.0 - 13.0')	3/5/2004	X	X	--	--	X	--	--	--	--	--	--	X	--	--	--
SB-234	(12.0 - 15.4')	3/5/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--

See Notes on Page 3.

TABLE 1
SAMPLE SUMMARY

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Location ID	Sample Depth	Date Sampled	BTEX	PAHs	VOCs	SVOCs	PCBs	Geochemistry	Inorganics	Total Cyanide	Total Metal & Free Cyanide	Waste Characterization	TOC	DRO	PLFA	Grain Size	Vertical Hydraulic Conductivity
Soil (Cont'd.)																	
SB-235	(12.0 - 14.9')	3/4/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-236	(18 - 19.8')	3/17/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-237	(38 - 39.1')	3/25/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-237	(84 - 86.1')	3/30/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-239	(66 - 68.6')	4/1/2004	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-240	(22 - 25.7')	4/1/2004	--	X	--	--	--	--	--	--	--	--	--	X	--	--	--
SB-240 (DUP)	(22 - 25.7')	4/1/2004	--	X	--	--	--	--	--	--	--	--	--	X	--	--	--
SB-242	(8 - 10.7')	4/2/2004	--	X	--	--	--	--	--	--	--	--	--	X	--	--	--
SB-243	(13.3 - 15')	4/5/2004	--	X	--	--	--	--	--	--	--	--	--	X	--	--	--
SB-244	(20 - 20.1')	5/23/2005	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-245	(16 - 18.5')	5/25/2005	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-246	(12 - 13.8')	5/25/2005	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
SB-247	(20 - 21.3')	5/25/2005	X	X	--	--	--	--	--	X	--	--	--	--	--	--	--
TP-204	(12.0')	2/24/2004	--	X	--	--	X	--	--	--	--	--	--	X	--	--	--
TP-204 (DUP)	(12.0')	2/24/2004	--	X	--	--	X	--	--	--	--	--	--	X	--	--	--
TP-206	(11.5')	2/25/2004	--	X	--	--	X	--	--	--	--	--	--	X	--	--	--
TP-207	(13.0')	2/25/2004	--	X	--	--	X	--	--	--	--	--	--	X	--	--	--
TP-208	(9.5')	2/25/2004	--	X	--	--	X	--	--	--	--	--	--	X	--	--	--
TP-209	(10.5')	2/25/2004	--	X	--	--	--	--	--	--	--	--	--	X	--	--	--
TP-210	(9.0')	2/26/2004	--	X	--	--	--	--	--	--	--	--	--	X	--	--	--
TP-211	(9.5')	2/26/2004	--	X	--	--	--	--	--	--	--	--	--	X	--	--	--
TP-212	(12.5')	2/26/2004	--	X	--	--	--	--	--	--	--	--	--	X	--	--	--
TP-213	(10.5')	2/26/2004	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--
TP-214	(11.0')	2/26/2004	--	X	--	--	--	--	--	--	--	--	--	X	--	--	--
TP-215	(8.0')	2/26/2004	--	X	--	--	--	--	--	--	--	--	--	X	--	--	--
TW-0401S	(12.0 - 16.0')	3/3/2004	--	--	--	--	--	--	--	--	--	--	X	--	--	--	--
TW-0402S	(19.0 - 23.0')	3/4/2004	--	--	--	--	--	--	--	--	--	--	X	--	--	--	--
TW-0403S	(16.0 - 17.5')	3/5/2004	--	--	--	--	--	--	--	--	--	--	X	--	--	--	--
Surface Soil																	
SS-201	(0 - 0.5')	4/6/2004	--	--	X	X	--	--	X	X	--	--	--	--	--	--	--
SS-202	(0 - 0.5')	4/6/2004	--	--	X	X	--	--	X	X	--	--	--	--	--	--	--
SS-203	(0 - 0.5')	4/6/2004	--	--	X	X	--	--	X	X	--	--	--	--	--	--	--
SS-204	(0 - 0.5')	4/6/2004	--	--	X	X	--	--	X	X	--	--	--	--	--	--	--
SS-205	(0 - 0.5')	4/6/2004	--	--	X	X	--	--	X	X	--	--	--	--	--	--	--
SS-206	(0 - 0.5')	4/6/2004	--	--	X	X	--	--	X	X	--	--	--	--	--	--	--
SS-206 (DUP)	(0 - 0.5')	4/6/2004	--	--	X	X	--	--	X	X	--	--	--	--	--	--	--
SS-207	(0 - 0.5')	4/6/2004	--	--	X	X	--	--	X	X	--	--	--	--	--	--	--
SS-208	(0 - 0.5')	4/6/2004	--	--	X	X	--	--	X	X	--	--	--	--	--	--	--
SS-209	(0 - 0.5')	4/6/2004	--	--	X	X	--	--	X	X	--	--	--	--	--	--	--
SS-210	(0 - 0.5')	4/6/2004	--	--	X	X	--	--	X	X	--	--	--	--	--	--	--
SS-211	(0 - 0.5')	4/6/2004	--	--	X	X	--	--	X	X	--	--	--	--	--	--	--
SS-212	(0 - 0.5')	4/6/2004	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--
SS-213	(0 - 0.5')	4/6/2004	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--

Notes:
-- = Not analyzed.
BTEX = Benzene, toluene, ethylbenzene, and total xylenes by USEPA Method 8260B
DRO = Diesel Range Organics.
Geochemistry = Orthophosphate, ammonia, nitrate, sulfate, alkalinity, and methane
Inorganics = TAL Metals.
NA = Not available/not applicable.
PAHs = Polycyclic aromatic hydrocarbons by USEPA Method 8270C
SVOCs = Semivolatile Organic Compounds by USEPA Method 8270B.
TOC = Total organic carbon.
VOCs = Volatile Organic Compounds by USEPA Method 8260B.
Waste Characterization = TCLP Benzene, ignitability, reactive cyanide, reactive sulfide, and total sulfur.
X^1 = Iron, Manganese.
X^2 = Total cyanide.

TABLE 2
SUBSURFACE SOIL ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	PIPE	PIPE-100	MANHOLE	MW-0304D	NMW-0403S	NMW-0403S	SB-201	SB-202	SB-203	SB-204	SB-204	SB-205	SB-205	SB-206
Sample Depth				(2 - 4')	(6.8 - 9.0')	(12 - 15')	(16 - 18')	(22 - 24')	(24 - 26')	(12 - 14')	(26 - 28')	(6 - 8')	(16 - 18')	(4 - 6')
Sample Date	2/27/04	5/24/05	4/28/04	10/8/03	3/22/04	3/22/04	9/30/03	9/26/03	9/24/03	9/29/03	9/29/03	9/30/03	9/30/03	9/23/03
Sample Type	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
VOCs (ppm)														
Benzene	1.2 U	**1.7 J**	**0.0026**	0.0012 U	--	--	**0.0012**	**0.0032**	**0.003**	0.11 U	**0.001 J**	0.1 U	**0.0012**	**1.1**
Ethylbenzene	**0.56 J**	**12 J**	**0.0011 J**	0.0049 U	--	--	0.0043 U	0.0043 U	**0.0007 J**	**0.17 J**	0.0043 U	0.41 U	0.0042 U	**10**
Toluene	6.2 U	**19 J**	**0.0074 J**	**0.0009 J**	--	--	**0.0028 J**	**0.0072**	**0.0065**	0.54 U	**0.0028 J**	0.51 U	**0.0028 J**	**0.79**
Xylenes, Total	**8**	**160**	**0.0056 J**	0.0061 U	--	--	**0.0017 J**	**0.0054 J**	**0.0062**	**0.097 J**	**0.0025 J**	0.51 U	**0.0025 J**	**7.7**
Total BTEX	**8.56**	**192.7**	**0.0167**	**0.0009**	--	--	**0.0057**	**0.0158**	**0.0164**	**0.267**	**0.0063**	ND	**0.0065**	**19.59**
SVOCs (ppm)														
2-Methylnaphthalene	**71**	**1,700**	**0.83 J**	**0.27 J**	--	--	0.36 U	0.33 U	0.37 U	1.9 U	0.36 U	3.9 U	0.37 U	**120**
Acenaphthene	**88**	**520**	**16**	**0.18 J**	--	--	**0.013 J**	0.33 U	**0.0087 J**	**19**	**0.098 J**	3.9 U	0.37 U	**85**
Acenaphthylene	**100**	**670**	**6.4 J**	**0.11 J**	--	--	0.36 U	0.33 U	**0.0087 J**	**1.5 J**	**0.013 J**	3.9 U	0.37 U	**71**
Anthracene	**270**	**1,700**	**51**	**0.24 J**	--	--	**0.034 J**	0.33 U	**0.0083 J**	**7.4**	**0.056 J**	3.9 U	**0.0091 J**	**78**
Benzo(a)anthracene	**210**	**940**	**39**	**0.28**	--	--	**0.063**	0.033 U	**0.011 J**	**4.9**	**0.036 J**	0.39 U	0.037 U	**76**
Benzo(a)pyrene	**170**	**690**	**33**	**0.45**	--	--	**0.054**	0.033 U	**0.011 J**	**6**	**0.047**	0.39 U	0.037 U	**100**
Benzo(b)fluoranthene	**120**	**460**	**26**	**0.28**	--	--	**0.038**	0.033 U	**0.0077 J**	**2.7**	**0.017 J**	0.39 U	0.037 U	**50**
Benzo(g,h,i)perylene	**41 J**	**300 J**	**12 J**	**0.35 J**	--	--	**0.026 J**	0.33 U	**0.0086 J**	**3.1**	0.36 U	3.9 U	0.37 U	**88**
Benzo(k)fluoranthene	**180**	**650**	**38**	**0.41**	--	--	**0.052**	0.033 U	**0.0098 J**	**3.9**	**0.024 J**	0.39 U	0.037 UJ	**66**
Chrysene	**180**	**840**	**44**	**0.27 J**	--	--	**0.061 J**	0.33 U	**0.012 J**	**4.8**	**0.034 J**	3.9 U	0.37 U	**96**
Dibenz(a,h)anthracene	**21**	**130**	**4.4 J**	**0.12**	--	--	0.036 U	0.033 U	0.037 U	**0.62**	0.036 U	0.39 U	0.037 U	**13**
Fluoranthene	**520**	**2,400**	**170**	**0.32 J**	--	--	**0.14 J**	0.33 U	**0.019 J**	**12**	**0.084 J**	**0.27 J**	**0.016 J**	**210**
Fluorene	**190**	**1,400**	**21**	**0.71**	--	--	**0.014 J**	0.33 U	0.37 U	**6.8**	**0.041 J**	**0.18 J**	0.37 U	**71**
Indeno(1,2,3-cd)pyrene	**55 J**	**330**	**11 J**	**0.34**	--	--	**0.026 J**	0.033 U	0.037 U	**2.2**	0.036 U	0.39 U	0.037 U	**54**
Naphthalene	**210**	**5,800**	**1.1 J**	**0.24 J**	--	--	0.36 U	0.33 U	0.37 U	**0.28 J**	**0.01 J**	3.9 U	**0.015 J**	**250**
Phenanthrene	**620**	**4,000**	**160**	**0.99**	--	--	**0.07 J**	0.33 U	**0.039 J**	**38**	**0.26 J**	**0.61 J**	0.37 U	**660**
Pyrene	**350**	**1,800**	**120**	**0.32 J**	--	--	**0.11 J**	0.33 U	**0.046 J**	**24**	**0.19 J**	**0.3 J**	**0.026 J**	**370**
Total PAHs	**3,396**	**24,330**	**753.73**	**5.88**	--	--	**0.701**	ND	**0.1898**	**137.2**	**0.91**	**1.36**	**0.0661**	**2,458**
PCBs (ppm)														
Aroclor-1016	--	--	0.15 U	--	--	--	0.073 U	--	--	0.076 U	0.073 U	0.079 U	--	--
Aroclor-1221	--	--	0.15 U	--	--	--	0.073 U	--	--	0.076 U	0.073 U	0.079 U	--	--
Aroclor-1232	--	--	0.15 U	--	--	--	0.073 U	--	--	0.076 U	0.073 U	0.079 U	--	--
Aroclor-1242	--	--	0.15 U	--	--	--	0.073 U	--	--	0.076 U	0.073 U	0.079 U	--	--
Aroclor-1248	--	--	0.15 U	--	--	--	0.073 U	--	--	0.076 U	0.073 U	0.079 U	--	--
Aroclor-1254	--	--	0.15 U	--	--	--	0.073 U	--	--	0.076 U	0.073 U	0.079 U	--	--
Aroclor-1260	--	--	**0.42**	--	--	--	0.073 U	--	--	0.076 U	0.073 U	0.079 U	--	--
Aroclor-1262	--	--	0.15 U	--	--	--	0.073 U	--	--	0.076 U	0.073 U	0.079 U	--	--
Aroclor-1268	--	--	0.15 U	--	--	--	0.073 U	--	--	0.076 U	0.073 U	0.079 U	--	--
Inorganics (ppm)		--												
Cyanide, Total	--	--	**2.1**	--	--	--	--	--	--	--	--	--	--	--
Sulfur	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.21**
Misc. Parameters		--												
TCLP Benzene	--	--	--	--	**0.0089**	--	--	--	--	--	--	--	--	**0.023**
Percent Sulfur (%)	--	--	--	--	**0.027**	--	--	--	--	--	--	--	--	--
Reactive Cyanide	--	--	--	--	25 U	--	--	--	--	--	--	--	--	25 UJ
Reactive Sulfide	--	--	--	--	**112 J**	--	--	--	--	--	--	--	--	20 U
Total Organic Carbon	--	--	--	--	--	--	--	**3,820**	**8,730**	--	--	--	--	--
Total Diesel Range Organics	--	--	--	--	--	**2,520**	7.3 U	--	--	**3,080**	**10.8**	**4,110**	--	--

See Notes on Page 8.

TABLE 2
SUBSURFACE SOIL ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**SB-206**	**SB-206**	**SB-206**	**SB-207**	**SB-208**	**SB-208**	**SB-209**	**SB-210**	**SB-210**	**SB-211**	**SB-211**	**SB-212**	**SB-212**	**SB-213**
Sample Depth	**(14 - 16')**	**(24 - 26')**	**(40 - 42')**	**(30 - 32')**	**(10 - 11')**	**(14 - 14.5')**	**(22 - 23.4')**	**(28.5 - 29.3')**	**(38 - 39.5')**	**(6 - 8')**	**(20 - 22')**	**(32 - 33.2')**	**(42 - 45.2')**	**(26 - 26.8')**
Sample Date	**9/23/03**	**9/23/03**	**9/23/03**	**9/22/03**	**9/18/03**	**9/18/03**	**9/19/03**	**9/17/03**	**9/17/03**	**9/11/03**	**9/11/03**	**2/17/04**	**2/17/04**	**2/16/04**
Sample Type	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
VOCs (ppm)														
Benzene	**0.1 J**	**0.0045 J**	0.0013 U	**0.0011 J**	0.12 U	**0.0038**	**0.0027**	**0.06 J**	**0.0017**	**0.0072**	**0.0008 J**	**0.061 J**	**0.003**	0.11 U
Ethylbenzene	**6.5**	**0.012**	0.0052 U	0.005 U	0.47 U	**0.0012 J**	0.0043 U	**14**	**0.0024 J**	**0.0008 J**	0.0045 U	**1**	**0.0054**	**4.1**
Toluene	**0.088 J**	**0.012 J**	0.0064 U	**0.0015 J**	0.58 U	**0.0096**	**0.004 J**	**0.34 J**	**0.0039 J**	0.006 U	0.0056 U	0.54 U	**0.0044 J**	**0.22 J**
Xylenes, Total	**3.9**	**0.02**	R	0.0063 U	0.58 U	**0.01**	**0.0017 J**	**11**	**0.0058**	**0.0031 J**	0.0056 U	**0.56**	**0.0047 J**	**4.8**
Total BTEX	**10.588**	**0.0485**	ND	**0.0026**	ND	**0.0246**	**0.0084**	**25.4**	**0.0138**	**0.0111**	**0.0008**	**1.621**	**0.0175**	**9.12**
SVOCs (ppm)														
2-Methylnaphthalene	**100**	**0.48**	0.043 U	0.44 U	2 U	0.38 U	0.37 U	**180**	**0.53**	**0.063 J**	**0.019 J**	**31**	**1.6**	**130**
Acenaphthene	**60**	**0.61**	**0.032 J**	0.44 U	**16**	**0.15 J**	0.37 U	**130**	**0.38**	**0.024 J**	**0.49**	**36**	**1.7**	**40**
Acenaphthylene	**22**	**0.26 J**	**0.014 J**	0.44 U	**1.7 J**	**0.02 J**	0.37 U	**20**	**0.095 J**	**0.046 J**	**0.12 J**	**5**	**0.39**	**68**
Anthracene	**36**	**0.63**	**0.026 J**	0.44 U	**11**	**0.1 J**	0.37 U	**81**	**0.34 J**	**0.061 J**	**0.02 J**	**16**	**0.75**	**40**
Benzo(a)anthracene	**18**	**0.56**	**0.024 J**	0.044 U	**6.3**	**0.067**	**0.021 J**	**34**	**0.18**	**0.12**	**0.043**	**9.2**	**0.44**	**22**
Benzo(a)pyrene	**16**	**0.63**	**0.025 J**	0.044 U	**6.8**	**0.086**	**0.045**	**26**	**0.18**	**0.17**	**0.054**	**9.4**	**0.42**	**18**
Benzo(b)fluoranthene	**5.6**	**0.3**	**0.014 J**	0.044 U	**2.6**	**0.034 J**	0.037 U	**9.6**	**0.074**	**0.12**	**0.044**	**3.5**	**0.15**	**7.7**
Benzo(g,h,i)perylene	**8.4 J**	**0.35 J**	**0.017 J**	0.44 U	**3.9**	**0.048 J**	**0.037 J**	**10 J**	**0.062 J**	**0.094 J**	0.38 U	**4.7**	**0.2 J**	**7.7 J**
Benzo(k)fluoranthene	**9.8**	**0.42**	**0.02 J**	0.044 U	**4.8**	**0.057**	0.037 U	**18**	**0.12**	**0.16**	**0.05**	**6.2**	**0.27**	**11**
Chrysene	**17 J**	**0.56**	**0.03 J**	0.44 U	**6**	**0.067 J**	**0.02 J**	**30**	**0.16 J**	**0.12 J**	**0.038 J**	**8.7**	**0.38**	**18 J**
Dibenz(a,h)anthracene	**2**	**0.022 J**	0.043 U	0.044 U	**0.25**	0.038 U	0.037 U	**2.6**	**0.022 J**	**0.021 J**	0.038 U	**0.92**	**0.053**	**1.8 J**
Fluoranthene	**36**	**1.1**	**0.044 J**	0.44 U	**14**	**0.15 J**	**0.021 J**	**77**	**0.35 J**	**0.25 J**	**0.075 J**	**18**	**0.85**	**37**
Fluorene	**34**	**0.46**	**0.028 J**	0.44 U	**6.7**	**0.062 J**	0.37 U	**75**	**0.24 J**	**0.034 J**	**0.021 J**	**15**	**0.73**	**42**
Indeno(1,2,3-cd)pyrene	**5.7**	**0.24**	**0.012 J**	0.044 U	**2.8**	**0.033 J**	**0.029 J**	**7.6**	**0.053**	**0.092**	0.038 U	**3.6**	**0.13**	**5.8**
Naphthalene	**250**	**0.66**	**0.087 J**	0.44 U	**0.19 J**	0.38 U	0.37 U	**220**	**0.58**	**0.25 J**	**0.085 J**	**56**	**2.2**	**200**
Phenanthrene	**140**	**2.5**	**0.12 J**	0.44 U	**25**	**0.23 J**	0.37 U	**240**	**1**	**0.17 J**	**0.044 J**	**55**	**2.7**	**130**
Pyrene	**63**	**2**	**0.084 J**	0.44 U	**20**	**0.26 J**	**0.023 J**	**110**	**0.54**	**0.34 J**	**0.097 J**	**29**	**1.4**	**61**
Total PAHs	**823.5**	**11.782**	**0.577**	ND	**128.04**	**1.364**	**0.196**	**1,270.8**	**4.906**	**2.135**	**1.2**	**307.22**	**14.363**	**840**
PCBs (ppm)														
Aroclor-1016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1221	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1232	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1242	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1248	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1254	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1260	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1262	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1268	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics (ppm)														
Cyanide, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	--	--	--	--	**0.041**	--	--	--	--	--	--	--	--	--
Misc. Parameters														
TCLP Benzene	--	--	--	--	0.001 U	--	--	--	--	--	--	--	--	--
Percent Sulfur (%)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Reactive Cyanide	--	--	--	--	25 UJ	--	--	--	--	--	--	--	--	--
Reactive Sulfide	--	--	--	--	**77.5**	--	--	--	--	--	--	--	--	--
Total Organic Carbon	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Diesel Range Organics	--	--	--	--	--	--	--	--	--	--	--	--	--	--

See Notes on Page 8.

TABLE 2
SUBSURFACE SOIL ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**SB-213**	**SB-213**	**SB-214**	**SB-214**	**SB-214**	**SB-215**	**SB-216**	**SB-216**	**SB-217**	**SB-217**	**SB-218**	**SB-218**	**SB-218**	**SB-219**
Sample Depth	**(26 - 26.8')**	**(30 - 31.3')**	**(6 - 8')**	**(6 - 8')**	**(10 - 12')**	**(8 - 10')**	**(16 - 17.4')**	**(34 - 36.4')**	**(14 - 16')**	**(18 - 20')**	**(2 - 4')**	**(22 - 24')**	**(32 - 34')**	**(4 - 6')**
Sample Date	**2/16/04**	**2/16/04**	**10/6/03**	**10/6/03**	**10/6/03**	**9/9/03**	**9/16/03**	**9/16/03**	**9/10/03**	**9/10/03**	**10/1/03**	**10/1/03**	**10/1/03**	**10/1/03**
Sample Type	**DUP**	**FS**	**FS**	**DUP**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
VOCs (ppm)														
Benzene	0.11 U	**0.0013**	**0.7**	**0.36**	**0.0003 J**	0.0012 U	--	**0.001 J**	**0.41**	**0.15**	--	0.11 U	**0.0012**	--
Ethylbenzene	**4**	**0.0018 J**	**12**	**4**	**0.0002 J**	0.0047 U	--	0.0043 U	**5.3**	**0.0043**	--	**0.41 J**	0.0046 U	--
Toluene	**0.2 J**	**0.0084**	**6.5 J**	**1.4 J**	**0.0008 J**	0.0059 U	--	**0.0024 J**	**1.8**	**0.0078**	--	0.53 U	**0.0045 J**	--
Xylenes, Total	**4.5**	**0.0034 J**	**43 J**	**6.7 J**	**0.0009 J**	0.0059 U	--	**0.0016 J**	**7.6**	**0.0084**	--	**0.72**	**0.0038 J**	--
Total BTEX	**8.7**	**0.0149**	**62.2**	**12.46**	**0.0022**	ND	--	**0.005**	**15.11**	**0.1705**	--	**1.13**	**0.0095**	--
SVOCs (ppm)														
2-Methylnaphthalene	**100**	**1.1**	**110 J**	**18 J**	**23 J**	0.41 U	--	0.36 U	**77**	**0.24 J**	--	**1.9**	0.39 U	--
Acenaphthene	**29**	**0.62**	**49 J**	**10 J**	**3 J**	0.41 U	--	0.36 U	**74**	**0.19 J**	--	**4.3**	0.39 U	--
Acenaphthylene	**61**	**0.5**	**23 J**	**3.9 J**	**4.9 J**	0.41 U	--	0.36 U	**18 J**	**0.068 J**	--	**10**	0.39 U	--
Anthracene	**34**	**0.41**	**65 J**	**14 J**	**10 J**	0.41 U	--	0.36 U	**46**	**0.16 J**	--	**15**	0.39 U	--
Benzo(a)anthracene	**21**	**0.25**	**62 J**	**13 J**	**9.1 J**	0.041 U	--	0.036 U	**29**	**0.073**	--	**15**	0.039 U	--
Benzo(a)pyrene	**14**	**0.18**	**56 J**	**12 J**	**8.7 J**	**0.021 J**	--	0.036 U	**30**	**0.071**	--	**13**	0.039 U	--
Benzo(b)fluoranthene	**5.7**	**0.075**	**38 J**	**9.5 J**	**5.9 J**	**0.015 J**	--	0.036 U	**14**	**0.033 J**	--	**9.1**	0.039 U	--
Benzo(g,h,i)perylene	**5.9 J**	**0.071 J**	**29 J**	**7.2 J**	**4.6 J**	0.41 U	--	0.36 U	**11 J**	**0.035 J**	--	**4.6**	**0.0045 J**	--
Benzo(k)fluoranthene	**9.4**	**0.11**	**47 J**	**10 J**	**7.3 J**	**0.014 J**	--	0.036 U	**23**	**0.055**	--	**13 J**	0.039 U	--
Chrysene	**16**	**0.19 J**	**56 J**	**13 J**	**9.1 J**	0.41 U	--	0.36 U	**26**	**0.079 J**	--	**11**	0.39 U	--
Dibenz(a,h)anthracene	**0.68 J**	**0.016 J**	**8.4 J**	**2.5 J**	**1.8 J**	0.041 U	--	0.036 U	2 U	0.036 U	--	**1.8**	0.039 U	--
Fluoranthene	**30**	**0.41**	**130 J**	**27 J**	**18 J**	0.41 U	--	0.36 U	**59**	**0.2 J**	--	**29**	0.39 U	--
Fluorene	**38**	**0.45**	**58 J**	**13 J**	**7.8 J**	0.41 U	--	0.36 U	**40**	**0.15 J**	--	**16**	0.39 U	--
Indeno(1,2,3-cd)pyrene	**4.5**	**0.057**	**28 J**	**6.7 J**	**4 J**	0.041 U	--	0.036 U	**10**	**0.028 J**	--	**5.2**	0.039 U	--
Naphthalene	**200**	**1.5**	**880 J**	**72 J**	**100 J**	0.41 U	--	0.36 U	**270**	**1.7**	--	**12**	0.39 U	--
Phenanthrene	**110**	**1.4**	**210 J**	**41 J**	**34 J**	0.41 U	--	0.36 U	**170**	**0.59**	--	**43**	**0.0089 J**	--
Pyrene	**47**	**0.61**	**120 J**	**26 J**	**19 J**	**0.02 J**	--	0.36 U	**93**	**0.28 J**	--	**29**	0.39 U	--
Total PAHs	**726.18**	**7.949**	**1969.4**	**298.8**	**270.2**	**0.07**	--	ND	**990**	**3.952**	--	**232.9**	**0.0134**	--
PCBs (ppm)														
Aroclor-1016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1221	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1232	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1242	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1248	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1254	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1260	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1262	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1268	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics (ppm)														
Cyanide, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	--	--	**0.037**	--	--	--	--	--	--	--	**0.76**	--	--	**0.16**
Misc. Parameters														
TCLP Benzene	--	--	**0.0062**	--	--	--	--	--	--	--	0.001 U	--	--	0.001 U
Percent Sulfur (%)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Reactive Cyanide	--	--	25 UJ	--	--	--	--	--	--	--	25 UJ	--	--	25 UJ
Reactive Sulfide	--	--	20 U	--	--	--	--	--	--	--	20 U	--	--	20 U
Total Organic Carbon	--	--	--	--	--	--	**640**	--	--	--	--	--	--	--
Total Diesel Range Organics	--	--	--	--	--	--	--	--	--	--	--	--	--	--

See Notes on Page 8.

TABLE 2
SUBSURFACE SOIL ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**SB-220**	**SB-221**	**SB-222**	**SB-222**	**SB-223**	**SB-223**	**SB-224**	**SB-224**	**SB-225**	**SB-226**	**SB-226**	**SB-227**	**SB-227**	**SB-228**
Sample Depth	**(0 - 2')**	**(16 - 18')**	**(4 - 6')**	**(8 - 10')**	**(20 - 21.3')**	**(36 - 38.6')**	**(28 - 28.8')**	**(40 - 41')**	**(20 - 21.2')**	**(48 - 49.5')**	**(52 - 54.4')**	**(8 - 10.5')**	**(34 - 35.2')**	**(12 - 13.3')**
Sample Date	**10/2/03**	**10/2/03**	**10/2/03**	**10/2/03**	**3/15/04**	**3/16/04**	**3/11/04**	**3/12/04**	**3/9/04**	**3/8/04**	**3/8/04**	**2/19/04**	**2/19/04**	**2/18/04**
Sample Type	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
VOCs (ppm)														
Benzene	--	**0.0016**	0.12 U	0.0011 U	**0.11**	**0.026**	**0.23**	**0.17**	**0.27**	**3.9**	**0.0035**	0.0012 U	0.0012 U	**0.0015**
Ethylbenzene	--	0.0044 U	0.48 U	0.0046 U	**5.9**	**0.14**	**5.2**	**5.6**	**2.7**	**44**	**0.011**	0.0047 U	0.0048 U	**0.0006 J**
Toluene	--	**0.0039 J**	0.6 U	0.0057 U	**1.4**	**0.037**	**0.39 J**	**1.1**	**0.17 J**	**18**	**0.011**	0.0059 U	**0.013**	**0.0062**
Xylenes, Total	--	**0.0035 J**	0.6 U	0.0057 U	**4.8**	**0.067**	**4.5**	**5.5**	**2.2**	**36**	**0.012**	**0.0013 J**	**0.0014 J**	**0.0061**
Total BTEX	--	**0.009**	ND	ND	**12.21**	**0.27**	**10.32**	**12.37**	**5.34**	**101.9**	**0.0375**	**0.0013**	**0.0144**	**0.0144**
SVOCs (ppm)														
2-Methylnaphthalene	--	0.37 U	0.43 U	0.4 U	**140**	**0.99**	**93**	**62**	**13**	**180**	**0.45**	**0.014 J**	0.4 U	0.39 U
Acenaphthene	--	0.37 U	**0.3 J**	0.4 U	**83**	**0.68**	**60**	**26**	**9.2**	**44**	**0.53**	**0.0084 J**	0.4 U	0.39 U
Acenaphthylene	--	0.37 U	**0.13 J**	0.4 U	**19**	**0.96**	**10**	**14**	**1.3 J**	**66**	**0.39**	**0.022 J**	0.4 U	0.39 U
Anthracene	--	**0.0088 J**	**0.65**	0.4 U	**35**	**0.14 J**	**25**	**13**	**3.8**	**35 J**	**0.43**	**0.017 J**	0.4 U	0.39 U
Benzo(a)anthracene	--	0.037 U	**0.57**	**0.07**	**19**	**0.094**	**15**	**7.2**	**2.3**	**22**	**0.28**	**0.067**	0.04 U	0.039 U
Benzo(a)pyrene	--	0.037 U	**1**	**0.19**	**16**	**0.067**	**12**	**6.7**	**2.7**	**24**	**0.3**	**0.046**	0.04 U	0.039 U
Benzo(b)fluoranthene	--	0.037 U	**0.65**	**0.13**	**6.2**	**0.025 J**	**5**	**2.5**	**1.1**	**9.8**	**0.11**	**0.039 J**	0.04 U	0.039 U
Benzo(g,h,i)perylene	--	0.37 U	**0.73**	**0.14 J**	**5.8 J**	**0.02 J**	**4.8 J**	**2.6 J**	**1.4 J**	**12 J**	**0.17 J**	0.41 U	0.4 U	0.39 U
Benzo(k)fluoranthene	--	0.037 U	**1.1**	**0.2**	**9.6**	**0.044**	**8.2 J**	**4.4**	**1.7**	**14**	**0.19**	**0.058**	0.04 U	0.039 U
Chrysene	--	0.37 U	**0.68**	**0.079 J**	**16 J**	**0.078 J**	**15**	**6 J**	**2 J**	**19 J**	**0.27 J**	**0.082 J**	0.4 U	0.39 U
Dibenz(a,h)anthracene	--	0.037 U	**0.068**	0.04 U	**1.8 J**	0.039 U	**1.3**	**0.78 J**	**0.26 J**	**2.5 J**	**0.031 J**	0.041 U	0.04 U	0.039 U
Fluoranthene	--	**0.017 J**	**1.3**	**0.05 J**	**33**	**0.14 J**	**24**	**12**	**4.7**	**42**	**0.5**	**0.088 J**	0.4 U	0.39 U
Fluorene	--	0.37 U	**0.7**	0.4 U	**41**	**0.25 J**	**28**	**14**	**3.5 J**	**38**	**0.32 J**	0.41 U	0.4 U	0.39 U
Indeno(1,2,3-cd)pyrene	--	0.037 U	**0.66**	**0.12**	**4.5**	0.039 U	**3.7**	**2.1**	**1**	**8.3**	**0.12**	**0.018 J**	0.04 U	0.039 U
Naphthalene	--	0.37 U	**0.093 J**	0.4 U	**250**	**3.6**	**160**	**120**	**28**	**390**	**0.87**	**0.021 J**	0.4 U	0.39 U
Phenanthrene	--	**0.023 J**	**0.11 J**	0.4 U	**110**	**0.51**	**77**	**48**	**15**	**140**	**1.6**	**0.055 J**	**0.026 J**	0.39 U
Pyrene	--	**0.012 J**	**1.6**	**0.057 J**	**52**	**0.23 J**	**37**	**20**	**7.6**	**71**	**0.87**	**0.098 J**	**0.014 J**	0.39 U
Total PAHs	--	**0.0608**	**10.341**	**1.036**	**841.9**	**7.828**	**579**	**361.28**	**98.56**	**1,117.6**	**7.431**	**0.6334**	**0.04**	ND
PCBs (ppm)														
Aroclor-1016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1221	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1232	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1242	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1248	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1254	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1260	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1262	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1268	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics (ppm)														
Cyanide, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	**0.13**	--	--	--	--	--	--	--	--	--	--	--	--	--
Misc. Parameters														
TCLP Benzene	0.001 U	--	--	--	**0.016**	--	--	--	--	--	--	--	--	--
Percent Sulfur (%)	--	--	--	--	**0.031**	--	--	--	--	--	--	--	--	--
Reactive Cyanide	25 UJ	--	--	--	25 UJ	--	--	--	--	--	--	--	--	--
Reactive Sulfide	20 U	--	--	--	20 U	--	--	--	--	--	--	--	--	--
Total Organic Carbon	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Diesel Range Organics	--	--	--	--	--	--	--	--	--	--	--	--	--	--

See Notes on Page 8.

TABLE 2
SUBSURFACE SOIL ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**SB-228**	**SB-229**	**SB-230**	**SB-233**	**SB-234**	**SB-235**	**SB-236**	**SB-237**	**SB-237**	**SB-239**	**SB-240**	**SB-240**	**SB-242**	**SB-243**
Sample Depth	**(36 - 39')**	**(30.0 - 31.6')**	**(24.0 - 27.1')**	**(12.0 - 13.0')**	**(12.0 - 15.4')**	**(12.0 - 14.9')**	**(18 - 19.8')**	**(38 - 39.1')**	**(84 - 86.1')**	**(66 - 68.6')**	**(22 - 25.7')**	**(22 - 25.7')**	**(8 - 10.7')**	**(13.3 - 15')**
Sample Date	**2/19/04**	**3/1/04**	**3/3/04**	**3/5/04**	**3/5/04**	**3/4/04**	**3/17/04**	**3/25/04**	**3/30/04**	**4/1/04**	**4/1/04**	**4/1/04**	**4/2/04**	**4/5/04**
Sample Type	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**DUP**	**FS**	**FS**
VOCs (ppm)														
Benzene	**0.0007 J**	**0.0005 J**	0.0011 U	--	0.0011 U	0.0011 U	**0.0005 J**	0.0011 U	0.0012 U	0.0011 U	--	--	--	--
Ethylbenzene	0.0051 U	**0.0073**	0.0044 U	--	0.0044 U	0.0043 U	0.0042 U	0.0043 U	**0.0008 J**	0.0046 U	--	--	--	--
Toluene	**0.0029 J**	**0.023**	**0.0033 J**	--	**0.0037 J**	**0.0039 J**	**0.0017 J**	**0.0012 J**	**0.03**	**0.0068**	--	--	--	--
Xylenes, Total	**0.0013 J**	**0.012**	0.0055 U	--	0.0055 U	0.0054 U	**0.001 J**	0.0054 U	**0.0013 J**	0.0057 U	--	--	--	--
Total BTEX	**0.0049**	**0.0428**	**0.0033**	--	**0.0037**	**0.0039**	**0.0032**	**0.0012**	**0.0321**	**0.0068**	--	--	--	--
SVOCs (ppm)														
2-Methylnaphthalene	0.44 U	**0.19 J**	**0.097 J**	0.39 U	0.38 U	0.37 U	**0.014 J**	0.38 U	0.4 U	0.38 U	0.37 U	0.37 U	**0.025 J**	**0.014 J**
Acenaphthene	0.44 U	**0.1 J**	**0.24 J**	**8.5**	0.38 U	**0.074 J**	**0.015 J**	0.38 U	0.4 U	0.38 U	0.37 U	0.37 U	0.39 U	**0.031 J**
Acenaphthylene	0.44 U	**0.075 J**	**0.077 J**	**0.86**	**0.023 J**	**0.1 J**	0.37 U	0.38 U	0.4 U	0.38 U	0.37 U	0.37 U	0.39 U	0.41 U
Anthracene	0.44 U	**0.16 J**	**0.24 J**	**3.8**	0.38 U	**0.1 J**	**0.051 J**	0.38 U	0.4 U	0.38 U	0.37 U	0.37 U	0.39 U	**0.043 J**
Benzo(a)anthracene	0.044 U	**0.11**	**0.15**	**2.5**	**0.031 J**	**0.072**	**0.048**	0.038 U	0.04 U	0.038 U	0.037 U	0.037 U	**0.063**	**0.077**
Benzo(a)pyrene	0.044 U	**0.1**	**0.13**	**2**	**0.038 J**	**0.084**	**0.039**	0.038 U	0.04 U	0.038 U	0.037 U	0.037 U	**0.051**	**0.076**
Benzo(b)fluoranthene	0.044 U	**0.042**	**0.055**	**1.1**	**0.025 J**	**0.044**	**0.032 J**	0.038 U	0.04 U	0.038 U	0.037 U	0.037 U	**0.045**	**0.064**
Benzo(g,h,i)perylene	0.44 U	**0.055 J**	**0.059 J**	**0.84**	0.38 U	**0.12 J**	**0.026 J**	0.38 U	0.4 U	0.38 U	0.37 U	0.37 U	0.39 U	**0.054 J**
Benzo(k)fluoranthene	0.044 U	**0.071**	**0.08**	**1.5**	**0.032 J**	**0.055**	**0.036 J**	0.038 U	0.04 U	0.038 U	0.037 U	0.037 U	**0.05**	**0.073**
Chrysene	0.44 U	**0.1 J**	**0.13 J**	**2.3**	**0.037 J**	**0.073 J**	**0.055 J**	0.38 U	0.4 U	0.38 U	0.37 U	0.37 U	**0.13 J**	**0.083 J**
Dibenz(a,h)anthracene	0.044 U	0.038 U	0.037 U	**0.18**	0.038 U	0.037 U	0.037 U	0.038 U	0.04 U	0.038 U	0.037 U	0.037 U	0.039 U	**0.018 J**
Fluoranthene	0.44 U	**0.23 J**	**0.3 J**	**5.5**	**0.06 J**	**0.16 J**	**0.2 J**	0.38 U	0.4 U	0.38 U	**0.013 J**	0.37 U	**0.2 J**	**0.19 J**
Fluorene	0.44 U	**0.14 J**	**0.17 J**	**3.4**	0.38 U	**0.064 J**	**0.018 J**	0.38 U	0.4 U	0.38 U	0.37 U	0.37 U	0.39 U	**0.026 J**
Indeno(1,2,3-cd)pyrene	0.044 U	**0.041**	**0.038**	**0.67**	0.038 U	**0.076**	**0.02 J**	0.038 U	0.04 U	0.038 U	0.037 U	0.037 U	0.039 U	**0.044**
Naphthalene	0.44 U	**0.31 J**	**0.11 J**	0.39 U	0.38 U	0.37 U	**0.025 J**	0.38 U	0.4 U	0.38 U	0.37 U	0.37 U	**0.019 J**	**0.028 J**
Phenanthrene	0.44 U	**0.54**	**0.86**	**7.9**	**0.025 J**	**0.28 J**	**0.16 J**	0.38 U	**0.016 J**	0.38 U	**0.022 J**	0.37 U	**0.16 J**	**0.23 J**
Pyrene	0.44 U	**0.29 J**	**0.52**	**8.2**	**0.057 J**	**0.27 J**	**0.11 J**	0.38 U	**0.0084 J**	0.38 U	**0.014 J**	0.37 U	**0.24 J**	**0.18 J**
Total PAHs	ND	**2.554**	**3.256**	**49.25**	**0.328**	**1.572**	**0.849**	ND	**0.0244**	ND	**0.049**	ND	**0.983**	**1.231**
PCBs (ppm)														
Aroclor-1016	--	--	--	0.079 U	--	--	--	--	--	--	--	--	--	--
Aroclor-1221	--	--	--	0.079 U	--	--	--	--	--	--	--	--	--	--
Aroclor-1232	--	--	--	0.079 U	--	--	--	--	--	--	--	--	--	--
Aroclor-1242	--	--	--	0.079 U	--	--	--	--	--	--	--	--	--	--
Aroclor-1248	--	--	--	0.079 U	--	--	--	--	--	--	--	--	--	--
Aroclor-1254	--	--	--	0.079 U	--	--	--	--	--	--	--	--	--	--
Aroclor-1260	--	--	--	0.079 U	--	--	--	--	--	--	--	--	--	--
Aroclor-1262	--	--	--	0.079 U	--	--	--	--	--	--	--	--	--	--
Aroclor-1268	--	--	--	0.079 U	--	--	--	--	--	--	--	--	--	--
Inorganics (ppm)														
Cyanide, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Misc. Parameters														
TCLP Benzene	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Percent Sulfur (%)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Reactive Cyanide	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Reactive Sulfide	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Diesel Range Organics	--	--	--	**1,500**	--	--	--	--	--	--	0.0074 U	0.0074 U	**1.6**	**21.2**

See Notes on Page 8.

TABLE 2
SUBSURFACE SOIL ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**SB-244**	**SB-246**	**SB-247**	**SB-247**	**TP-204**	**TP-204**	**TP-206**	**TP-207**	**TP-208**	**TP-209**	**TP-210**	**TP-211**	**TP-212**	**TP-213**
Sample Depth	**(20 - 21.1')**	**(12 - 13.8")**	**(20 - 21.3')**	**(20 - 21.3')**	**(12.0')**	**(12.0')**	**(11.5')**	**(13.0')**	**(9.5')**	**(10.5')**	**(9.0')**	**(9.5')**	**(12.5')**	**(10.5')**
Sample Date	**5/25/05**	**5/25/05**	**5/25/05**	**5/25/05**	**2/24/04**	**2/24/04**	**2/25/04**	**2/25/04**	**2/25/04**	**2/25/04**	**2/26/04**	**2/26/04**	**2/26/04**	**2/26/04**
Sample Type	**FS**	**FS**	**FS**	**DUP**	**FS**	**DUP**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
VOCs (ppm)														
Benzene	0.11 U	0.0011 U	0.0011 U	0.0011 U	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	**0.16 J**	0.0046 U	0.0046 U	0.0045 U	--	--	--	--	--	--	--	--	--	--
Toluene	0.56 U	0.0057 U	0.0057 U	0.0057 U	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	**0.47 J**	**0.0019 J**	**0.0014 J**	**0.0014 J**	--	--	--	--	--	--	--	--	--	--
Total BTEX	**0.63**	**0.0019**	**0.0014**	**0.0014**	--	--	--	--	--	--	--	--	--	--
SVOCs (ppm)														
2-Methylnaphthalene	0.4 U	0.39 U	0.4 U	0.4 U	**4.7 J**	**6.2 J**	**14**	**47**	**0.17 J**	**0.054 J**	0.43 U	**2.9**	**3.9**	**0.71 J**
Acenaphthene	0.4 U	0.39 U	0.4 U	0.4 U	**74**	**83**	**82**	**67**	**0.3 J**	**0.13 J**	**0.13 J**	**12**	**1.4**	**3.5 J**
Acenaphthylene	0.4 U	0.39 U	0.4 U	0.4 U	**8.5 J**	**10 J**	**14**	**10**	**0.24 J**	2.1 U	**0.094 J**	**1.4**	**3.5**	**2.6 J**
Anthracene	0.4 U	0.39 U	0.4 U	0.4 U	**38**	**42**	**47**	**34**	**0.47 J**	**0.18 J**	**0.48**	**6.3**	**3.2**	**7.4**
Benzo(a)anthracene	0.04 U	0.039 U	0.04 U	0.04 U	**22**	**24**	**26**	**20**	**0.32**	**0.22**	**0.34**	**2.9**	**2**	**27**
Benzo(a)pyrene	0.04 U	0.039 U	0.04 U	0.04 U	**25**	**28**	**32**	**21**	**0.24**	**0.17 J**	**0.27**	**2.9**	**2.6**	**37**
Benzo(b)fluoranthene	0.04 U	0.039 U	0.04 U	0.04 U	**11**	**12**	**13**	**8.5**	**0.18**	**0.2 J**	**0.19**	**1.5**	**1.4**	**31**
Benzo(g,h,i)perylene	0.4 U	0.39 U	0.4 U	0.4 U	**14**	**13 J**	**19**	**8.8 J**	**0.11 J**	2.1 U	**0.13 J**	**1.1**	**0.33 J**	**8.4 J**
Benzo(k)fluoranthene	0.04 U	0.039 U	0.04 U	0.04 U	**15**	**19**	**20**	**13**	**0.23**	**0.2 J**	**0.26**	**1.8**	**1.9**	**35**
Chrysene	0.4 U	0.39 U	0.4 U	0.4 U	**20**	**24**	**26**	**18**	**0.59 J**	**0.67 J**	**0.3 J**	**2.6**	**1.8**	**26**
Dibenz(a,h)anthracene	0.04 U	0.039 U	0.04 U	0.04 U	**2.5**	**2.6**	**3.5**	**2.1**	0.088 U	0.21 U	**0.046**	**0.31**	**0.12**	**3.6**
Fluoranthene	0.4 U	0.39 U	0.4 U	0.4 U	**56**	**64**	**71**	**39**	**0.82 J**	**0.5 J**	**1**	**5.6**	**4.1**	**37**
Fluorene	0.4 U	0.39 U	0.4 U	0.4 U	**29**	**32**	**37**	**32**	**0.47 J**	**0.11 J**	**0.43 J**	**5.2**	**2.3**	**1.6 J**
Indeno(1,2,3-cd)pyrene	0.04 U	0.039 U	0.04 U	0.04 U	**10**	**9.6 J**	**13**	**6.4 J**	**0.098**	0.21 U	**0.12**	**0.91**	**0.38 J**	**12 J**
Naphthalene	0.4 U	0.39 U	0.4 U	0.4 U	**18**	**24**	**38**	**76**	**0.42 J**	**0.14 J**	**0.016 J**	**11**	**4.5**	**2.8 J**
Phenanthrene	0.4 U	0.39 U	0.4 U	0.4 U	**150**	**170**	**200**	**110**	**1.6**	**0.53 J**	**1.4**	**16**	**10**	**19**
Pyrene	0.4 U	0.39 U	0.4 U	0.4 U	**90**	**100**	**110**	**55**	**1.5**	**0.73 J**	**0.8**	**9**	**7.1**	**35**
Total PAHs	ND	ND	ND	ND	**587.7**	**663.4**	**765.5**	**567.8**	**7.758**	**3.834**	**6.006**	**83.42**	**50.53**	**289.61**
PCBs (ppm)														
Aroclor-1016	--	--	--	--	0.087 U	0.084 U	0.09 U	0.087 U	0.089 U	--	--	--	--	--
Aroclor-1221	--	--	--	--	0.087 U	0.084 U	0.09 U	0.087 U	0.089 U	--	--	--	--	--
Aroclor-1232	--	--	--	--	0.087 U	0.084 U	0.09 U	0.087 U	0.089 U	--	--	--	--	--
Aroclor-1242	--	--	--	--	0.087 U	0.084 U	0.09 U	0.087 U	0.089 U	--	--	--	--	--
Aroclor-1248	--	--	--	--	0.087 U	0.084 U	0.09 U	0.087 U	0.089 U	--	--	--	--	--
Aroclor-1254	--	--	--	--	0.087 U	0.084 U	0.09 U	0.087 U	0.089 U	--	--	--	--	--
Aroclor-1260	--	--	--	--	0.087 U	0.084 U	0.09 U	0.087 U	0.089 U	--	--	--	--	--
Aroclor-1262	--	--	--	--	0.087 U	0.084 U	0.09 U	0.087 U	0.089 U	--	--	--	--	--
Aroclor-1268	--	--	--	--	0.087 U	0.084 U	0.09 U	0.087 U	0.089 U	--	--	--	--	--
Inorganics (ppm)														
Cyanide, Total	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	--
Sulfur	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Misc. Parameters														
TCLP Benzene	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Percent Sulfur (%)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Reactive Cyanide	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Reactive Sulfide	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Diesel Range Organics	--	--	--	--	**8,500**	**7,500**	**6,000**	**3,400**	**6,400**	**4,700**	**830**	**610**	**1,900**	--

See Notes on Page 8.

TABLE 2
SUBSURFACE SOIL ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**TP-214**	**TP-215**	**TW-0401S**	**TW-0402S**	**TW-0403S**	**MW05-06S**
Sample Depth	**(11.0')**	**(8.0')**	**(12.0 - 16.0')**	**(19.0 - 23.0')**	**(16.0 - 17.5')**	**(16 - 18.5')**
Sample Date	**2/26/04**	**2/26/04**	**3/3/04**	**3/4/04**	**3/5/04**	**5/23/05**
Sample Type	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
VOCs (ppm)						
Benzene	--	--	--	--	--	0.0012 U
Ethylbenzene	--	--	--	--	--	0.0047 U
Toluene	--	--	--	--	--	0.0058 U
Xylenes, Total	--	--	--	--	--	0.0058 U
Total BTEX	--	--	--	--	--	ND
SVOCs (ppm)						
2-Methylnaphthalene	**1.5 J**	**12**	--	--	--	0.4 U
Acenaphthene	**30**	**67**	--	--	--	0.4 U
Acenaphthylene	**3.7 J**	**13**	--	--	--	0.4 U
Anthracene	**16**	**45**	--	--	--	0.4 U
Benzo(a)anthracene	**9**	**21**	--	--	--	0.04 U
Benzo(a)pyrene	**11**	**22**	--	--	--	0.04 U
Benzo(b)fluoranthene	**4.2**	**8.3**	--	--	--	0.04 U
Benzo(g,h,i)perylene	**5**	**8 J**	--	--	--	0.4 U
Benzo(k)fluoranthene	**6.5 J**	**13**	--	--	--	0.04 U
Chrysene	**8.4**	**20**	--	--	--	0.4 U
Dibenz(a,h)anthracene	**0.9**	**2.1**	--	--	--	0.04 U
Fluoranthene	**22**	**46**	--	--	--	0.4 U
Fluorene	**11**	**37**	--	--	--	0.4 U
Indeno(1,2,3-cd)pyrene	**3.6 J**	**6.2 J**	--	--	--	0.04 U
Naphthalene	**8.1**	**95**	--	--	--	0.4 U
Phenanthrene	**52**	**140**	--	--	--	0.4 U
Pyrene	**32**	**66**	--	--	--	0.4 U
Total PAHs	**224.9**	**621.6**	--	--	--	ND
PCBs (ppm)						
Aroclor-1016	0.085 U	--	--	--	--	--
Aroclor-1221	0.085 U	--	--	--	--	--
Aroclor-1232	0.085 U	--	--	--	--	--
Aroclor-1242	0.085 U	--	--	--	--	--
Aroclor-1248	0.085 U	--	--	--	--	--
Aroclor-1254	0.085 U	--	--	--	--	--
Aroclor-1260	0.085 U	--	--	--	--	--
Aroclor-1262	0.085 U	--	--	--	--	--
Aroclor-1268	0.085 U	--	--	--	--	--
Inorganics (ppm)						
Cyanide, Total	--	--	--	--	--	0.5 U
Sulfur	--	--	--	--	--	--
Misc. Parameters						
TCLP Benzene	--	--	--	--	--	--
Percent Sulfur (%)	--	--	--	--	--	--
Reactive Cyanide	--	--	--	--	--	--
Reactive Sulfide	--	--	--	--	--	--
Total Organic Carbon	--	--	**13,100**	**20,200**	**24,500**	--
Total Diesel Range Organics	**5,200**	**3,600**	--	--	--	--

See Notes on Page 8.

TABLE 2
SUBSURFACE SOIL ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Notes:
All concentrations in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm), unless otherwise noted.
-- = Not analyzed.
NA = No criteria listed.
DUP = Duplicate field sample.
FS = Field sample.
Bolded values indicate the constituent was detected.

Data Qualifiers:
J = The compound/constituent was positively identified; however, the associated numerical value is an estimated concentration only.
ND = Non detect.
R = The sample results are rejected.
U = The compound/constituent was analyzed for but not detected. The associated value is the compound/constituent quantitation limit.

TABLE 3
WELL CONSTRUCTION DETAILS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Location ID	Unit Screened	Date Completed	Northing Coordinate	Easting Coordinate	Measuring Point Elev.	Ground Surface Elev.	Well Diam.	Casing/Screen Type	Screen Slot Size	Screen Length	Sump Length	Depth to Screened Interval (ft. bgs)		Well Depth	Estimated Hydraulic Conductivity (K)	Comments
			ft.	ft.	ft. AMSL	ft. AMSL	in.		in.	ft.	ft.	Top	Bottom	ft. bgs	ft/day	
MW-0301S	fine to medium sand	10/6/03	764643.00	760931.39	852.64	853.10	2	PVC	0.02	10.0	--	12.0	22.0	22.0	NA	field data not valid
MW-0304D	fine sand (till)	10/8/03	764260.67	761081.66	851.18	851.54	2	PVC	0.02	10.0	--	50.0	60.0	60.0	1.78E+01	specific capacity test
MW-0401S*	fine to coarse sand	3/23/04	764625.90	761852.65	853.34	850.35	2	PVC	0.02	10.0	--	14.0	24.0	24.0	> 1.31E+02	specific capacity test
MW-0402S	silt and fine to coarse gravel	2/23/04	764075.94	761733.37	850.09	850.71	2	PVC	0.02	10.0	--	13.0	23.0	23.0	5.55E+01	specific capacity test
MW-0403S	fine to medium sand and fine to coarse gravel	3/31/04	763959.90	761400.22	849.66	850.24	2	PVC	0.02	10.0	--	29.9	39.9	39.9	1.14E+02	specific capacity test
MW-0404D	fine to coarse sand (till)	3/31/04	763869.83	761174.92	849.55	850.28	2	PVC	0.02	10.0	--	50.5	60.5	60.5	1.75E+02	specific capacity test
MW-0404S	fine to medium sand and fine to coarse gravel	4/5/03	763871.10	761179.74	849.99	850.42	2	PVC	0.02	10.0	--	19.0	29.0	29.0	5.95E+01	specific capacity test
MW-0405S	silty fine to coarse gravel	4/5/03	763822.88	761007.70	850.59	851.32	2	PVC	0.02	10.0	--	26.0	36.0	36.0	NA	field data not valid
MW-0506S	silt and fine to coarse sand	5/26/05	764396.33	762247.49	854.80	855.16	2	PVC	0.01	10.0	--	16.0	26.0	26.0	NA	field data not valid
MW-1S	silt and medium to coarse sand	11/6/87	764431.10	760722.27	852.88	853.10	2	SS	0.01	5.0	--	9.0	14.0	14.0	4.05E+01	specific capacity test
MW-1D	fine to coarse sand and gravel (till)	12/18/85	764426.39	760704.94	852.98	853.04	2	SS	0.01	10.0	--	51.5	61.5	61.5	1.03E+02	specific capacity test
MW-2S	fine to coarse sand and gravel, some silt	12/20/85	764032.34	760866.21	854.06	852.44	2	SS	0.01	10.0	--	8.6	18.6	18.6	6.30E+00	specific capacity test
MW-2D	fine to medium sand and gravel (till)	2/23/89	764025.44	760858.07	855.66	852.47	2	SS	0.01	11.0	--	54.0	65.0	65.0	9.76E+01	specific capacity test
MW-3S	fine to medium sand, silt and gravel	1/2/86	764183.59	760989.11	852.08	852.34	2	SS	0.01	10.0	--	5.7	15.7	15.7	7.81E+00	specific capacity test
MW-4S	clay and silt, some sand and gravel	12/30/85	764258.22	761090.59	851.34	851.54	2	SS	0.01	10.0	--	7.0	17.0	17.0	1.80E-01	specific capacity test
MW-6S*	sand, gravel and silt	12/19/85	764490.04	761024.15	852.54	852.70	2	SS	0.01	20.0	--	5.0	25.0	25.0	> 1.14E+02	specific capacity test
MW-7*	sand and gravel	12/29/85	764398.36	761425.36	854.14	852.58	2	SS	0.01	30.0	--	8.0	38.0	38.0	> 7.00E+01	specific capacity test
MW-8S	sand and gravel	1/3/86	764362.90	761845.89	850.38	850.68	2	SS	0.01	10.0	--	5.0	15.0	15.0	NA	field data not valid
MW-8D	silt (till)	12/4/87	764357.37	761843.20	850.08	850.50	2	SS	0.01	10.0	--	60.0	70.0	70.0	1.18E+01	specific capacity test

See Notes on Page 2.

TABLE 3
WELL CONSTRUCTION DETAILS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Location ID	Unit Screened	Date Completed	Northing Coordinate	Easting Coordinate	Measuring Point Elev.	Ground Surface Elev.	Well Diam.	Casing/Screen Type	Screen Slot Size	Screen Length	Sump Length	Depth to Screened Interval (ft. bgs)		Well Depth	Estimated Hydraulic Conductivity (K)	Comments
			ft.	ft.	ft. AMSL	ft. AMSL	in.		in.	ft.	ft.	Top	Bottom	ft. bgs	ft/day	
MW-9S	gravel and sand, some silt	11/5/87	764187.19	761383.94	848.68	848.86	2	SS	0.01	10.5	--	4.5	15.0	15.0	2.28E+02	specific capacity test
MW-9D	shale cobbles (till)	12/2/87	764192.11	761395.07	848.72	848.94	2	SS	0.01	10.0	--	62.0	72.0	72.0	7.40E-01	specific capacity test
MW-10S	gravel	11/4/87	764349.67	761523.93	853.86	852.71	2	SS	0.01	16.0	--	8.0	24.0	24.0	4.10E+01	specific capacity test
MW-11S	gravel	11/4/87	764554.49	762326.55	848.10	845.83	2	SS	0.01	20.0	--	6.0	26.0	26.0	2.77E+01	specific capacity test
MW-12S*	gravel	11/5/87	764747.86	761407.25	852.54	850.70	2	SS	0.01	16.0	--	9.0	25.0	25.0	> 1.24E+02	specific capacity test
MW-12D	silt and gravel (till)	12/8/87	764744.32	761428.11	852.10	850.42	2	SS	0.01	11.0	--	66.0	77.0	77.0	3.34E-03	specific capacity test
NMW-0401S	silty fine to coarse sand, some fine to coarse gravel	3/2/04	764212.45	760999.75	851.25	852.05	2	PVC	0.02	5.0	2.0	10.5	15.5	17.5	1.20E+00	specific capacity test
NMW-0402S	silt and fine to coarse gravel	3/15/04	764022.91	761029.19	849.77	850.38	2	PVC	0.02	10.0	2.0	19.9	29.9	31.9	NA	field data not valid
NMW-0403S	silty fine to coarse gravel	3/22/04	764354.31	761491.94	851.83	852.27	2	PVC	0.02	15.0	2.0	5.6	20.6	22.6	NA	field data not valid
TW-0401S	sand and gravel	3/4/04	764678.18	761652.22	849.95	849.87	1	PVC	0.01	10.0	--	14.0	24.0	24.0	NA	no field data available
TW-0402S	sand and gravel	3/4/04	764624.51	761849.58	850.59	850.39	1	PVC	0.01	NA	--	14.0	24.0	24.0	NA	no field data available
TW-0403S	sand and gravel	3/5/04	764593.65	762061.05	850.59	850.44	1	PVC	0.01	10.0	--	8.5	18.5	18.5	NA	no field data available
TMW-1	NA	NA	764329.26	761949.45	852.34	851.39	1	NA	NA	NA	NA	NA	NA	NA	NA	well construction data not available
TMW-2	NA	NA	763855.99	761085.17	850.81	850.80	1	NA	NA	NA	NA	NA	NA	NA	NA	well construction data not available

Notes:

Elevations given in feet above Mean Sea Level (ft. AMSL), 1988 North American Vertical Datum (NAVD); northing and easting coordinates on New York State Plane Grid Central (3012).
Coordinates and elevations of all wells and piezometers surveyed by NYSEG on several occasions in 2004.
Depths given in feet below ground surface (ft. bgs).
NA indicates not available.
Hydraulic conductivity for wells installed during the SRI are estimated from specific capacity test reductions as described in Walton 1962.
In casing type column, SS indicates stainless steel, PVC indicates polyvinyl chloride.
-- = Not applicable.
* = Assumed a drawdown of 0.01 ft for specific capacity test reduction even though no drawdown was observed during pumping.

TABLE 4
GROUNDWATER ELEVATION DATA

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Location ID	MP Elevation ft. AMSL	DTW (TIC)		Water Elevation - ft. AMSL	
		3/10/2004	4/20/2004	3/10/2004	4/20/2004
MW-0301S	852.64	8.45	8.61	844.19	844.03
MW-0304D	851.18	8.91	8.54	842.27	842.64
MW-0401S	853.34	6.72	8.57	846.62	844.77
MW-0402S	850.09	7.35	7.07	842.74	843.02
MW-0403S	849.66	--	8.55	--	841.11
MW-0404D	849.55	--	8.30	--	841.25
MW-0404S	849.99	--	8.57	--	841.42
MW-0405S	850.59	--	9.11	--	841.48
MW-1S	852.88	8.11	8.00	844.77	844.88
MW-1D	852.98	9.94	9.84	843.04	843.14
MW-2S	854.06	9.01	9.46	845.05	844.60
MW-2D	855.66	13.79	13.63	841.87	842.03
MW-3S	852.08	--	6.01	--	846.07
MW-4S	851.34	7.68	6.81	843.66	844.53
MW-6S	852.54	5.34	5.18	847.20	847.36
MW-7	854.14	10.43	10.22	843.71	843.92
MW-8S	850.38	6.58	6.50	843.80	843.88
MW-8D	850.08	9.87	9.38	840.21	840.70
MW-9S	848.68	3.63	3.35	845.05	845.33
MW-9D	848.72	7.13	6.82	841.59	841.90
MW-10S	853.86	10.15	10.05	843.71	843.81
MW-11S	848.10	6.39	6.35	841.71	841.75
MW-12S	852.54	8.83	8.75	843.71	843.79
MW-12D	852.10	8.73	8.36	843.37	843.74
NMW-0401S	851.25	6.51	5.73	844.74	845.52
NMW-0402S	849.77	--	8.26	--	841.51
NMW-0403S	851.83	--	8.04	--	843.79
TW-0401S	849.95	6.25	--	843.70	--
TW-0402S	850.59	6.72	--	843.87	--
TW-0403S	850.59	6.67	--	843.92	--
TMW-1	852.34	--	8.62	--	843.72
TMW-2	850.81	9.44	9.32	841.37	841.49

Notes:
1. MP = Measuring point. Measuring point elevations surveyed by NYSEG.
2. Elevations given in feet Above Mean Sea Level (AMSL), 1988 North American Vertical Datum (NAVD).
3. "--" indicates measurements not taken.

TABLE 5
GROUNDWATER ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**NYSDEC**	**MW-01S**	**MW-01D**	**MW-02S**	**MW-02D**	**MW-03S**	**MW-04S**	**MW-06S**	**MW-07**	**MW-07**	**MW-08S**	**MW-08D**	**MW-09S**	**MW-09D**	**MW-10S**	**MW-11S**	**MW-12S**
Sample Date	**TOGS**	**4/27/04**	**4/27/04**	**4/21/04**	**4/21/04**	**4/21/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/23/04**	**4/27/04**	**4/23/04**	**4/26/04**	**4/29/04**	**4/21/04**
Sample Type	**(ppb)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**DUP**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
VOCs																	
1,1,1-Trichloroethane	5	**0.8 J**	5 U	5 U	5 U	**130**	**2.2 J**	**1.2 J**	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U
1,1,2-Trichloroethane	1	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	15 U	3 U	3 U
1,1-Dichloroethane	5	**0.9 J**	5 U	5 U	5 U	**79**	**25**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
1,1-Dichloroethene	5	2 U	2 U	2 U	2 U	**26**	**0.8 J**	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	2 U	2 U
1,2-Dichloroethane	0.6	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	2 U	2 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U
2-Butanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
4-Methyl-2-pentanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
Acetone	NA	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 U	5 U	5 U	25 U	5 U	5 U
Benzene	1	1 U	1 U	1 U	1 U	**0.6 J**	1 U	1 U	1 U	1 U	**0.5 J**	1 U	1 U	1 U	**180**	1 U	1 U
Bromodichloromethane	NA	1 U	1 U	**1.1**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U
Bromoform	NA	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	20 U	4 U	4 U
Bromomethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
Carbon disulfide	60	5 U	5 U	5 UJ	5 UJ	5 U	5 U	5 U	5 U	5 U	**0.4 J**	5 U	5 U	5 U	25 U	5 U	5 UJ
Carbon tetrachloride	5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	2 U	2 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
Chloroethane	5	5 U	5 U	5 U	5 U	**7.3**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
Chloroform	7	5 U	5 U	**3.4 J**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
Chloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
cis-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
cis-1,3-Dichloropropene	0.4	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
Ethylbenzene	5	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	**1.3 J**	4 U	4 U	4 U	**720**	4 U	4 U
Methylene chloride	5	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	15 U	3 U	3 U
Styrene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
Tetrachloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U
Toluene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**15 J**	5 U	5 U
trans-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
trans-1,3-Dichloropropene	0.4	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
Trichloroethene	5	1 U	1 U	1 U	1 U	**2.1**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U
Vinyl chloride	2	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U
Xylenes, Total	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**6**	5 U	5 U	5 U	**41**	5 U	5 U
Total BTEX	NA	ND	ND	ND	ND	**0.6**	ND	ND	ND	ND	**7.8**	ND	ND	ND	**956**	ND	ND
Total VOCs	NA	**1.7**	ND	**4.5**	ND	**245**	**28**	**1.2**	ND	ND	**8.2**	ND	ND	ND	**956**	ND	ND

See Notes on Page 13.

TABLE 5
GROUNDWATER ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**NYSDEC**	**MW-01S**	**MW-01D**	**MW-02S**	**MW-02D**	**MW-03S**	**MW-04S**	**MW-06S**	**MW-07**	**MW-07**	**MW-08S**	**MW-08D**	**MW-09S**	**MW-09D**	**MW-10S**	**MW-11S**	**MW-12S**
Sample Date	**TOGS**	**4/27/04**	**4/27/04**	**4/21/04**	**4/21/04**	**4/21/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/23/04**	**4/27/04**	**4/23/04**	**4/26/04**	**4/29/04**	**4/21/04**
Sample Type	**(ppb)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**DUP**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
SVOCs																	
1,2,4-Trichlorobenzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	1 U	1 U	1.1 U	1 U
1,2-Dichlorobenzene	3	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
1,3-Dichlorobenzene	3	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
1,4-Dichlorobenzene	3	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
2,4-Dinitrotoluene	5	2 U	2 U	2 U	2 U	2 U	2.1 U	2 U	2.1 U	2 U	2 U	2.1 U	2.2 U	2 U	2 U	2.1 U	2 U
2,6-Dinitrotoluene	5	2 U	2 U	2 U	2 U	2 U	2.1 U	2 U	2.1 U	2 U	2 U	2.1 U	2.2 U	2 U	2 U	2.1 U	2 U
2-Chloronaphthalene	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
2-Methylnaphthalene	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**2.6 J**	**3.1 J**	10 U	10 U	11 U	10 U	10 U	11 U	10 U
2-Nitroaniline	5	20 U	20 U	20 U	20 U	20 U	21 U	20 U	21 U	20 U	20 U	21 U	22 U	20 U	20 U	21 U	20 U
3,3'-Dichlorobenzidine	5	20 U	20 U	20 U	20 U	20 U	21 U	20 U	21 U	20 U	20 U	21 U	22 U	20 U	20 U	21 U	20 U
3-Nitroaniline	5	20 U	20 U	20 U	20 U	20 U	21 U	20 U	21 U	20 U	20 U	21 U	22 U	20 U	20 U	21 U	20 U
4-Bromophenyl phenyl ether	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
4-Chloroaniline	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
4-Chlorophenyl phenyl ether	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
4-Nitroaniline	5	20 U	20 U	20 U	20 U	20 U	21 U	20 U	21 U	20 U	20 U	21 U	22 U	20 U	20 U	21 U	20 U
Acenaphthene	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**2 J**	10 U	11 U	10 U	**98**	11 U	10 U
Acenaphthylene	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**1.1 J**	**1.3 J**	10 U	10 U	11 U	10 U	**13**	11 U	10 U
Anthracene	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	**4.4 J**	11 U	10 U
Benzo(a)anthracene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	1 U	1 U	1.1 U	1 U
Benzo(a)pyrene	ND	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	1 U	1 U	1.1 U	1 U
Benzo(b)fluoranthene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	1 U	1 U	1.1 U	1 U
Benzo(g,h,i)perylene	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
Benzo(k)fluoranthene	NA	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1.1 U	1 U	1 U	1.1 U	1 UJ
bis(2-Chloroethoxy)methane	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
bis(2-Chloroethyl)ether	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	1 U	1 U	1.1 U	1 U
Bis(2-chloroisopropyl)ether	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
bis(2-Ethylhexyl)phthalate	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
Butyl benzyl phthalate	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
Carbazole	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**1.7 J**	10 U	11 U	10 U	**2.2 J**	11 U	10 U
Chrysene	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
Dibenz(a,h)anthracene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	1 U	1 U	1.1 U	1 U
Dibenzofuran	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**1 J**	10 U	11 U	10 U	**4.3 J**	11 U	10 U
Diethyl phthalate	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
Dimethyl phthalate	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
Di-n-butyl phthalate	50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U

See Notes on Page 13.

TABLE 5
GROUNDWATER ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**NYSDEC**	**MW-01S**	**MW-01D**	**MW-02S**	**MW-02D**	**MW-03S**	**MW-04S**	**MW-06S**	**MW-07**	**MW-07**	**MW-08S**	**MW-08D**	**MW-09S**	**MW-09D**	**MW-10S**	**MW-11S**	**MW-12S**
Sample Date	**TOGS**	**4/27/04**	**4/27/04**	**4/21/04**	**4/21/04**	**4/21/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/23/04**	**4/27/04**	**4/23/04**	**4/26/04**	**4/29/04**	**4/21/04**
Sample Type	**(ppb)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**DUP**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
SVOCs (cont.)																	
Di-n-octyl phthalate	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
Fluoranthene	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**0.4 J**	10 U	11 U	10 U	**3.1 J**	11 U	10 U
Fluorene	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**1.7 J**	10 U	11 U	10 U	**30**	11 U	10 U
Hexachlorobenzene	0.04	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	1 U	1 U	1.1 U	1 U
Hexachlorobutadiene	0.5	2 U	2 U	2 U	2 U	2 U	2.1 U	2 U	2.1 U	2 U	2 U	2.1 U	2.2 U	2 U	2 U	2.1 U	2 U
Hexachlorocyclopentadiene	5	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	11 UJ	10 U	10 UJ	11 U	10 U
Hexachloroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	1 U	1 U	1.1 U	1 U
Indeno(1,2,3-cd)pyrene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	1 U	1 U	1.1 U	1 U
Isophorone	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
Naphthalene	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**17**	**20**	**14**	10 U	11 U	10 U	**59**	11 U	10 U
Nitrobenzene	0.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	1 U	1 U	1.1 U	1 U
N-Nitroso-di-n-propylamine	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	1 U	1 U	1.1 U	1 U
N-Nitrosodiphenylamine	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U
Phenanthrene	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**0.2 J**	10 U	11 U	10 U	**17**	11 U	10 U
Pyrene	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**0.3 J**	10 U	11 U	10 U	**4.4 J**	11 U	10 U
Total PAHs	NA	ND	ND	ND	ND	ND	ND	ND	**20.7**	**24.4**	**18.6**	ND	ND	ND	**228.9**	ND	ND
Total SVOCs	NA	ND	ND	ND	ND	ND	ND	ND	**20.7**	**24.4**	**21.3**	ND	ND	ND	**235.4**	ND	ND
PCBs																	
Aroclor-1016	0.09	--	--	--	--	--	--	--	0.53 U	0.5 U	--	--	0.53 U	--	--	--	--
Aroclor-1221	0.09	--	--	--	--	--	--	--	0.53 U	0.5 U	--	--	0.53 U	--	--	--	--
Aroclor-1232	0.09	--	--	--	--	--	--	--	0.53 U	0.5 U	--	--	0.53 U	--	--	--	--
Aroclor-1242	0.09	--	--	--	--	--	--	--	0.53 U	0.5 U	--	--	0.53 U	--	--	--	--
Aroclor-1248	0.09	--	--	--	--	--	--	--	0.53 U	0.5 U	--	--	0.53 U	--	--	--	--
Aroclor-1254	0.09	--	--	--	--	--	--	--	0.53 U	0.5 U	--	--	0.53 U	--	--	--	--
Aroclor-1260	0.09	--	--	--	--	--	--	--	0.53 U	0.5 U	--	--	0.53 U	--	--	--	--
Aroclor-1262	NA	--	--	--	--	--	--	--	0.53 U	0.5 U	--	--	0.53 U	--	--	--	--
Aroclor-1268	NA	--	--	--	--	--	--	--	0.53 U	0.5 U	--	--	0.53 U	--	--	--	--
Inorganics (total)																	
Cyanide, Total	200	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	300	39.2 U	--	--	--	--	**6,850**	**952**	--	--	**253**	--	--	--	--	**18,300**	39.7 U
Manganese	300	**66.4**	--	--	--	--	**7,730**	**52.1**	--	--	**996**	--	--	--	--	**2,350**	2.9 U
Inorganics (dissolved)																	
Iron	300	39.2 U	--	--	--	--	**969**	**276**	--	--	**100**	--	--	--	--	**110**	39.7 U
Manganese	300	**65.3**	--	--	--	--	**7,590**	**4.8**	--	--	**999**	--	--	--	--	**2,300**	2.9 U

See Notes on Page 13.

TABLE 5
GROUNDWATER ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**NYSDEC**	**MW-01S**	**MW-01D**	**MW-02S**	**MW-02D**	**MW-03S**	**MW-04S**	**MW-06S**	**MW-07**	**MW-07**	**MW-08S**	**MW-08D**	**MW-09S**	**MW-09D**	**MW-10S**	**MW-11S**	**MW-12S**
Sample Date	**TOGS**	**4/27/04**	**4/27/04**	**4/21/04**	**4/21/04**	**4/21/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/23/04**	**4/27/04**	**4/23/04**	**4/26/04**	**4/29/04**	**4/21/04**
Sample Type	**(ppb)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**DUP**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
NA Parameters																	
Actinomycetes (MidBrSats)	NA	***0.77***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total	NA	**322,000**	--	--	--	--	**209,000**	**209,000**	--	--	**250,000**	--	--	--	--	**221,000**	**252,000**
Anaerobic metal reducers (BrMonos)	NA	***0.87***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Eukaryotes (polyenoics)	NA	***41.38***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Firmicutes (TerBrSats)	NA	***2.19***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General (Nsats)	NA	***29.32***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methane	NA	5 U	--	--	--	--	**140**	5 U	--	--	**38**	--	--	--	--	**26**	5 U
Microbial Biomass PLFA/ml	NA	***13,333.3***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate	NA	100 U	--	--	--	--	100 U	**1,900**	--	--	**380**	--	--	--	--	100 U	**4,600**
Nitrogen, Ammonia	NA	100 U	--	--	--	--	**1,000**	100 U	--	--	**270**	--	--	--	--	**150**	100 U
Ortho Phosphate	NA	30 U	--	--	--	--	**87**	30 U	--	--	30 U	--	--	--	--	30 U	30 U
Proteobacteria (Monos)	NA	***25.45***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Starvation	NA	***0.19***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Stress	NA	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	250000	**60200**	--	--	--	--	**110,000**	**257,000**	--	--	**20,600**	--	--	--	--	**25,900**	**44,500**
Sulfide (S)	50	1,000 U	--	--	--	--	1,000 U	1,000 U	--	--	1,000 U	--	--	--	--	1,000 U	1,000 U

See Notes on Page 13.

TABLE 5
GROUNDWATER ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**NYSDEC**	**MW-12D**	**MW-0301S**	**MW-0304D**	**MW-0401S**	**MW-0402S**	**MW-0403S**	**MW-0404S**	**MW-0404D**	**MW-0405S**	**MW-0506S**	**MW-0506S**	**NMW-0401S**	**NMW-0401S**
Sample Date	**TOGS**	**4/21/04**	**4/29/04**	**4/28/04**	**4/26/04**	**4/28/04**	**4/28/04**	**4/29/04**	**4/29/04**	**4/29/04**	**6/10/05**	**6/10/05**	**4/28/04**	**4/28/04**
Sample Type	**(ppb)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**DUP**	**FS**	**DUP**
VOCs														
1,1,1-Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
1,1,2,2-Tetrachloroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	--	--	50 U	50 U
1,1,2-Trichloroethane	1	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	--	--	150 U	150 U
1,1-Dichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
1,1-Dichloroethene	5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	--	--	100 U	100 U
1,2-Dichloroethane	0.6	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	--	--	100 U	100 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	--	--	50 U	50 U
2-Butanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
4-Methyl-2-pentanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
Acetone	NA	5 U	5 U	5 U	5 U	5 U	**12**	5 U	5 U	5 U	--	--	250 U	250 U
Benzene	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.3 U	0.3 U	**4,100**	**4,100**
Bromodichloromethane	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	--	--	50 U	50 U
Bromoform	NA	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	--	--	200 U	200 U
Bromomethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
Carbon disulfide	60	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
Carbon tetrachloride	5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	--	--	100 U	100 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
Chloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
Chloroform	7	5 U	5 U	5 U	5 U	5 U	**0.6 J**	5 U	5 U	5 U	--	--	250 U	250 U
Chloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
cis-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
cis-1,3-Dichloropropene	0.4	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
Ethylbenzene	5	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	0.5 UJ	0.5 UJ	**2,200**	**2,100**
Methylene chloride	5	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	--	--	150 U	150 U
Styrene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
Tetrachloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	--	--	50 U	50 U
Toluene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.4 UJ	0.4 UJ	**3,000**	**3,000**
trans-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
trans-1,3-Dichloropropene	0.4	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
Trichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	--	--	50 U	50 U
Vinyl chloride	2	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	250 U	250 U
Xylenes, Total	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.4 UJ	0.4 UJ	**2,100**	**2,000**
Total BTEX	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**11,400**	**11,200**
Total VOCs	NA	ND	ND	ND	ND	ND	**12.6**	ND	ND	ND	ND	ND	**11,400**	**11,200**

See Notes on Page 13.

TABLE 5
GROUNDWATER ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**NYSDEC**	**MW-12D**	**MW-0301S**	**MW-0304D**	**MW-0401S**	**MW-0402S**	**MW-0403S**	**MW-0404S**	**MW-0404D**	**MW-0405S**	**MW-0506S**	**MW-0506S**	**NMW-0401S**	**NMW-0401S**
Sample Date	**TOGS**	**4/21/04**	**4/29/04**	**4/28/04**	**4/26/04**	**4/28/04**	**4/28/04**	**4/29/04**	**4/29/04**	**4/29/04**	**6/10/05**	**6/10/05**	**4/28/04**	**4/28/04**
Sample Type	**(ppb)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**DUP**	**FS**	**DUP**
SVOCs														
1,2,4-Trichlorobenzene	5	1 U	1 U	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U	--	--	50 U	50 U
1,2-Dichlorobenzene	3	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
1,3-Dichlorobenzene	3	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
1,4-Dichlorobenzene	3	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
2,4-Dinitrotoluene	5	2 U	2.1 U	2 U	2.1 U	2.1 U	2 U	2 U	2 U	2.1 U	--	--	100 U	100 U
2,6-Dinitrotoluene	5	2 U	2.1 U	2 U	2.1 U	2.1 U	2 U	2 U	2 U	2.1 U	--	--	100 U	100 U
2-Chloronaphthalene	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
2-Methylnaphthalene	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	**510**	**560**
2-Nitroaniline	5	20 U	21 U	20 U	21 U	21 U	20 U	20 U	20 U	21 U	--	--	1000 U	1000 U
3,3'-Dichlorobenzidine	5	20 U	21 U	20 U	21 U	21 U	20 U	20 U	20 U	21 U	--	--	1000 U	1000 U
3-Nitroaniline	5	20 U	21 U	20 U	21 U	21 U	20 U	20 U	20 U	21 U	--	--	1000 U	1000 U
4-Bromophenyl phenyl ether	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
4-Chloroaniline	5	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
4-Chlorophenyl phenyl ether	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
4-Nitroaniline	5	20 U	21 U	20 U	21 U	21 U	20 U	20 U	20 U	21 U	--	--	1000 U	1000 U
Acenaphthene	NA	10 U	10 U	10 U	**0.7 J**	10 U	10 U	10 U	10 U	10 U	0.1 U	0.1 U	**160 J**	**150 J**
Acenaphthylene	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	0.1 U	0.1 U	**75 J**	**77 J**
Anthracene	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	0.1 UJ	0.1 UJ	**14 J**	**14 J**
Benzo(a)anthracene	NA	1 U	1 U	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U	0.2 UJ	0.2 UJ	50 U	50 U
Benzo(a)pyrene	ND	1 U	1 U	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U	0.06	0.06	50 U	50 U
Benzo(b)fluoranthene	NA	1 U	1 U	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U	0.1 UJ	0.1 UJ	50 U	50 U
Benzo(g,h,i)perylene	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	0.09 U	0.09 U	500 U	500 U
Benzo(k)fluoranthene	NA	1 UJ	1 U	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U	0.09 UJ	0.09 UJ	50 U	50 U
bis(2-Chloroethoxy)methane	5	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
bis(2-Chloroethyl)ether	1	1 U	1 U	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U	--	--	50 U	50 U
Bis(2-chloroisopropyl)ether	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
bis(2-Ethylhexyl)phthalate	5	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
Butyl benzyl phthalate	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
Carbazole	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	**52 J**	**49 J**
Chrysene	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	0.2 UJ	0.2 UJ	500 U	500 U
Dibenz(a,h)anthracene	NA	1 U	1 U	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U	0.1 UJ	0.1 UJ	50 U	50 U
Dibenzofuran	NA	10 U	10 U	10 U	**0.2 J**	10 U	10 U	10 U	10 U	10 U	--	--	**15 J**	**14 J**
Diethyl phthalate	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
Dimethyl phthalate	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
Di-n-butyl phthalate	50	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U

See Notes on Page 13.

TABLE 5
GROUNDWATER ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**NYSDEC**	**MW-12D**	**MW-0301S**	**MW-0304D**	**MW-0401S**	**MW-0402S**	**MW-0403S**	**MW-0404S**	**MW-0404D**	**MW-0405S**	**MW-0506S**	**MW-0506S**	**NMW-0401S**	**NMW-0401S**
Sample Date	**TOGS**	**4/21/04**	**4/29/04**	**4/28/04**	**4/26/04**	**4/28/04**	**4/28/04**	**4/29/04**	**4/29/04**	**4/29/04**	**6/10/05**	**6/10/05**	**4/28/04**	**4/28/04**
Sample Type	**(ppb)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**DUP**	**FS**	**DUP**
SVOCs (cont.)														
Di-n-octyl phthalate	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
Fluoranthene	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	0.1 UJ	0.1 UJ	500 U	500 U
Fluorene	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	0.2 U	0.2 U	**51 J**	**63 J**
Hexachlorobenzene	0.04	1 U	1 U	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U	--	--	50 U	50 U
Hexachlorobutadiene	0.5	2 U	2.1 U	2 U	2.1 U	2.1 U	2 U	2 U	2 U	2.1 U	--	--	100 U	100 U
Hexachlorocyclopentadiene	5	10 U	10 U	10 UJ	11 UJ	10 UJ	10 UJ	10 U	10 U	10 U	--	--	500 U	500 U
Hexachloroethane	5	1 U	1 U	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U	--	--	50 U	50 U
Indeno(1,2,3-cd)pyrene	NA	1 U	1 U	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U	0.08 UJ	0.08 UJ	50 U	50 U
Isophorone	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
Naphthalene	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	0.2 U	0.2 U	**6,900**	**7,300**
Nitrobenzene	0.4	1 U	1 U	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U	--	--	50 U	50 U
N-Nitroso-di-n-propylamine	NA	1 U	1 U	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U	--	--	50 U	50 U
N-Nitrosodiphenylamine	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	--	--	500 U	500 U
Phenanthrene	NA	10 U	10 U	10 U	**0.5 J**	10 U	10 U	10 U	10 U	10 U	0.08 UJ	0.08 UJ	**79 J**	**89 J**
Pyrene	NA	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	0.1 U	0.1 U	500 U	**11 J**
Total PAHs	NA	ND	ND	ND	**1.2**	ND	ND	ND	ND	ND	ND	ND	**7,789**	**8,264**
Total SVOCs	NA	ND	ND	ND	**1.4**	ND	ND	ND	ND	ND	ND	ND	**7,856**	**8,327**
PCBs														
Aroclor-1016	0.09	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1221	0.09	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1232	0.09	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1242	0.09	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1248	0.09	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1254	0.09	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1260	0.09	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1262	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1268	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics (total)														
Cyanide, Total	200	--	--	--	--	--	--	--	--	--	10 U	10 U	--	--
Iron	300	--	--	--	--	**319**	39.2 U	39.2 U	**2,250**	**381**	--	--	**4,460**	--
Manganese	300	--	--	--	--	**1,500**	**21.5**	**1,010**	**965**	**446**	--	--	**2,440**	--
Inorganics (dissolved)														
Iron	300	--	--	--	--	39.2 U	39.2 U	39.2 U	**741**	39.2 U	--	--	**2,240**	--
Manganese	300	--	--	--	--	**1,510**	**20.6**	**1,020**	**970**	**451**	--	--	**2,500**	--

See Notes on Page 13.

TABLE 5
GROUNDWATER ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**NYSDEC**	**MW-12D**	**MW-0301S**	**MW-0304D**	**MW-0401S**	**MW-0402S**	**MW-0403S**	**MW-0404S**	**MW-0404D**	**MW-0405S**	**MW-0506S**	**MW-0506S**	**NMW-0401S**	**NMW-0401S**
Sample Date	**TOGS**	**4/21/04**	**4/29/04**	**4/28/04**	**4/26/04**	**4/28/04**	**4/28/04**	**4/29/04**	**4/29/04**	**4/29/04**	**6/10/05**	**6/10/05**	**4/28/04**	**4/28/04**
Sample Type	**(ppb)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**DUP**	**FS**	**DUP**
NA Parameters														
Actinomycetes (MidBrSats)	NA	--	--	--	--	--	--	--	--	--	--	--	***1.43***	***1.72***
Alkalinity, Total	NA	--	--	--	--	**306,000**	**288,000**	**324,000**	**445,000**	**247,000**	--	--	**479,000**	--
Anaerobic metal reducers (BrMonos)	NA	--	--	--	--	--	--	--	--	--	--	--	***0.57***	***0.61***
Eukaryotes (polyenoics)	NA	--	--	--	--	--	--	--	--	--	--	--	***0.34***	***2.54***
Firmicutes (TerBrSats)	NA	--	--	--	--	--	--	--	--	--	--	--	***5.71***	***5.29***
General (Nsats)	NA	--	--	--	--	--	--	--	--	--	--	--	***22.53***	***21.64***
Methane	NA	--	--	--	--	5 U	5 U	5 U	**20**	5 U	--	--	**2200**	--
Microbial Biomass PLFA/ml	NA	--	--	--	--	--	--	--	--	--	--	--	***2,475,056.2***	***2,216,336.1***
Nitrate	NA	--	--	--	--	**3,800**	**2,800**	**3,700**	100 U	**710**	--	--	100 U	--
Nitrogen, Ammonia	NA	--	--	--	--	100 U	100 U	100 U	**620**	100 U	--	--	**68,200**	--
Ortho Phosphate	NA	--	--	--	--	30 U	30 U	30 U	30 U	30 U	--	--	**180**	--
Proteobacteria (Monos)	NA	--	--	--	--	--	--	--	--	--	--	--	***69.44***	***68.19***
Starvation	NA	--	--	--	--	--	--	--	--	--	--	--	***0.03***	***0.04***
Stress	NA	--	--	--	--	--	--	--	--	--	--	--	***0.1***	ND
Sulfate	250000	--	--	--	--	**61,100**	**50,300**	**90,600**	**36,700**	**70,000**	--	--	**124,000**	--
Sulfide (S)	50	--	--	--	--	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U	--	--	1,000 U	--

See Notes on Page 13.

TABLE 5
GROUNDWATER ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**NYSDEC**	**NMW-0402S**	**NMW-0403S**	**TMW-01**	**TMW-02**	**TW-0401S**	**TW-0402S**	**TW-0403S**
Sample Date	**TOGS**	**4/29/04**	**4/29/04**	**4/26/04**	**4/26/04**	**3/9/04**	**3/9/04**	**3/9/04**
Sample Type	**(ppb)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
VOCs								
1,1,1-Trichloroethane	5	500 U	5 U	5 U	5 U	--	--	--
1,1,2,2-Tetrachloroethane	5	100 U	1 U	1 U	1 U	--	--	--
1,1,2-Trichloroethane	1	300 U	3 U	3 U	3 U	--	--	--
1,1-Dichloroethane	5	500 U	5 U	5 U	5 U	--	--	--
1,1-Dichloroethene	5	200 U	2 U	2 U	2 U	--	--	--
1,2-Dichloroethane	0.6	200 U	2 U	2 U	2 U	--	--	--
1,2-Dichloropropane	1	100 U	1 U	1 U	1 U	--	--	--
2-Butanone	NA	500 U	5 U	5 U	5 U	--	--	--
2-Hexanone	NA	500 U	5 U	5 U	5 U	--	--	--
4-Methyl-2-pentanone	NA	500 U	5 U	5 U	5 U	--	--	--
Acetone	NA	500 U	5 U	5 U	5 U	--	--	--
Benzene	1	**5,400**	**61**	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	NA	100 U	1 U	1 U	1 U	--	--	--
Bromoform	NA	400 U	4 U	4 U	4 U	--	--	--
Bromomethane	5	500 U	5 U	5 U	5 U	--	--	--
Carbon disulfide	60	500 U	5 U	5 U	5 U	--	--	--
Carbon tetrachloride	5	200 U	2 U	2 U	2 U	--	--	--
Chlorobenzene	5	500 U	5 U	5 U	5 U	--	--	--
Chlorodibromomethane	NA	500 U	5 U	5 U	5 U	--	--	--
Chloroethane	5	500 U	5 U	5 U	5 U	--	--	--
Chloroform	7	500 U	5 U	5 U	5 U	--	--	--
Chloromethane	5	500 U	5 U	5 U	5 U	--	--	--
cis-1,2-Dichloroethene	5	500 U	5 U	**1.7 J**	5 U	--	--	--
cis-1,3-Dichloropropene	0.4	500 U	5 U	5 U	5 U	--	--	--
Ethylbenzene	5	**1,700**	**190**	4 U	4 U	4 U	4 U	4 U
Methylene chloride	5	300 U	3 U	3 U	3 U	--	--	--
Styrene	5	500 U	5 U	5 U	5 U	--	--	--
Tetrachloroethene	5	100 U	1 U	**0.7 J**	1 U	--	--	--
Toluene	5	**4,800**	**6.9**	5 U	5 U	5 U	**1.8 J**	**1.2 J**
trans-1,2-Dichloroethene	5	500 U	5 U	5 U	5 U	--	--	--
trans-1,3-Dichloropropene	0.4	500 U	5 U	5 U	5 U	--	--	--
Trichloroethene	5	100 U	1 U	**0.8 J**	1 U	--	--	--
Vinyl chloride	2	500 U	5 U	5 U	5 U	--	--	--
Xylenes, Total	5	**1,500**	**120**	5 U	5 U	5 U	5 U	5 U
Total BTEX	NA	**13,400**	**377.9**	ND	ND	ND	**1.8**	**1.2**
Total VOCs	NA	**13,400**	**377.9**	**3.2**	ND	ND	**1.8**	**1.2**

See Notes on Page 13.

TABLE 5
GROUNDWATER ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**NYSDEC**	**NMW-0402S**	**NMW-0403S**	**TMW-01**	**TMW-02**	**TW-0401S**	**TW-0402S**	**TW-0403S**
Sample Date	**TOGS**	**4/29/04**	**4/29/04**	**4/26/04**	**4/26/04**	**3/9/04**	**3/9/04**	**3/9/04**
Sample Type	**(ppb)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
SVOCs								
1,2,4-Trichlorobenzene	5	52 U	10 U	1 U	1 U	--	--	--
1,2-Dichlorobenzene	3	520 U	100 U	10 U	10 U	--	--	--
1,3-Dichlorobenzene	3	520 U	100 U	10 U	10 U	--	--	--
1,4-Dichlorobenzene	3	520 U	100 U	10 U	10 U	--	--	--
2,4-Dinitrotoluene	5	100 U	20 U	2 U	2.1 U	--	--	--
2,6-Dinitrotoluene	5	100 U	20 U	2 U	2.1 U	--	--	--
2-Chloronaphthalene	NA	520 U	100 U	10 U	10 U	--	--	--
2-Methylnaphthalene	NA	**1,200**	**190**	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	5	1000 U	200 U	20 U	21 U	--	--	--
3,3'-Dichlorobenzidine	5	1000 U	200 U	20 U	21 U	--	--	--
3-Nitroaniline	5	1000 U	200 U	20 U	21 U	--	--	--
4-Bromophenyl phenyl ether	NA	520 U	100 U	10 U	10 U	--	--	--
4-Chloroaniline	5	520 U	100 U	10 U	10 U	--	--	--
4-Chlorophenyl phenyl ether	NA	520 U	100 U	10 U	10 U	--	--	--
4-Nitroaniline	5	1000 U	200 U	20 U	21 U	--	--	--
Acenaphthene	NA	**280 J**	**100**	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	NA	**110 J**	**44 J**	10 U	10 U	10 U	10 U	10 U
Anthracene	NA	**36 J**	**15 J**	10 U	10 U	10 U	10 U	10 U
Benzo(a)anthracene	NA	**17 J**	10 U	1 U	1 U	1 U	1 U	1 U
Benzo(a)pyrene	ND	**14 J**	10 U	1 U	1 U	1 U	1 U	1 U
Benzo(b)fluoranthene	NA	52 U	10 U	1 U	1 U	1 U	1 U	1 U
Benzo(g,h,i)perylene	NA	520 U	100 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	NA	**10 J**	10 U	1 U	1 U	1 U	1 U	1 U
bis(2-Chloroethoxy)methane	5	520 U	100 U	10 U	10 U	--	--	--
bis(2-Chloroethyl)ether	1	52 U	10 U	1 U	1 U	--	--	--
Bis(2-chloroisopropyl)ether	NA	520 U	100 U	10 U	10 U	--	--	--
bis(2-Ethylhexyl)phthalate	5	520 U	100 U	10 U	10 U	--	--	--
Butyl benzyl phthalate	NA	520 U	100 U	10 U	10 U	--	--	--
Carbazole	NA	**12 J**	**6.1 J**	10 U	10 U	--	--	--
Chrysene	NA	**13 J**	100 U	10 U	10 U	10 U	10 U	10 U
Dibenz(a,h)anthracene	NA	52 U	10 U	1 U	1 U	1 U	1 U	1 U
Dibenzofuran	NA	520 U	**6 J**	10 U	10 U	--	--	--
Diethyl phthalate	NA	520 U	100 U	10 U	10 U	--	--	--
Dimethyl phthalate	NA	520 U	100 U	10 U	10 U	--	--	--
Di-n-butyl phthalate	50	520 U	100 U	10 U	10 U	--	--	--

See Notes on Page 13.

TABLE 5
GROUNDWATER ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	NYSDEC	NMW-0402S	NMW-0403S	TMW-01	TMW-02	TW-0401S	TW-0402S	TW-0403S
Sample Date	TOGS	4/29/04	4/29/04	4/26/04	4/26/04	3/9/04	3/9/04	3/9/04
Sample Type	(ppb)	FS	FS	FS	FS	FS	FS	FS
SVOCs (cont.)								
Di-n-octyl phthalate	NA	520 U	100 U	10 U	10 U	--	--	--
Fluoranthene	NA	**26 J**	**9.1 J**	10 U	10 U	10 U	10 U	10 U
Fluorene	NA	**110 J**	**58 J**	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	0.04	52 U	10 U	1 U	1 U	--	--	--
Hexachlorobutadiene	0.5	100 U	20 U	2 U	2.1 U	--	--	--
Hexachlorocyclopentadiene	5	520 UJ	100 U	10 UJ	10 UJ	--	--	--
Hexachloroethane	5	52 U	10 U	1 U	1 U	--	--	--
Indeno(1,2,3-cd)pyrene	NA	52 U	10 U	1 U	1 U	1 U	1 U	1 U
Isophorone	NA	520 U	100 U	10 U	10 U	--	--	--
Naphthalene	NA	**9,100**	**1,600**	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	0.4	52 U	10 U	1 U	1 U	--	--	--
N-Nitroso-di-n-propylamine	NA	52 U	10 U	1 U	1 U	--	--	--
N-Nitrosodiphenylamine	NA	520 U	100 U	10 U	10 U	--	--	--
Phenanthrene	NA	**140 J**	**74 J**	10 U	10 U	10 U	10 U	10 U
Pyrene	NA	**40 J**	**9.2 J**	10 U	10 U	10 U	10 U	10 U
Total PAHs	NA	**11,096**	**2,099.3**	ND	ND	ND	ND	ND
Total SVOCs	NA	**11,108**	**2,111.4**	ND	ND	ND	ND	ND
PCBs								
Aroclor-1016	0.09	--	--	--	--	--	--	--
Aroclor-1221	0.09	--	--	--	--	--	--	--
Aroclor-1232	0.09	--	--	--	--	--	--	--
Aroclor-1242	0.09	--	--	--	--	--	--	--
Aroclor-1248	0.09	--	--	--	--	--	--	--
Aroclor-1254	0.09	--	--	--	--	--	--	--
Aroclor-1260	0.09	--	--	--	--	--	--	--
Aroclor-1262	NA	--	--	--	--	--	--	--
Aroclor-1268	NA	--	--	--	--	--	--	--
Inorganics (total)								
Cyanide, Total	200	--	--	--	--	10 UJ	10 UJ	10 UJ
Iron	300	**4,730**	**5,000**	--	--	--	--	--
Manganese	300	**730**	**3,040**	--	--	--	--	--
Inorganics (dissolved)								
Iron	300	39.2 U	**3,350**	--	--	--	--	--
Manganese	300	**693**	**2,970**	--	--	--	--	--

See Notes on Page 13.

TABLE 5
GROUNDWATER ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID **Sample Date** **Sample Type**	**NYSDEC TOGS (ppb)**	**NMW-0402S** **4/29/04** **FS**	**NMW-0403S** **4/29/04** **FS**	**TMW-01** **4/26/04** **FS**	**TMW-02** **4/26/04** **FS**	**TW-0401S** **3/9/04** **FS**	**TW-0402S** **3/9/04** **FS**	**TW-0403S** **3/9/04** **FS**
NA Parameters								
Actinomycetes (MidBrSats)	NA	***0.88***	***1.86***	--	--	--	--	--
Alkalinity, Total	NA	**464,000**	**371,000**	--	--	--	--	--
Anaerobic metal reducers (BrMonos)	NA	***0.59***	***0.31***	--	--	--	--	--
Eukaryotes (polyenoics)	NA	***3.16***	***7.33***	--	--	--	--	--
Firmicutes (TerBrSats)	NA	***2.71***	***2.41***	--	--	--	--	--
General (Nsats)	NA	***29.62***	***26.68***	--	--	--	--	--
Methane	NA	**170**	**75**	--	--	--	--	--
Microbial Biomass PLFA/ml	NA	***35,805.1***	***66,925.8***	--	--	--	--	--
Nitrate	NA	100 U	**620**	--	--	--	--	--
Nitrogen, Ammonia	NA	**14,500**	**1,600**	--	--	--	--	--
Ortho Phosphate	NA	**30**	**47**	--	--	--	--	--
Proteobacteria (Monos)	NA	***63.05***	***61.41***	--	--	--	--	--
Starvation	NA	***0.28***	***0.19***	--	--	--	--	--
Stress	NA	***0.19***	***0.05***	--	--	--	--	--
Sulfate	250000	5,000 U	**58,700**	--	--	--	--	--
Sulfide (S)	50	1,000 U	1,000 U	--	--	--	--	--

See Notes on Page 13.

TABLE 5
GROUNDWATER ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Notes:
All concentrations in micrograms per liter (ug/L), equivalent to parts per billion (ppb).
-- = Not analyzed.
NA = No criteria listed .
DUP = Duplicate field sample.
FS = Field sample.
NYS TOGS = New York State Technical and Operational Guidance Series, June 1998.
Bolded values indicate the constituent was detected.
Shaded values exceed NYSDEC TOGS standard.

Data Qualifiers:
J = The compound/constituent was positively identified; however, the associated numerical value is an estimated concentration only.
ND = Non detect.
U = The compound/constituent was analyzed for but not detected. The associated value is the compound/constituent quantitation limit.

TABLE 6
SITE-SPECIFIC RETARDATION FACTORS FOR CONSTITUENTS IN GROUNDWATEF

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC & GAS CORPORATIOI
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Chemical of Concern	K_{oc}	Retardation Factor in Site Groundwater
Benzene	49	5
Toluene	95	9
Ethylbenzene	250	22
Xylene	193	17
Naphthalene	870	73
Acenaphthene	3,890	323
Phenanthrene	18,800	1558
Benzo(k)flouranthene	22,000	1823
Chrysene	133,000	11016
Benzo(a)anthracene	200,000	16565

Notes:

Calculations assume a soil bulk density of 2.1 g/cm^3 and porosity of 0.3. Fraction of organic carbon calculated from averaged total organic carbon measured at five locations in site vicinity. Koc values are Syracuse Research Corporation (SRC) recommended values based on their Chemfate database, which may be found at http://esc.syrres.com/efdb/Chemfate.htm. Xylene Koc value is average for all isomers. Retardation factors calculated according to the following equation: $R_c = r_b \text{ x } K_{oc} \text{ x } F_{oc} / n$.

TABLE 7
NATURAL GROUNDWATER REMEDIATION RATE ANALYSIS SUMMARY TABLE

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Monitoring Well ID	Compound	Trend	Correlation Coefficient (R2)	Half-Life (days)
MW-2S	Benzene	Remediated	--	--
	Toluene	NA	--	--
	Ethylbenzene	NA	--	--
	Xylenes total	NA	--	--
	Total PAH	ID	--	--
MW-3S	Benzene	Remediated	0.72	--
	Toluene	ID	--	--
	Ethylbenzene	ID	--	--
	Xylenes total	ID	--	--
	Total PAH	Decreasing	ID	ID
MW-4S	Benzene	Remediated	--	--
	Toluene	ID	--	--
	Ethylbenzene	ID	--	--
	Xylenes total	ID	--	--
	Total PAH	ID	--	--
MW-6S	Benzene	ID	--	--
	Toluene	ID	--	--
	Ethylbenzene	ID	--	--
	Xylenes total	ID	--	--
	Total PAH	Decreasing	ID	ID
MW-7	Benzene	NA	--	--
	Toluene	NA	--	--
	Ethylbenzene	NA	--	--
	Xylenes total	NA	--	--
	Total PAH	Decreasing	ID	ID
MW-8S	Benzene	Remediated	--	--
	Toluene	Remediated	--	--
	Ethylbenzene	Remediated	--	--
	Xylenes total	Decreasing	0.62	1340
	Total PAH	Decreasing	0.82	911
MW-10S	Benzene	ID	--	--
	Toluene	Decreasing	ID	ID
	Ethylbenzene	ID	--	--
	Xylenes total	Decreasing	0.66	2660
	Total PAH	Decreasing	0.86	2240

Notes:
ID = Insufficient Data.
" -- " = not applicable.
NA = Not above standard; trend analysis not warranted.

TABLE 8
IN-SITU BIODEGRADATION DATA

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	NYSDEC Class GA Groundwater Standard (ppb)	MW-01S	MW-02S	MW-03S	MW-04S	MW-06S	MW-07	MW-07	MW-08S	MW-09S	MW-10S	MW-11S	MW-12S	MW-0301S	MW-0401S	MW-0402S	MW-0403S
Sample Date		**4/27/04**	**4/21/04**	**4/21/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/22/04**	**4/27/04**	**4/26/04**	**4/29/04**	**4/21/04**	**4/29/04**	**4/26/04**	**4/28/04**	**4/28/04**
Sample Type		**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**DUP**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
Metals																	
Cyanide, Total	200	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron, Total	300	39.2 U	--	--	**6,850**	**952**	--	--	**253**	--	--	**18,300**	39.7 U	--	--	**319**	39.2 U
Manganese, Total	300	**66.4**	--	--	**7,730**	**52.1**	--	--	**996**	--	--	**2,350**	2.9 U	--	--	**1,500**	**21.5**
Iron, Dissolved	300	39.2 U	--	--	**969**	**276**	--	--	**100**	--	--	**110**	39.7 U	--	--	39.2 U	39.2 U
Manganese, Dissolved	300	**65.3**	--	--	**7,590**	**4.8**	--	--	**999**	--	--	**2,300**	2.9 U	--	--	**1,510**	**20.6**
General Chemistry																	
Alkalinity, Total (ppm)	NA	**322**	--	--	**209**	**209**	--	--	**250**	--	--	**221**	**252**	--	--	**306**	**288**
Ortho Phosphate	NA	30 U	--	--	**87**	30 U	--	--	30 U	--	--	30 U	30 U	--	--	30 U	30 U
Oxygen, Dissolved (ppm)	NA	**2.1**	**3.5**	**0.3**	**0.2**	**1.7**	**2**	--	**0.7**	**6.9**	**8.8**	**0.3**	**2.8**	**4.9**	**0.02**	ND	**2.4**
Carbon Dioxide, Dissolved (ppm)	NA	**65**	--	**140**	**75**	**90**	**--**	**110**	**70**	**15**	**170**	**30**	**60**	**70**	**15**	**90**	**12**
Methane	NA	5 U	--	--	**140**	5 U	--	--	**38**	--	--	**26**	5 U	--	--	5 U	5 U
Nitrate	NA	100 U	--	--	100 U	**1,900**	--	--	**380**	--	--	100 U	**4,600**	--	--	**3,800**	**2,800**
Nitrogen, Ammonia	NA	100 U	--	--	**1,000**	100 U	--	--	**270**	--	--	**150**	100 U	--	--	100 U	100 U
Sulfate (ppm)	250	**60.2**	--	--	**110**	**257**	--	--	**20.6**	--	--	**25.9**	**44.5**	--	--	**61.1**	**50.3**
Sulfide (S)	NA	1,000 U	--	--	1,000 U	1,000 U	--	--	1,000 U	--	--	1,000 U	1,000 U	--	--	1,000 U	1,000 U
Microbial Biomass PLFA/ml	NA	***13,333***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

See Notes on Page 3.

TABLE 8
IN-SITU BIODEGRADATION DATA

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID	**NYSDEC Class GA Groundwater Standard (ppb)**	**MW-0404S**	**MW-0405S**	**MW-0506S**	**MW-0506S**	**NMW-0401S**	**NMW-0401S**	**NMW-0402S**	**NMW-0403S**	**TMW-01**	**TMW-02**	**TW-0401S**	**TW-0402S**	**TW-0403S**
Sample Date		**4/29/04**	**4/29/04**	**6/10/05**	**6/10/05**	**4/28/04**	**4/28/04**	**4/29/04**	**4/29/04**	**4/26/04**	**4/26/04**	**3/9/04**	**3/9/04**	**3/9/04**
Sample Type		**FS**	**FS**	**FS**	**DUP**	**FS**	**DUP**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
Metals														
Cyanide, Total	200	--	--	10 U	10 U	--	--	--	--	--	--	10 UJ	10 UJ	10 UJ
Iron, Total	300	39.2 U	**381**	--	--	**4,460**	--	**4,730**	**5,000**	--	--	--	--	--
Manganese, Total	300	**1,010**	**446**	--	--	**2,440**	--	**730**	**3,040**	--	--	--	--	--
Iron, Dissolved	300	39.2 U	39.2 U	--	--	**2,240**	--	39.2 U	**3,350**	--	--	--	--	--
Manganese, Dissolved	300	**1,020**	**451**	--	--	**2,500**	--	**693**	**2,970**	--	--	--	--	--
				--	--									
General Chemistry				--	--									
Alkalinity, Total (ppm)	NA	**324**	**247**	--	--	**479**	--	**464**	**371**	--	--	--	--	--
Ortho Phosphate	NA	30 U	30 U	--	--	**180**	--	**30**	**47**	--	--	--	--	--
Oxygen, Dissolved (ppm)	NA	**0.6**	ND	--	--	ND	--	**0.1**	ND	0.3	3.8	--	--	--
Carbon Dioxide, Dissolved (ppm)	NA	**75**	**50**	--	--	**100**	--	**70**	**70**	--	**70**	--	--	--
Methane	NA	5 U	5 U	--	--	**2,200**	--	**170**	**75**	--	--	--	--	--
Nitrate	NA	**3,700**	**710**	--	--	100 U	--	100 U	**620**	--	--	--	--	--
Nitrogen, Ammonia	NA	100 U	100 U	--	--	**68,200**	--	**14,500**	**1,600**	--	--	--	--	--
Sulfate (ppm)	250	**90.6**	**70**	--	--	**124**	--	5 U	**58.7**	--	--	--	--	--
Sulfide (S)	NA	1,000 U	1,000 U	--	--	1,000 U	--	1,000 U	1,000 U	--	--	--	--	--
Microbial Biomass PLFA/ml	NA	--	--	--	--	***2,475,056***	***2,216,336***	***35,805***	***66,925***	--	--	--	--	--

See Notes on Page 3.

TABLE 8
IN-SITU BIODEGRADATION DATA

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Notes:
All concentrations in micrograms per liter (ug/L), equivalent to parts per billion (ppb) unless otherwise noted.
-- = Not analyzed.
NA = No criteria listed.
NM = Not measured.
DUP = Duplicate field sample.
FS = Field sample.
NYS Class GA Groundwater Standard from *NYSDEC Technical and Operational Guidance Series 1.1.1* (June 1998).
Bolded values indicate the constituent was detected.
Shaded values NYSDEC TOG Values.

Data Qualifiers:
J = The compound/constituent was positively identified; however, the associated numerical value is an estimated concentration only.
ND = Non detect.
U = The compound/constituent was analyzed for but not detected. The associated value is the compound/constituent quantitation limit.

TABLE 9
GROUNDWATER QUALITY PARAMETERS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC & GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Sample Location	Date	Temp. (°C)	pH (S.U.)	Cond. (mS/cm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)
MW-01S	4/27/2004	10.4	6.95	1.34	2.09	0.0	118
MW-01D	4/27/2004	12.6	7.17	1.38	0.16	2.8	-2
MW-02S	4/21/2004	10.2	6.76	0.58	3.48	27.6	49
MW-02D	4/21/2004	13.2	7.27	1.13	0.47	15.9	-151
MW-03S	4/21/2004	13.0	6.73	1.13	0.25	45.1	-62
MW-04S	4/22/2004	11.6	6.56	1.31	0.17	11.3	-47
MW-06S	4/22/2004	9.9	6.60	1.38	1.66	12.3	312
MW-07	4/22/2004	13.7	4.30	0.73	1.98	11.1	333
MW-08S	4/22/2004	11.0	6.72	0.53	0.65	33.0	18
MW-08D	4/23/2004	10.4	9.98	0.39	0.17	23.3	-116
MW-09S	4/27/2004	8.7	5.57	0.16	6.90	9.2	227
MW-09D	4/23/2004	11.5	7.32	0.58	0.32	1.5	161
MW-10S	4/26/2004	10.6	6.56	1.12	8.84	30.7	-111
MW-11S	4/29/2004	8.4	6.68	1.06	0.26	8.6	-42
MW-12S	4/21/2004	13.9	7.10	1.31	2.80	48.7	111
MW-12D	4/21/2004	16.7	7.39	0.59	1.26	2.1	-154
MW-0301S	4/29/2004	11.5	7.05	0.90	4.87	11.2	196
MW-0304D	4/28/2004	12.3	7.76	0.84	0.63	6.2	-205
MW-0401S	4/26/2004	10.6	6.94	1.43	0.02	103	119
MW-0402S	4/28/2004	13.6	6.53	3.14	ND	15.5	125
MW-0403S	4/28/2004	13.7	6.93	0.98	2.42	4.1	140
MW-0404S	4/29/2004	13.9	6.74	1.85	0.55	2.2	96
MW-0404D	4/29/2004	15.7	7.38	2.16	ND	0.0	-112
MW-0405S	4/29/2004	16.0	7.32	1.27	ND	20.1	122
NMW-0401S	4/28/2004	9.7	7.30	1.82	ND	105	-151
NMW-0402S	4/29/2004	15.4	7.10	0.92	0.06	20.2	-186
NMW-0403S	4/29/2004	11.1	6.83	1.50	ND	83.5	-79
TMW-01	4/26/2004	10.2	6.32	1.32	0.28	40.9	128
TMW-02	4/26/2004	11.3	6.35	2.04	3.75	158	232

Notes:

Field parameters recorded immediately after groundwater samples were collected.
pH recorded in Standard Units (S.U.).
Temperature recorded in degrees Celsius (°C).
Specific Conductivity recorded in milliSiemens per centimeter (mS/cm).
Oxidation/Reduction Potential (ORP) recorded in millivolts (mV).
Dissolved Oxygen (DO) recorded in milligrams per liter (mg/L).
Turbidity recorded in Nephelometric Turbidity Units (NTU).
NA = Not Available.

TABLE 10
TYPICAL VEGETATIVE SPECIES OF OBSERVED COVERTYPES

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Species	Commercial/ Industrial/ Residential	Mowed Lawn	Scrub/Shrub and Early Successional Hardwood Forest	Managed Floodplain	Riparian Scrub/ Shrub	Perennial Stream
Herbaceous						
Aster spp.	x					
Blackberry			x		x	
Boneset						
Bull thistle			x			
Buttercup	x					
Chicory	x					
Common mullein	x		x			
Common plantain	x	x				
Common ragweed	x					
Cow vetch			x		x	
Curly dock		x			x	
Dandelion	x	x				
Goldenrod spp.	x		x		x	
Grass spp.	x	x		x		
Knotweed spp.					x	
New England aster	x					
Nightshade spp.			x		x	
Poison ivy			x			
Pondweed spp.						x
Raspberry			x			
Redtop	x					
Teasel					x	
Timothy	x					
Waterweed						x
White clover	x	x				
Wild carrot	x					
Wood sorrel			x			
Shrubs and Trees						
Bigtooth aspen			x			
Blue spruce	x	x				
Box elder	x	x	x	x	x	
Choke cherry			x			
Crabapple			x			
Eastern cottonwood			x	x		
Multiflora rose					x	
Norway spruce		x				
Quaking aspen			x			
Red maple	x	x				
Red oak	x	x				
Scotch pine	x					
Silver maple	x	x				
Staghorn sumac	x					
Sugar maple	x	x	x		x	
Tartarian honeysuckle			x		x	
Tree-of-heaven			x		x	
White oak	x	x				
Yellow birch			x			

TABLE 11
TYPICAL WILDLIFE SPECIES OF OBSERVED COVERTYPES

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Species	Commercial/ Industrial/ Residential	Mowed Lawn	Scrub/Shrub and Early Successional Hardwood Forest	Managed Floodplain	Riparian Scrub/ Shrub	Perennial Stream
Birds						
American crow	x	x		x		
American goldfinch	x	x		x		
American kestrel	x	x	x	x	x	
American robin	x	x		x		
Bluejay	x	x		x		
Brown thrasher			x		x	
Cardinal	x	x		x	x	
Chickadee	x	x	x	x	x	
Chipping sparrow	x	x		x		
Field sparrow			x	x		
Gray catbird	x		x		x	
House finch	x	x		x		
House sparrow	x	x		x		
Mourning dove	x	x		x		
Northern flicker		x	x	x		
Red-eyed vireo			x			
Red-tailed hawk			x			
Red-winged blackbird	x				x	
Rock dove	x	x		x		
Warbler spp.			x			
White-breasted nuthatch			x			
Reptiles/Amphibians						
American toad	x	x	x	x	x	
Bullfrog						
Eastern garter snake	x	x	x	x	x	
Leopard frog						
Northern brown snake	x				x	
Northern slimy salamander						
Redback salamander			x			
Spotted salamander			x			
Mammals						
Coyote						
Chipmunk	x	x	x	x	x	
Deer mouse	x	x	x	x	x	
Eastern cottontail	x	x	x	x		
Eastern gray squirrel	x	x	x	x		
Gray fox	x		x			
House mouse	x					
Meadow vole		x		x		
Raccoon			x		x	
Red fox			x		x	
Shrew spp.		x	x	x	x	
Weasel spp.					x	
Whitetail deer	x		x		x	
Woodchuck	x	x	x	x	x	
Fish						
Bluntnose minnow						x
Common shiner						x
Creek chub						x
Longnose dace						x
Northern hog sucker						x
Pumpkinseed						x
Rosyface shiner						x
Tessellated darter						x

TABLE 12
SURFACE SOIL ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

		Background Samples					Site Samples							
Sample ID	**TAGM Criteria**	**SS-201**	**SS-202**	**SS-203**	**SS-204**	**SS-205**	**SS-206**	**SS-207**	**SS-208**	**SS-209**	**SS-210**	**SS-211**	**SS-212**	**SS-213**
Sample Date		**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**
Sample Type		**FS**	**FS**	**FS**	**FS**	**FS**	**FS (w/ DUP)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
VOCs (ppm)														
1,1,1-Trichloroethane	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
1,1,2,2-Tetrachloroethane	NA	0.0013 U	0.0012 U	0.0013 U	0.0012 U	0.0013 U	0.0011 U [0.001 U]	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.001 U	--	--
1,1,2-Trichloroethane	NA	0.0039 U	0.0035 U	0.0039 U	0.0037 U	0.0038 U	0.0033 U [0.0032 U]	0.0033 U	0.0034 U	0.003 U	0.0032 U	0.0031 U	--	--
1,1-Dichloroethane	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
1,1-Dichloroethene	NA	0.0026 U	0.0023 U	0.0026 U	0.0025 U	0.0026 U	0.0022 U [0.0021 U]	0.0022 U	0.0022 U	0.002 U	0.0021 U	0.0021 U	--	--
1,2-Dichloroethane	NA	0.0026 U	0.0023 U	0.0026 U	0.0025 U	0.0026 U	0.0022 U [0.0021 U]	0.0022 U	0.0022 U	0.002 U	0.0021 U	0.0021 U	--	--
1,2-Dichloropropane	NA	0.0013 U	0.0012 U	0.0013 U	0.0012 U	0.0013 U	0.0011 U [0.001 U]	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.001 U	--	--
2-Butanone	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.015 [0.024]	0.0056 U	0.013 J	0.012	0.012	0.021	--	--
2-Hexanone	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
4-Methyl-2-pentanone	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
Acetone	NA	0.047	0.0058 U	0.079	0.027	0.036	0.065 [0.095]	0.06	0.058 J	0.063	0.066	0.091	--	--
Benzene	NA	0.0006 J	0.0012 U	0.0013 U	0.0012 U	0.0013 U	0.0009 J [0.0047 J]	0.0011 U	0.001 J	0.0005 J	0.0011 U	0.001 U	--	--
Bromodichloromethane	NA	0.0013 U	0.0012 U	0.0013 U	0.0012 U	0.0013 U	0.0011 U [0.001 U]	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.001 U	--	--
Bromoform	NA	0.0053 U	0.0047 U	0.0052 U	0.005 U	0.0051 U	0.0044 U [0.0042 U]	0.0044 U	0.0045 U	0.004 U	0.0043 U	0.0042 U	--	--
Bromomethane	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
Carbon disulfide	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0015 J [0.0064 J]	0.002 J	0.0009 J	0.0051 U	0.0054 U	0.0052 U	--	--
Carbon tetrachloride	NA	0.0026 U	0.0023 U	0.0026 U	0.0025 U	0.0026 U	0.0022 U [0.0021 U]	0.0022 U	0.0022 U	0.002 U	0.0021 U	0.0021 U	--	--
Chlorobenzene	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
Chlorodibromomethane	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
Chloroethane	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
Chloroform	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
Chloromethane	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
cis-1,2-Dichloroethene	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
cis-1,3-Dichloropropene	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
Ethylbenzene	NA	0.0009 J	0.0047 U	0.0012 J	0.001 J	0.0009 J	0.0015 J [0.0023 J]	0.0008 J	0.0009 J	0.0007 J	0.0011 J	0.0008 J	--	--
Methylene chloride	NA	0.0039 U	0.0035 U	0.0039 U	0.0037 U	0.0038 U	0.0033 U [0.0032 U]	0.0033 U	0.0034 U	0.003 U	0.0032 U	0.0031 U	--	--
Styrene	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0005 J]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
Tetrachloroethene	NA	0.0013 U	0.0012 U	0.0013 U	0.0012 U	0.0013 U	0.0011 U [0.001 U]	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.001 U	--	--
Toluene	1.5	0.0026 J	0.0058 U	0.0025 J	0.0028 J	0.0021 J	0.0033 J [0.0095]	0.0021 J	0.0034 J	0.0028 J	0.0023 J	0.0025 J	--	--
trans-1,2-Dichloroethene	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
trans-1,3-Dichloropropene	NA	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
Trichloroethene	0.7	0.0013 U	0.0012 U	0.0013 U	0.0012 U	0.0013 U	0.0011 U [0.001 U]	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.001 U	--	--
Vinyl chloride	0.2	0.0066 U	0.0058 U	0.0065 U	0.0062 U	0.0064 U	0.0055 U [0.0053 U]	0.0056 U	0.0056 U	0.0051 U	0.0054 U	0.0052 U	--	--
Xylenes, Total	1.2	0.0043 J	0.0058 U	0.0042 J	0.0036 J	0.0036 J	0.0056 [0.015]	0.0036 J	0.004 J	0.0037 J	0.0044 J	0.0042 J	--	--
Total BTEX	10	0.0084	ND	0.0079	0.0074	0.0066	0.0113 [0.0315]	0.0065	0.0093	0.0077	0.0078	0.0075	--	--
Total VOCs	10	0.0554	ND	0.0869	0.0344	0.0426	0.0928 [0.1574]	0.0685	0.0812	0.0827	0.0858	0.1195	--	--

See Notes on Page 5.

TABLE 12
SURFACE SOIL ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

		Background Samples					Site Samples							
Sample ID		**SS-201**	**SS-202**	**SS-203**	**SS-204**	**SS-205**	**SS-206**	**SS-207**	**SS-208**	**SS-209**	**SS-210**	**SS-211**	**SS-212**	**SS-213**
Sample Date	**TAGM**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**
Sample Type	**Criteria**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS (w/ DUP)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
SVOCs (ppm)														
1,2,4-Trichlorobenzene	3.4	0.088 U	0.04 U	0.045 U	0.044 U	0.043 U	0.037 U [0.036 U]	0.039 U	0.076 U	0.036 U	0.036 U	0.037 U	--	--
1,2-Dichlorobenzene	NA	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
1,3-Dichlorobenzene	NA	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
1,4-Dichlorobenzene	NA	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
2,4-Dinitrotoluene	NA	0.18 U	0.08 U	0.089 U	0.087 U	0.087 U	0.074 U [0.073 U]	0.078 U	0.15 U	0.072 U	0.073 U	0.074 U	--	--
2,6-Dinitrotoluene	1	0.18 U	0.08 U	0.089 U	0.087 U	0.087 U	0.074 U [0.073 U]	0.078 U	0.15 U	0.072 U	0.073 U	0.074 U	--	--
2-Chloronaphthalene	NA	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
2-Methylnaphthalene	36.4	0.47 J	0.089 J	0.039 J	0.057 J	0.093 J	0.58 [1.1]	0.11 J	0.1 J	0.36 U	0.013 J	0.37 U	--	--
2-Nitroaniline	0.43	1.8 U	0.8 U	0.89 U	0.87 U	0.87 U	0.74 U [0.73 U]	0.78 U	1.5 U	0.72 U	0.73 U	0.74 U	--	--
3,3'-Dichlorobenzidine	NA	1.8 U	0.8 U	0.89 U	0.87 U	0.87 U	0.74 U [0.73 U]	0.78 U	1.5 U	0.72 U	0.73 U	0.74 U	--	--
3-Nitroaniline	0.5	1.8 U	0.8 U	0.89 U	0.87 U	0.87 U	0.74 U [0.73 U]	0.78 U	1.5 U	0.72 U	0.73 U	0.74 U	--	--
4-Bromophenyl phenyl ether	NA	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
4-Chloroaniline	0.22	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
4-Chlorophenyl phenyl ether	NA	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
4-Nitroaniline	NA	1.8 U	0.8 U	0.89 U	0.87 U	0.87 U	0.74 U [0.73 U]	0.78 U	1.5 U	0.72 U	0.73 U	0.74 U	--	--
Acenaphthene	50	1.2	0.015 J	0.01 J	0.034 J	0.03 J	0.48 [1.1]	0.17 J	0.47 J	0.36 U	0.36 U	0.37 U	--	--
Acenaphthylene	41	0.28 J	0.035 J	0.038 J	0.49	0.15 J	0.59 [0.64]	0.68	0.78	0.0086 J	0.014 J	0.034 J	--	--
Anthracene	50	3.2	0.043 J	0.067 J	0.59	0.21 J	0.81 [0.97]	0.82	1.5	0.36 U	0.02 J	0.018 J	--	--
Benzo(a)anthracene	0.224	**5.9**	0.14	**0.38**	**2.2**	**0.61**	**0.76 [0.74]**	**3.3**	**5.8**	0.013 J	0.13	0.07	--	--
Benzo(a)pyrene	0.061	**5.8**	**0.14**	**0.37**	**2.5**	**0.62**	**0.83 [0.83]**	**5**	**5.7**	0.018 J	**0.17**	**0.092**	--	--
Benzo(b)fluoranthene	1.1	**5.9**	0.24	0.31	**2.4**	0.56	0.47 [0.38]	**5.6**	**7.4**	0.022 J	0.13	0.069	--	--
Benzo(g,h,i)perylene	50	3.3	0.078 J	0.22 J	0.73	0.26 J	0.48 [0.49]	1.6	2.3	0.012 J	0.13 J	0.078 J	--	--
Benzo(k)fluoranthene	1.1	**5.6 J**	0.29 J	0.46 J	**2.9 J**	0.82 J	0.69 J [0.66 J]	**4.8 J**	**6.5 J**	0.024 J	0.18 J	0.091 J	--	--
bis(2-Chloroethoxy)methane	NA	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
bis(2-Chloroethyl)ether	NA	0.088 U	0.04 U	0.045 U	0.044 U	0.043 U	0.037 U [0.036 U]	0.039 U	0.076 U	0.036 U	0.036 U	0.037 U	--	--
Bis(2-chloroisopropyl)ether	NA	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
bis(2-Ethylhexyl)phthalate	50	0.66 J	0.12 J	0.14 J	0.48	0.55	0.19 J [0.075 J]	0.11 J	0.76 U	0.36 U	0.36 U	0.37 U	--	--
Butyl benzyl phthalate	50	0.26 J	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
Carbazole	NA	1.7	0.024 J	0.03 J	0.13 J	0.09 J	0.13 J [0.027 J]	0.28 J	1.1	0.36 U	0.0093 J	0.37 U	--	--
Chrysene	0.4	**6.3**	0.19 J	**0.41 J**	**2.3**	**0.74**	**0.75 [0.71]**	**3.5**	**8.2**	0.027 J	0.14 J	0.076 J	--	--
Dibenz(a,h)anthracene	0.014	**1.2**	**0.033 J**	**0.086**	**0.3**	**0.11**	**0.13 [0.1]**	**0.7**	**0.93**	0.036 U	**0.041**	**0.023 J**	--	--
Dibenzofuran	6.2	0.94	0.03 J	0.016 J	0.063 J	0.056 J	0.29 J [0.11 J]	0.13 J	0.25 J	0.36 U	0.36 U	0.37 U	--	--
Diethyl phthalate	7.1	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
Dimethyl phthalate	2	0.88 U	0.15 J	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
Di-n-butyl phthalate	8.1	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
Di-n-octyl phthalate	50	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--

See Notes on Page 5.

TABLE 12
SURFACE SOIL ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

		Background Samples					**Site Samples**							
Sample ID		**SS-201**	**SS-202**	**SS-203**	**SS-204**	**SS-205**	**SS-206**	**SS-207**	**SS-208**	**SS-209**	**SS-210**	**SS-211**	**SS-212**	**SS-213**
Sample Date	**TAGM**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**
Sample Type	**Criteria**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS (w/ DUP)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
SVOCs (ppm) continued														
Fluoranthene	50	12	0.26 J	0.72	3.8	1.4	1.8 [1.6]	4	12	0.031 J	0.19 J	0.1 J	--	--
Fluorene	50	1.2	0.017 J	0.019 J	0.069 J	0.039 J	0.57 [0.95]	0.12 J	0.49 J	0.36 U	0.36 U	0.37 U	--	--
Hexachlorobenzene	0.41	0.088 U	0.04 U	0.045 U	0.044 U	0.043 U	0.037 U [0.036 U]	0.039 U	0.076 U	0.036 U	0.036 U	0.037 U	--	--
Hexachlorobutadiene	NA	0.18 U	0.08 U	0.089 U	0.087 U	0.087 U	0.074 U [0.073 U]	0.078 U	0.15 U	0.072 U	0.073 U	0.074 U	--	--
Hexachlorocyclopentadiene	NA	0.88 UJ	0.4 UJ	0.45 UJ	0.44 UJ	0.43 UJ	0.37 UJ [0.36 UJ]	0.39 UJ	0.76 UJ	0.36 UJ	0.36 UJ	0.37 UJ	--	--
Hexachloroethane	NA	0.088 U	0.04 U	0.045 U	0.044 U	0.043 U	0.037 U [0.036 U]	0.039 U	0.076 U	0.036 U	0.036 U	0.037 U	--	--
Indeno(1,2,3-cd)pyrene	3.2	3.2	0.1	0.21	0.84	0.28	0.41 [0.37]	1.9	2.5	0.012 J	0.12	0.064	--	--
Isophorone	4.4	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
Naphthalene	13	0.75 J	0.088 J	0.032 J	0.17 J	0.09 J	1.2 [0.46]	0.23 J	0.17 J	0.36 U	0.012 J	0.015 J	--	--
Nitrobenzene	0.2	0.088 U	0.04 U	0.045 U	0.044 U	0.043 U	0.037 U [0.036 U]	0.039 U	0.076 U	0.036 U	0.036 U	0.037 U	--	--
N-Nitroso-di-n-propylamine	NA	0.088 U	0.04 U	0.045 U	0.044 U	0.043 U	0.037 U [0.036 U]	0.039 U	0.076 U	0.036 U	0.036 U	0.037 U	--	--
N-Nitrosodiphenylamine	NA	0.88 U	0.4 U	0.45 U	0.44 U	0.43 U	0.37 U [0.36 U]	0.39 U	0.76 U	0.36 U	0.36 U	0.37 U	--	--
Phenanthrene	50	11	0.21 J	0.24 J	1.7	0.9	2.5 [2.8]	1.8	5.7	0.015 J	0.063 J	0.051 J	--	--
Pyrene	50	10	0.27 J	0.58	3.5	1.2	1.9 [2.1]	4.5	11	0.027 J	0.18 J	0.13 J	--	--
Total PAHs	500	77.3	2.238	4.191	24.58	8.112	14.95 [16]	38.83	71.54	0.2096	1.533	0.911	--	--
Total SVOCs	500	80.86	2.562	4.377	25.253	8.808	15.56 [16.212]	39.35	72.89	0.2096	1.5423	0.911	--	--
PCBs (ppm)														
Aroclor-1016	1	--	--	--	--	--	-- [--]	--	--	--	--	--	0.072 U	0.071 U
Aroclor-1221	1	--	--	--	--	--	-- [--]	--	--	--	--	--	0.072 U	0.071 U
Aroclor-1232	1	--	--	--	--	--	-- [--]	--	--	--	--	--	0.072 U	0.071 U
Aroclor-1242	1	--	--	--	--	--	-- [--]	--	--	--	--	--	0.072 U	0.071 U
Aroclor-1248	1	--	--	--	--	--	-- [--]	--	--	--	--	--	0.072 U	0.071 U
Aroclor-1254	1	--	--	--	--	--	-- [--]	--	--	--	--	--	0.072 U	0.071 U
Aroclor-1260	1	--	--	--	--	--	-- [--]	--	--	--	--	--	0.072 U	0.24
Aroclor-1262	1	--	--	--	--	--	-- [--]	--	--	--	--	--	0.072 U	0.071 U
Aroclor-1268	1	--	--	--	--	--	-- [--]	--	--	--	--	--	0.072 U	0.071 U
Inorganics (ppm)														
Aluminum	*8,220*	**8,610**	7,460	**8,760**	**8,380**	7,890	**9620 [9570]**	**8,340**	7,880	5,340	6,670	**8,640**	--	--
Antimony	*0.49*	1 UJ	0.94 UJ	1 UJ	1 UJ	1 UJ	0.87 UJ [0.86 UJ]	0.91 UJ	0.89 UJ	0.84 UJ	0.85 UJ	0.87 UJ	--	--
Arsenic	*7.9*	**8.9**	**9.1**	7	**8.1**	6.6	**8.4 [8.1]**	**9.7**	7.8	5.3	2.7 B	5.2 B	--	--
Barium	*361*	158 J	**1300 J**	91.2 J	126 J	129 J	56.5 J [58.5 J]	138	71.8 J	42.1 J	50.3 J	60 J	--	--
Beryllium	*0.42*	**0.45 B**	0.38 B	0.4 B	**0.45 B**	**0.43 B**	0.35 B [0.34 B]	**0.5 J**	0.3 B	0.17 B	0.19 B	0.33 B	--	--
Cadmium	1	**2.3**	0.096 U	0.17 B	0.1 U	0.1 U	0.089 U [0.088 U]	0.094 U	0.33 B	0.086 U	0.087 U	0.089 U	--	--
Calcium	*7,436*	**9,270 J**	**9,140 J**	5,370 J	**7,540 J**	5,860 J	**11,300 J [11,500 J]**	**31,700 J**	**19,200 J**	**80,800 J**	**28,400 J**	**31,300 J**	--	--
Chromium	*32*	**44.1 J**	**70.7 J**	15 J	13.9 J	15.1 J	12.2 J [12.2 J]	13 J	16.5 J	8.5 J	8.8 J	11.3 J	--	--
Cobalt	30	7.9 B	11.7 B	8 B	8.2 B	7.7 B	9 B [8.9 B]	7 B	7.6 B	5 B	5.4 B	7.4 B	--	--

See Notes on Page 5.

TABLE 12
SURFACE SOIL ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

		Background Samples					Site Samples							
Sample ID		**SS-201**	**SS-202**	**SS-203**	**SS-204**	**SS-205**	**SS-206**	**SS-207**	**SS-208**	**SS-209**	**SS-210**	**SS-211**	**SS-212**	**SS-213**
Sample Date	**TAGM**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**	**4/6/04**
Sample Type	**Criteria**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS (w/ DUP)**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
Inorganics (ppm) continued														
Copper	*79*	**154 J**	**87.3 J**	59.6 J	35.3 J	59.9 J	27.3 J [26.6 J]	46.9 J	37.6 J	18.8 J	41.4 J	26.7 J	--	--
Iron	*29,760*	25,400	**55,800**	25,700	22,100	19,800	24900 [24600]	20,500	22,500	14,300	16,700	20,900	--	--
Lead	*171*	**365**	88.6	51.9	153	**197**	13.8 [13.3]	114	107	8.5	9	12.9	--	--
Magnesium	*3,676*	**4,090**	**4,030**	3,210	3,310	**3,740**	**4680 [3940]**	**4,750**	**5,030**	**9,470**	**5,540**	**7,010**	--	--
Manganese	*511*	**527**	**710**	484	498	335	417 [416]	472	442	448	**680**	492	--	--
Mercury	*0.30*	**0.89**	0.21	0.09	0.17	0.14	0.019 U [0.018 U]	0.18	0.06	0.018 U	0.02 B	0.02 B	--	--
Nickel	*107*	44.4 J	**417 J**	27.6 J	20.9 J	22.9 J	21.9 J [21.3 J]	20.6 J	22.2 J	12.6 J	14.1 J	19.1 J	--	--
Potassium	*940*	870 B	693 B	**995 B**	**1020 B**	**1120 B**	23.7 U [23.3 U]	24.9 U	24.1 U	22.8 U	23.1 U	23.6 U	--	--
Selenium	2	1.3	1.9	1 U	1 U	1 U	0.87 U [0.86 U]	1 B	0.89 U	0.84 U	0.85 U	0.87 U	--	--
Silver	*0.15*	**0.4 B**	0.17 U	0.19 U	0.18 U	0.18 U	0.16 U [0.15 U]	0.16 U	0.16 U	0.15 U	0.15 U	0.16 U	--	--
Sodium	*177*	**451 B**	**291 B**	96.7 U	94.5 U	94 U	80.6 U [79.3 U]	95.4 B	82 U	77.6 U	78.6 U	80.2 U	--	--
Thallium	*0.57*	1.2 U	1.1 U	1.2 U	1.2 U	1.1 U	0.98 U [0.97 U]	1 U	1 U	0.95 U	0.96 U	0.98 U	--	--
Vanadium	150	16.6	16.4	14.1	15.3	15.5	13.1 [13.1]	15.2	14.9	8.7 B	9 B	12.8	--	--
Zinc	*215*	**316**	**246**	137	191	183	67.1 [64.4]	184	**240**	54.5	77	77.9	--	--

See Notes on Page 5.

TABLE 12
SURFACE SOIL ANALYTICAL RESULTS

SUPPLEMENTAL REMEDIAL INVESTIGATION
NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

Notes:

All concentrations in milligram per kilograms (mg/kg), equivalent to parts per million (ppm).
-- = Not analyzed.
NA = No criteria listed.
DUP = Duplicate field sample.
FS = Field sample.

Criteria:

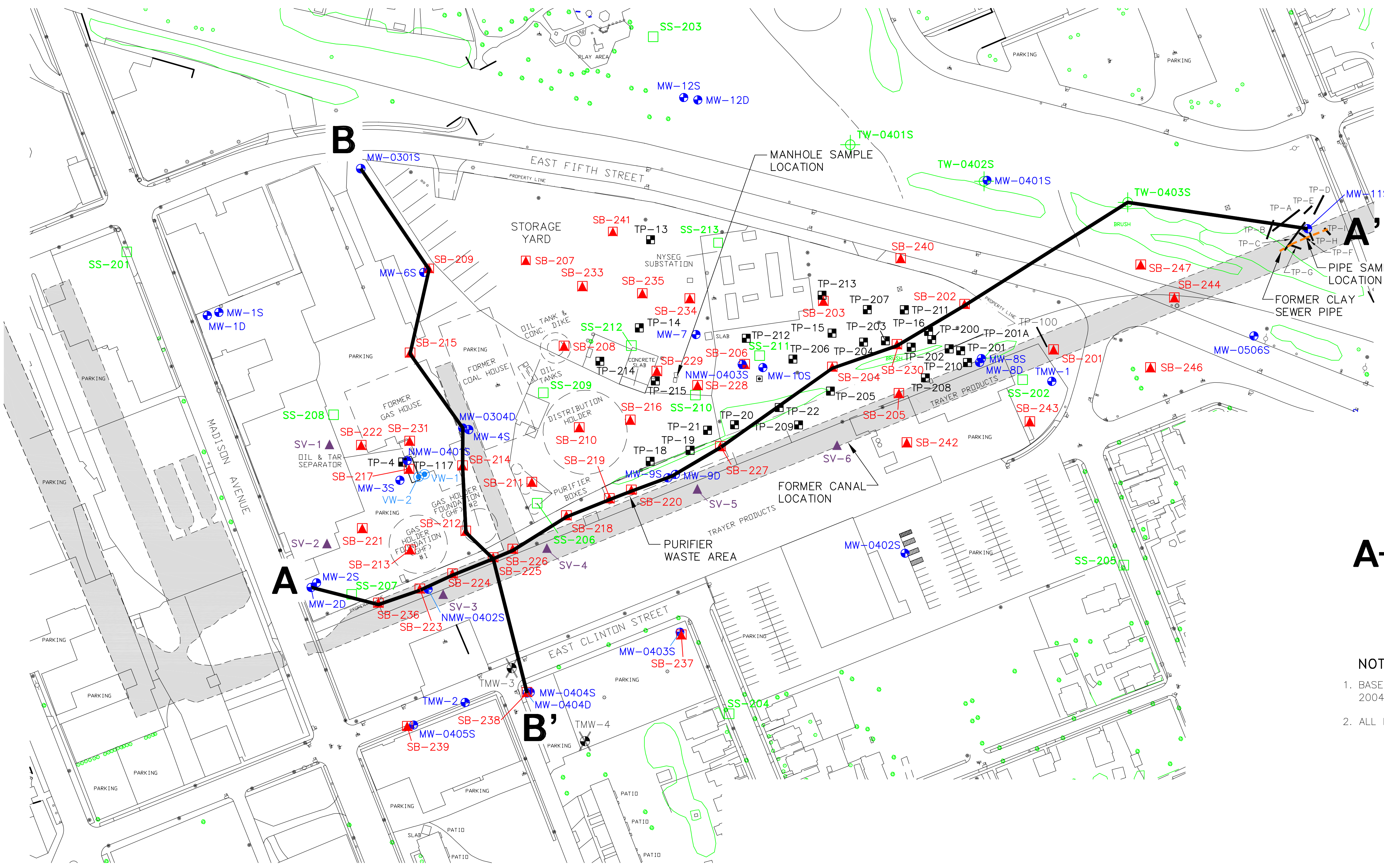
1. Technical and Administrative Guidance Memorandum (TAGM) #4046 recommended soil cleanup objective values (ppm) are used.

Bolded values indicate the constituent exceed criteria.
Italicized criteria values indicate average background concentration.

Data Qualifiers:

B = The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
J = The compound/constituent was positively identified; however, the associated numerical value is an estimated concentration only.
ND = Non detect.
U = The compound/constituent was analyzed for but not detected. The associated value is the compound/constituent quantitation limit.

FIGURES



LEGEND:

▲	APPROXIMATE LOCATION OF SUB-SLAB VAPOR SAMPLING LOCATIONS
●	MONITORING WELL; SHALLOW (S), DEEP (D), TRAYER WELL (TMW)
🟥	SOIL BORING
▚	TEST PIT
⊕	ABANDONED TEMPORARY MONITORING WELL
☐	SURFACE SOIL SAMPLING LOCATION
✕	ABANDONED MONITORING WELL
◉	MGP VAULTED WELL
▣	RECHARGE PIT
•	POWER POLE
-○-	UTILITY POLE W/GUY
☼	LIGHT POLE
○-○	POST, SIGN
▵	CATCH BASIN
○	TRAFFIC LIGHT
○	MANHOLE
A—A'	CROSS SECTION LOCATION

NOTES:

1. BASE MAP SUPPLIED BY NYSEG, LATEST REVISION DATED APRIL 2004, AT A SCALE OF 1"= 60'.
2. ALL LOCATIONS ARE APPROXIMATE.

0 80' 160'
GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP SITE
SUPPLEMENTAL REMEDIAL INVESTIGATION

SITE MAP

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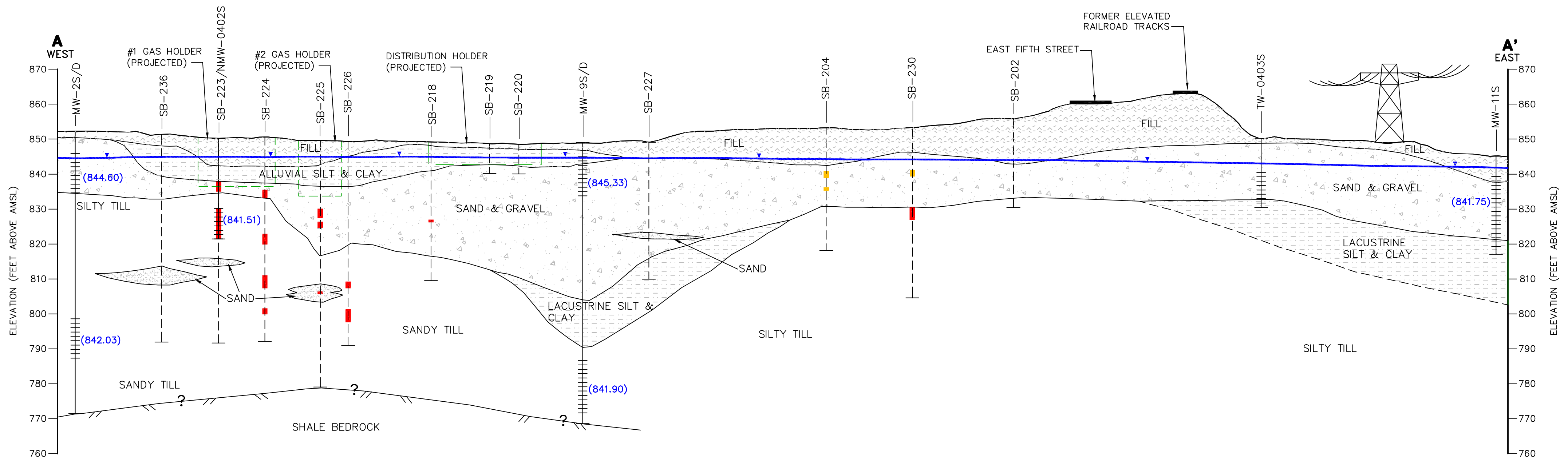
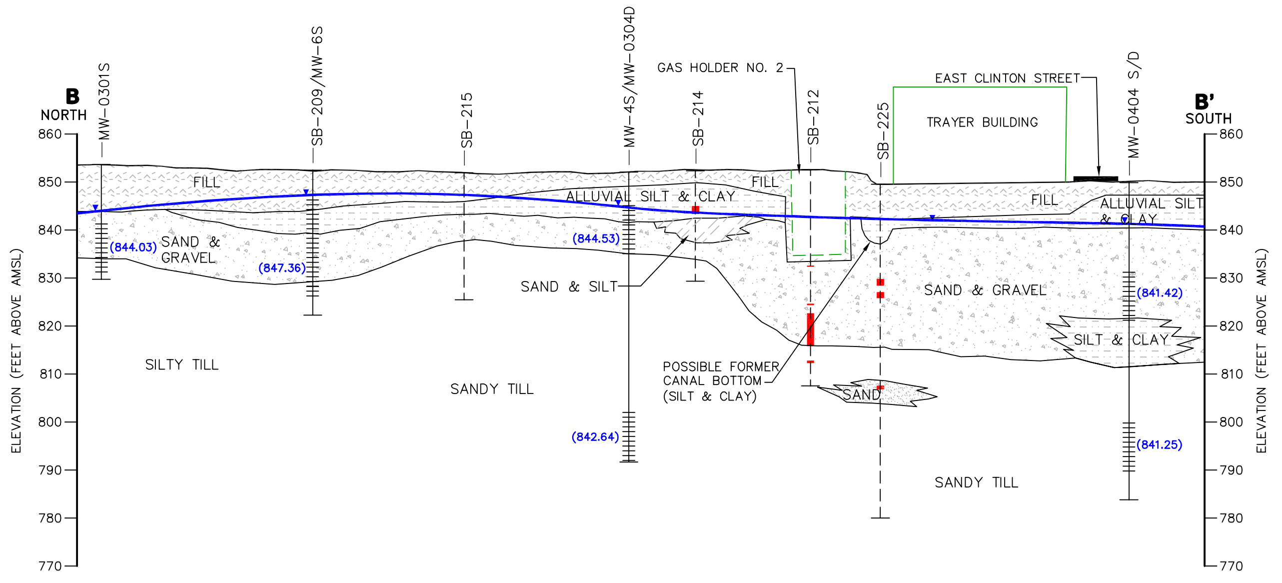
FIGURE
1

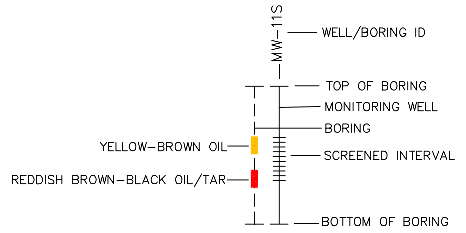
SYR-85-NJR WLJ RCA L: ON=*, OFF=REF*
F:\ACTIVE\-DWG\ACT\13043006\13043B02.DWG SAVED:12/6/2006 9:58 AM LAYOUT:Layout1 PAGESETUP: ---- PENTABLE:PLTFULL.CTB PRINTED:12/6/2006 9:58 AM BY:RALLEN
XREFS: IMAGES:

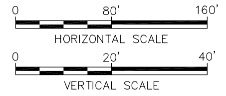




LEGEND:

▨	FILL
▤	SILT AND CLAY
▨	SAND AND GRAVEL
☐	TILL (DENSE UNSORTED SAND AND GRAVEL WITH VARYING AMOUNT OF SAND AND SILT)
(841.71)	GROUNDWATER ELEVATION (4/20/04)





NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP SITE
SUPPLEMENTAL REMEDIAL INVESTIGATION

GEOLOGIC CROSS SECTIONS
A-A' AND B-B'

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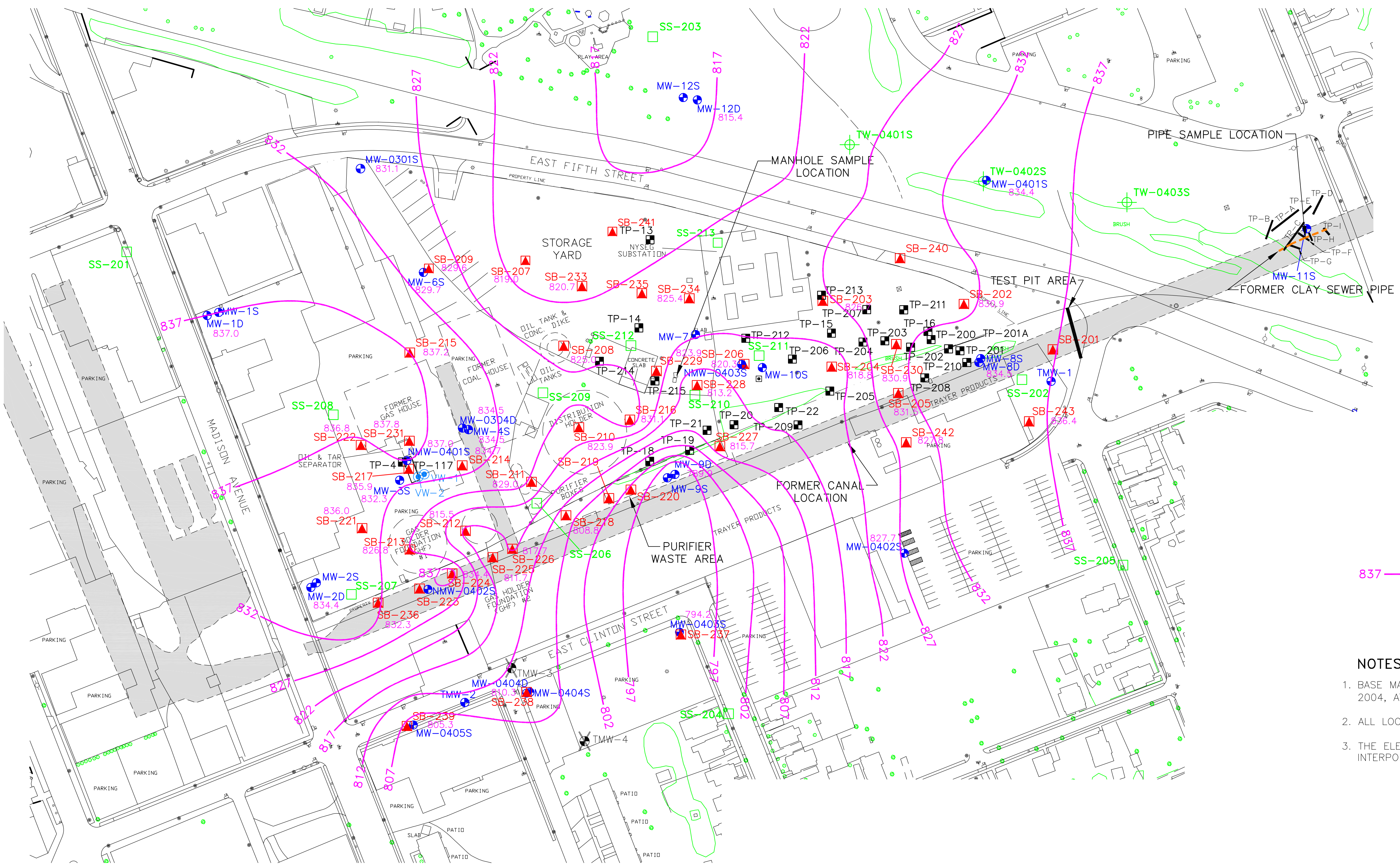
FIGURE
2

L: ON=*, OFF=REF*
P: PAGESET/PLT-DL
5/10/05 SYR-85-RCA GMS NJR
13043003/13043V01.DWG



LEGEND:

◕	MONITORING WELL; SHALLOW (S), DEEP (D), TRAYER WELL (TMW)
🟥	SOIL BORING
▨	TEST PIT
⊕	ABANDONED TEMPORARY MONITORING WELL
☐	SURFACE SOIL SAMPLING LOCATION
✕	ABANDONED MONITORING WELL
◉	MGP VAULTED WELL
▣	RECHARGE PIT
•	POWER POLE
-○-	UTILITY POLE W/GUY
☼	LIGHT POLE
o-oo	POST, SIGN
⊡	CATCH BASIN
○	TRAFFIC LIGHT
⊗	MANHOLE
831.1	TILL ELEVATION IN FEET
837 ——	INFERRED TILL ELEVATION CONTOUR

NOTES:

1. BASE MAP SUPPLIED BY NYSEG, LATEST REVISION DATED APRIL 2004, AT A SCALE OF 1"= 60'.
2. ALL LOCATIONS ARE APPROXIMATE.
3. THE ELEVATION CONTOURS DEPICTED ON THIS FIGURE WERE INTERPOLATED BY MVS SOFTWARE.

0 80' 160'
GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP SITE
SUPPLEMENTAL REMEDIAL INVESTIGATION

TILL SURFACE ELEVATION CONTOUR MAP

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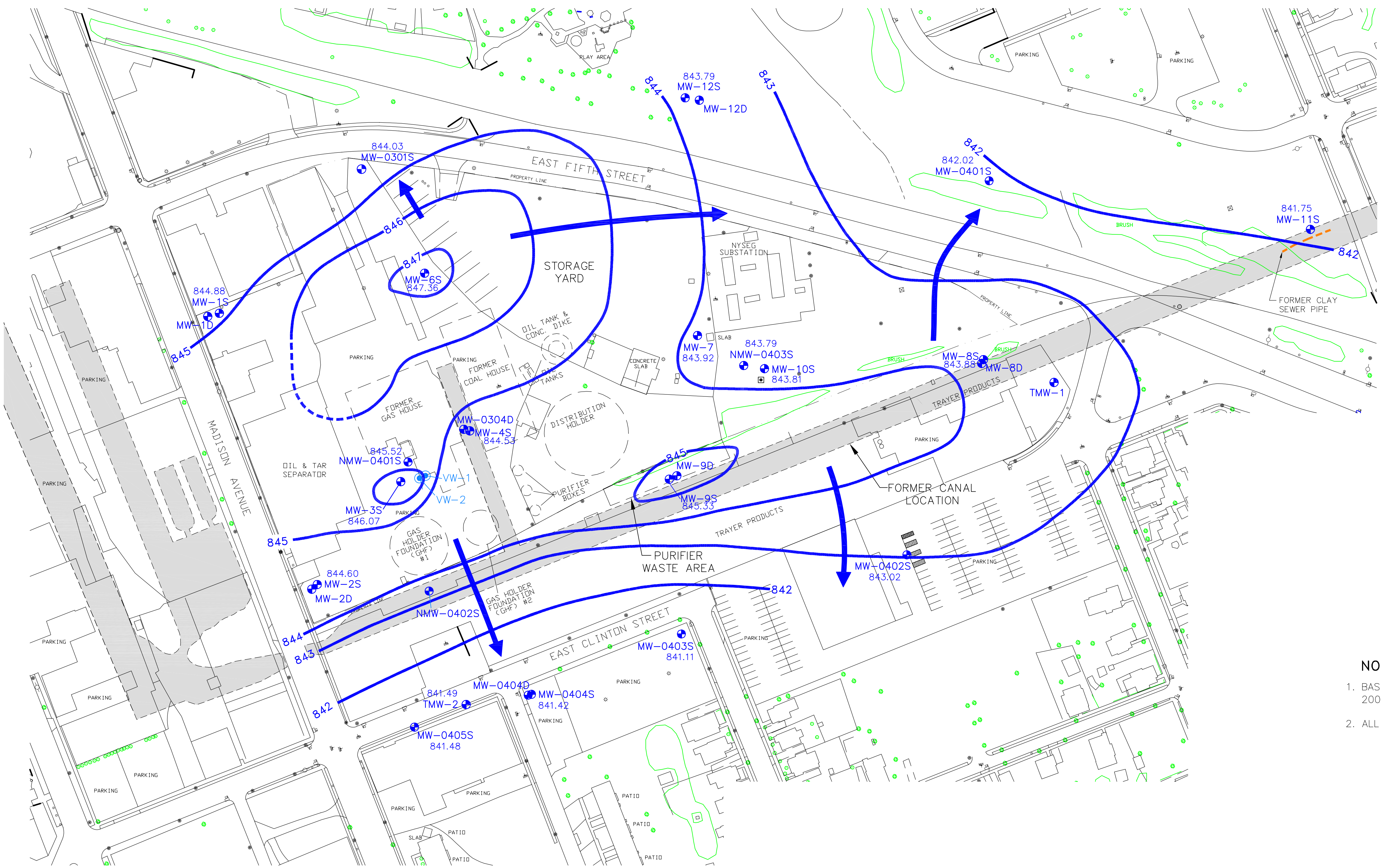
FIGURE
3

L: ON=*, OFF=REF*
P: PAGESET/PLT-DL
5/10/05 SYR-85-RCA GMS NJR
13043003/13043W06.DWG



LEGEND:

●	MONITORING WELL; SHALLOW (S), DEEP (D), TRAYER WELL (TMW)
◉	MGP VAULTED WELL
▣	RECHARGE PIT
•	POWER POLE
-○-	UTILITY POLE W/GUY
☼	LIGHT POLE
○-○	POST, SIGN
▭	CATCH BASIN
○	TRAFFIC LIGHT
◦	MANHOLE
842 ——	INFERRED GROUNDWATER ELEVATION CONTOUR
841.75	GROUNDWATER ELEVATION
←	GROUNDWATER FLOW DIRECTION

NOTES:

1. BASE MAP SUPPLIED BY NYSEG, LATEST REVISION DATED APRIL 2004, AT A SCALE OF 1"= 60'.
2. ALL LOCATIONS ARE APPROXIMATE.

0 80' 160'
GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP SITE
SUPPLEMENTAL REMEDIAL INVESTIGATION

WATER TABLE MAP - APRIL 20, 2004

BBL® an ARCADIS company

FIGURE
4

SYR-85- NJR WLJ RCA L: ON=*, OFF=REF*
F:\ACTIVE\-DWG\ACT\13043006\13043W03.DWG
SAVED:12/6/2006 10:01 AM LAYOUT:Layout1 PAGESETUP:---- PENTABLE:PLTFULL.CTB PRINTED:12/6/2006 10:02 AM BY:RALLEN
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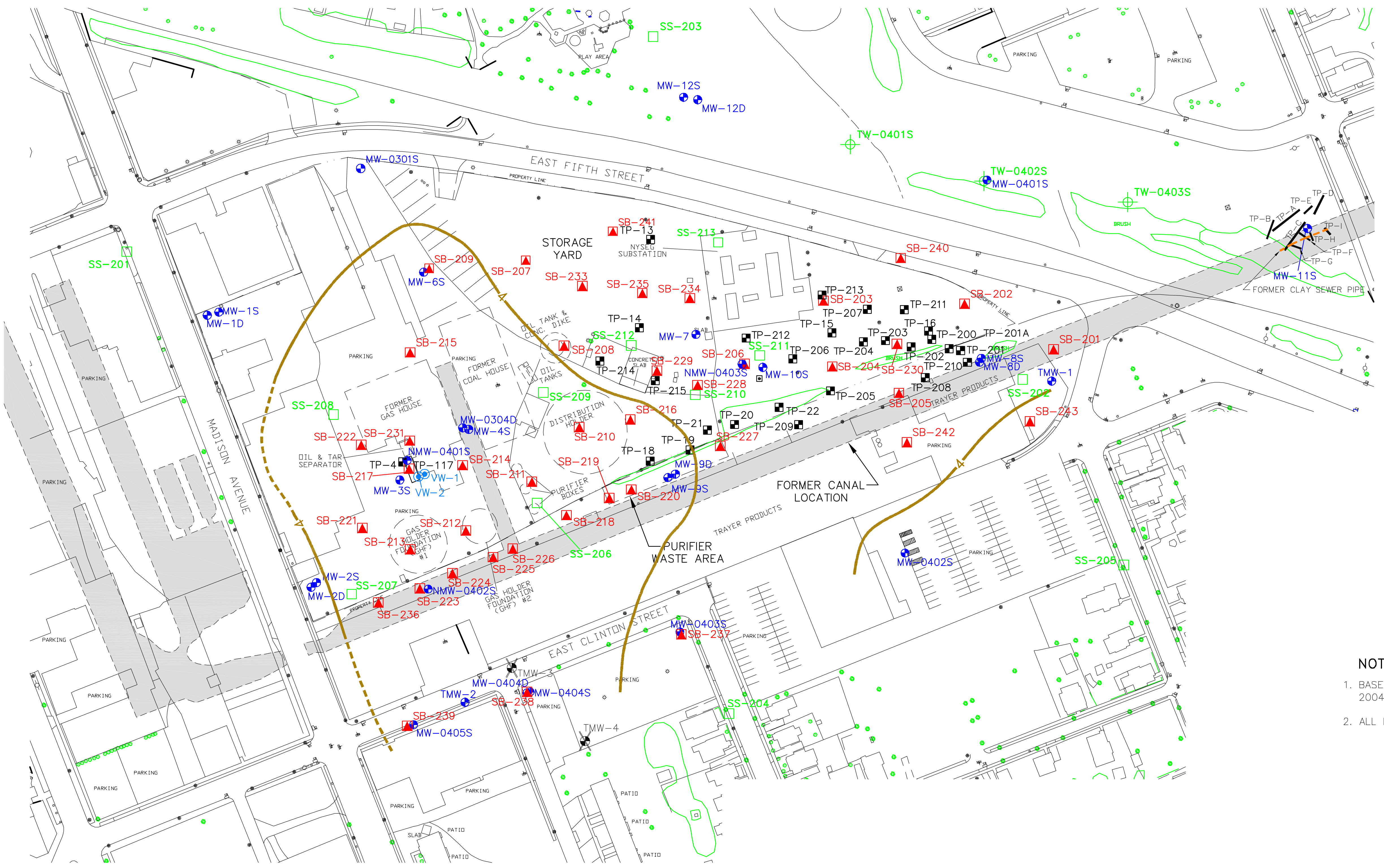

LEGEND:

- 🔵 MONITORING WELL; SHALLOW (S), DEEP (D), TRAYER WELL (TMW)
- 🔺 SOIL BORING
- ▚ TEST PIT
- ⊕ ABANDONED TEMPORARY MONITORING WELL
- ☐ SURFACE SOIL SAMPLING LOCATION
- ✖ ABANDONED MONITORING WELL
- ◉ MGP VAULTED WELL
- ▣ RECHARGE PIT
- ● POWER POLE
- -○- UTILITY POLE W/GUY
- ○ LIGHT POLE
- ○-○ POST, SIGN
- CATCH BASIN
- ○ TRAFFIC LIGHT
- MANHOLE
- —4— APPROXIMATE EXTENT OF ALLUVIAL SILT AND CLAY WITH THICKNESS GREATER THAN 4' (DASHED WHERE INFERRED)

NOTES:

1. BASE MAP SUPPLIED BY NYSEG, LATEST REVISION DATED APRIL 2004, AT A SCALE OF 1"= 60'.
2. ALL LOCATIONS ARE APPROXIMATE.

0 80' 160'
GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP SITE
SUPPLEMENTAL REMEDIAL INVESTIGATION

APPROXIMATE EXTENT OF ALLUVIAL SILT & CLAY (THICKNESS GREATER THAN 4')

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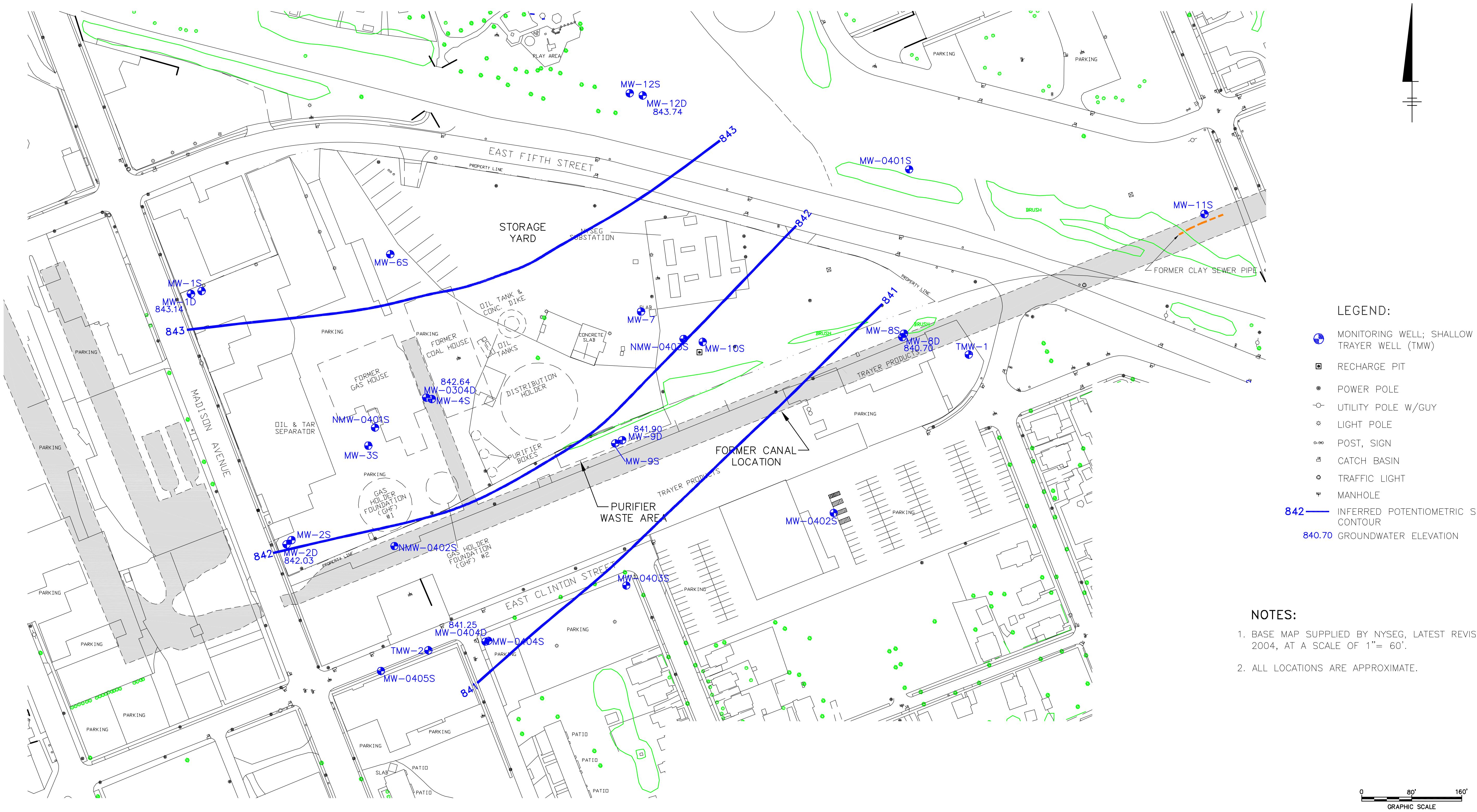
FIGURE
5

L: ON=*, OFF=REF*
P: PAGESET/PLT-DL
4/13/05 SYR-85-RCA GMS NJR
13043003/13043W01.DWG



LEGEND:

●	MONITORING WELL; SHALLOW (S), DEEP (D), TRAYER WELL (TMW)
▣	RECHARGE PIT
•	POWER POLE
-○-	UTILITY POLE W/GUY
○	LIGHT POLE
○-○	POST, SIGN
⊓	CATCH BASIN
○	TRAFFIC LIGHT
⊕	MANHOLE
842 ——	INFERRED POTENTIOMETRIC SURFACE ELEVATION CONTOUR
840.70	GROUNDWATER ELEVATION

NOTES:

1. BASE MAP SUPPLIED BY NYSEG, LATEST REVISION DATED APRIL 2004, AT A SCALE OF 1"= 60'.
2. ALL LOCATIONS ARE APPROXIMATE.

NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP SITE
SUPPLEMENTAL REMEDIAL INVESTIGATION

DEEP OVERBURDEN POTENTIOMETRIC SURFACE MAP - APRIL 20, 2004

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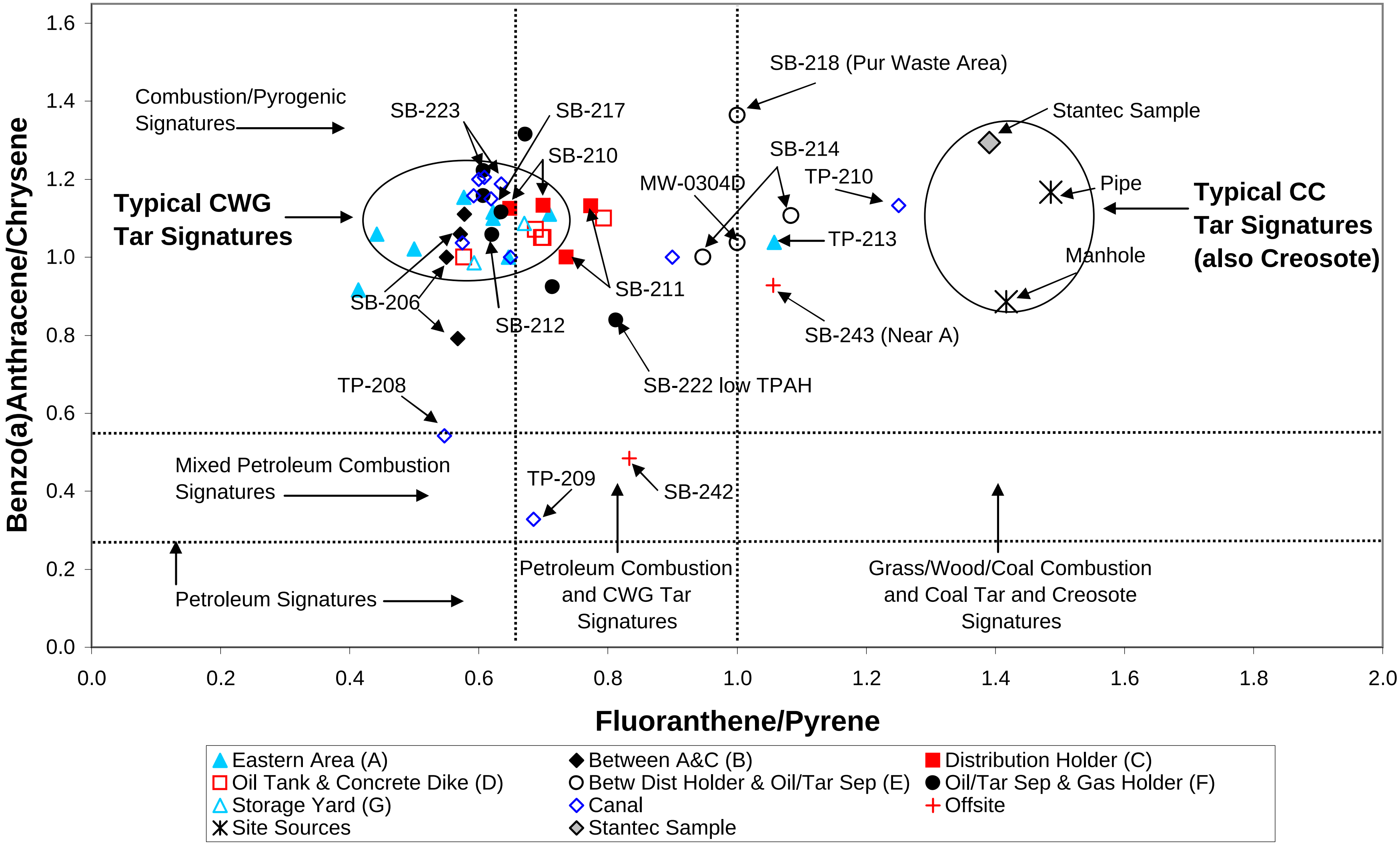
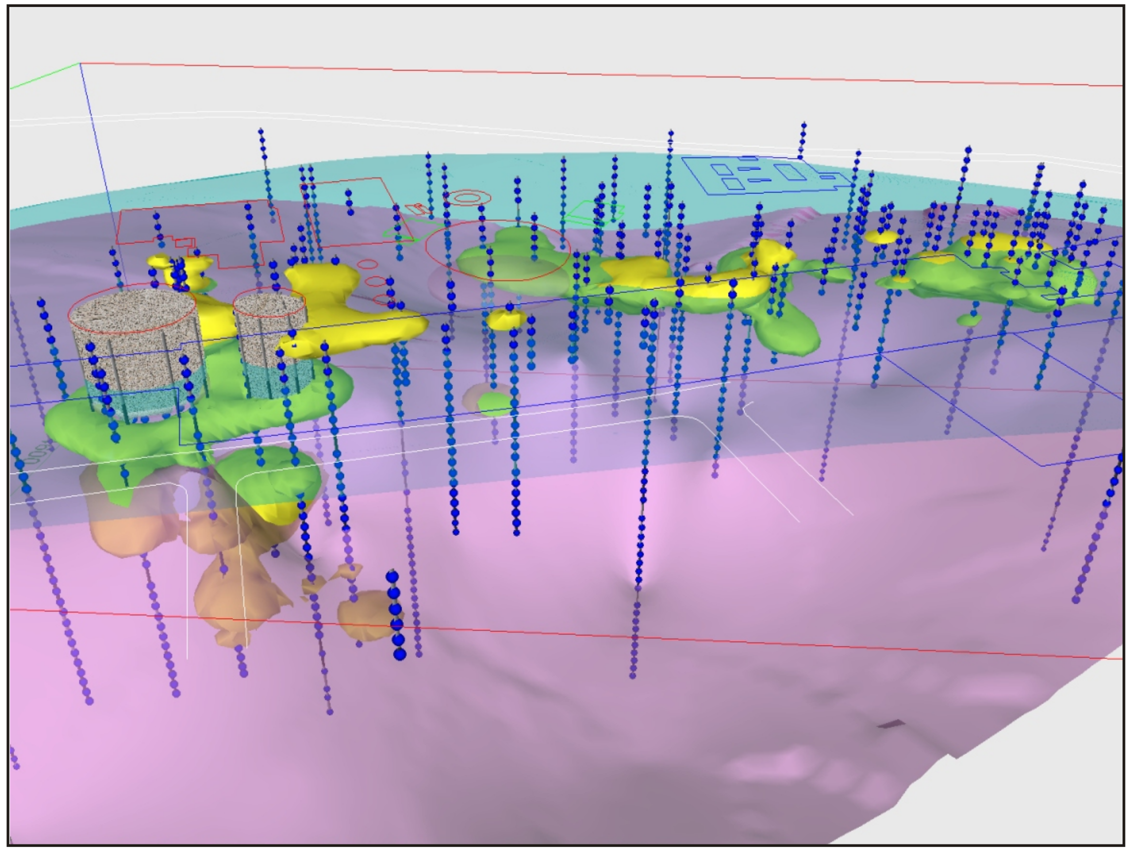
FIGURE
6

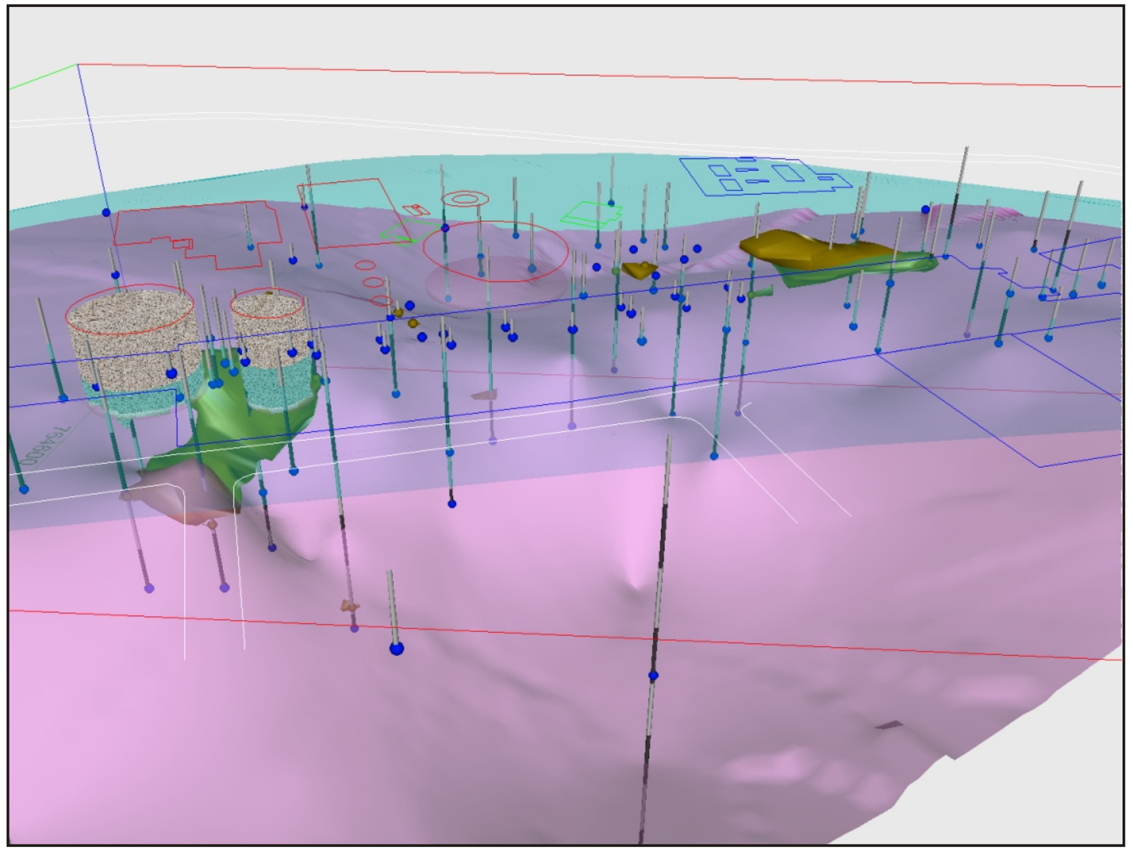
L: ON=*, OFF=REF*
P: PAGESET/PLT-DL
3/29/05 SYR-85-RCA GMS NJR
13043003/13043W02.DWG

Figure 7 - BAA/C vs Fl/Py of All Samples in Site Soils (excluding samples with <1 mg/kg TPAH). Ratios from Yunker et al. (2002)

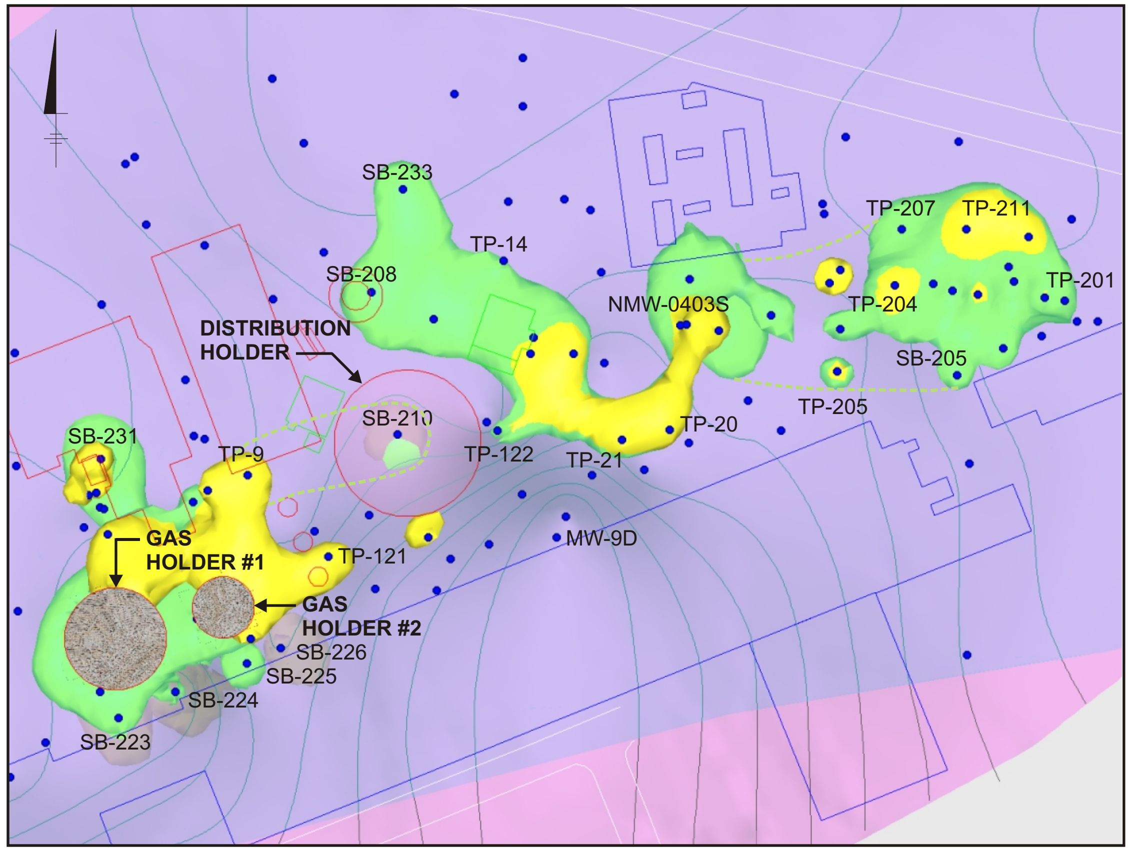




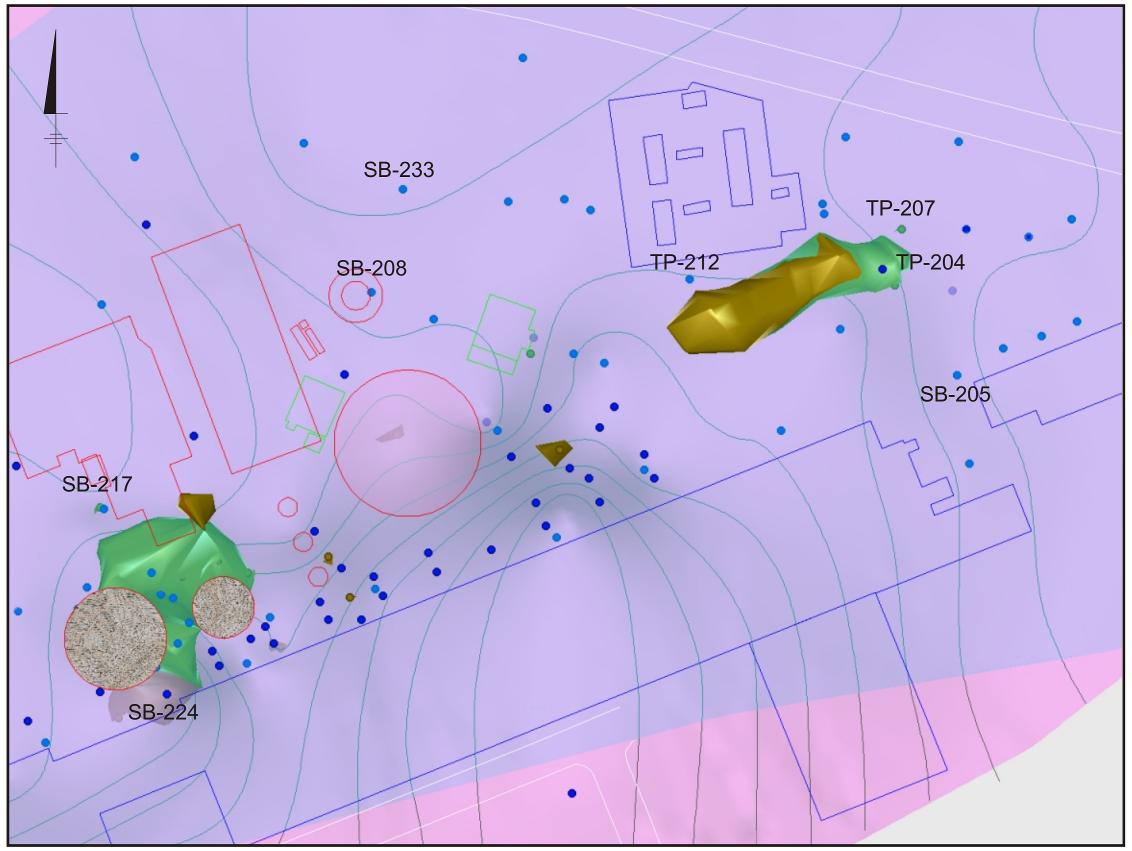
MODELED NAPL DISTRIBUTION (INCLUDING SHEEN) OBLIQUE VIEW FACING NORTHEAST



MODELED PAH DISTRIBUTION (≥ 500 PPM) OBLIQUE VIEW FACING NORTHEAST



MODELED NAPL DISTRIBUTION (INCLUDING SHEEN) - PLAN VIEW



MODELED PAH DISTRIBUTION (≥ 500 ppm) - PLAN VIEW

LEGEND:

▨ PAHs (≥ 500 PPM) ABOVE THE WATER TABLE

▨ PAHs (≥ 500 PPM) BELOW THE WATER TABLE

▨ NAPL ABOVE WATER TABLE

▨ NAPL BELOW WATER TABLE

▨ NAPL BELOW TILL SURFACE

▨ WATER TABLE

▨ IRM BACKFILL

- - - - INFERRED NAPL LIMITS

— 832 — TOP OF SILT AND FINE SAND TOPOGRAPHIC CONTOUR (REFER TO FIGURE 3 FOR DETAILS)

BOREHOLE TRACE

● SAMPLE LOCATION

NOTE:
THE MAJORITY OF DATA POINTS USED TO GENERATE THE REGION OF PAHS SHOWN ARE LOCATED INSIDE THE REGION ITSELF AND ARE THEREFORE NOT VISIBLE. ALL AVAILABLE SOIL PAH DATA WERE USED TO GENERATE THE REGION.

Area Location

NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP SITE
SUPPLEMENTAL REMEDIAL INVESTIGATION

MODELED DISTRIBUTION OF NAPL (INCLUDING SHEEN) AND PAHS ≥ 500 PPM IN SOIL

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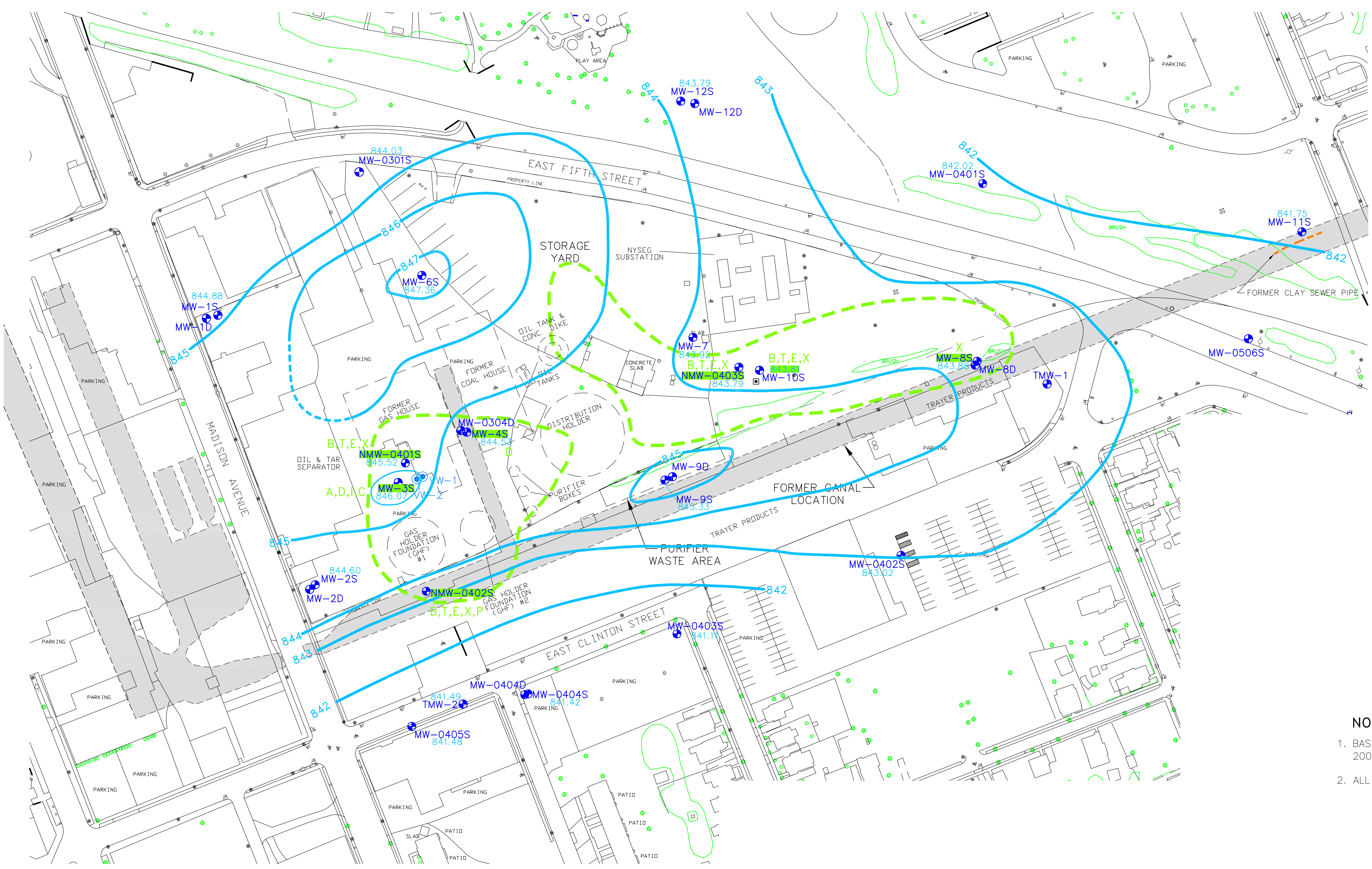
FIGURE
8

05/23/05 SYR-D85-DJH
13043003/13043n04.cdr



LEGEND:

- ● MONITORING WELL; SHALLOW (S), DEEP (D), TRAYER WELL (TMW)
- ◉ MGP VAULTED WELL
- ▣ RECHARGE PIT
- • POWER POLE
- -○- UTILITY POLE W/GUY
- ☼ LIGHT POLE
- ∘-∘ POST, SIGN
- ⊡ CATCH BASIN
- ○ TRAFFIC LIGHT
- ⊕ MANHOLE
- 842 — INFERRED GROUNDWATER ELEVATION CONTOUR
- 841.75 GROUNDWATER ELEVATION
- 🟩 B,T,E,X,C APRIL 2004 GROUNDWATER SAMPLE CONTAINED ONE OR MORE CONSTITUENTS OF CONCERN (BTEX AND PAHs) AT A CONCENTRATION GREATER THAN THE NYSDEC CLASS GA GROUNDWATER STANDARD (TOGS 1,1,1, JUNE 1998). THE LETTER GIVEN REPRESENTS THE COMPOUND(S) THAT EXCEED THEIR RESPECTIVE STANDARD, AS FOLLOWS:

  A = 1,1,1-TRICHLOROETHANE
  D = 1,1-DICHLOROETHANE
  I = 1,1-DICHLOROETHENE
  C = CHLOROETHANE
  X = XYLENES
  B = BENZENE
  E = ETHYLBENZENE
  T = TOLUENE
  P = BENZO(A)PYRENE

- – – INFERRED EXTENT OF SHALLOW GROUNDWATER CONCENTRATIONS ABOVE NYSDEC CLASS GA GROUNDWATER STANDARDS, AS FOLLOWS:

NOTES:

1. BASE MAP SUPPLIED BY NYSEG, LATEST REVISION DATED APRIL 2004, AT A SCALE OF 1"= 60'.
2. ALL LOCATIONS ARE APPROXIMATE.

0 80' 160'
GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP SITE
SUPPLEMENTAL REMEDIAL INVESTIGATION

ESTIMATED EXTENT OF VOCs AND SVOCs EXCEEDING CLASS GA GROUNDWATER STANDARDS

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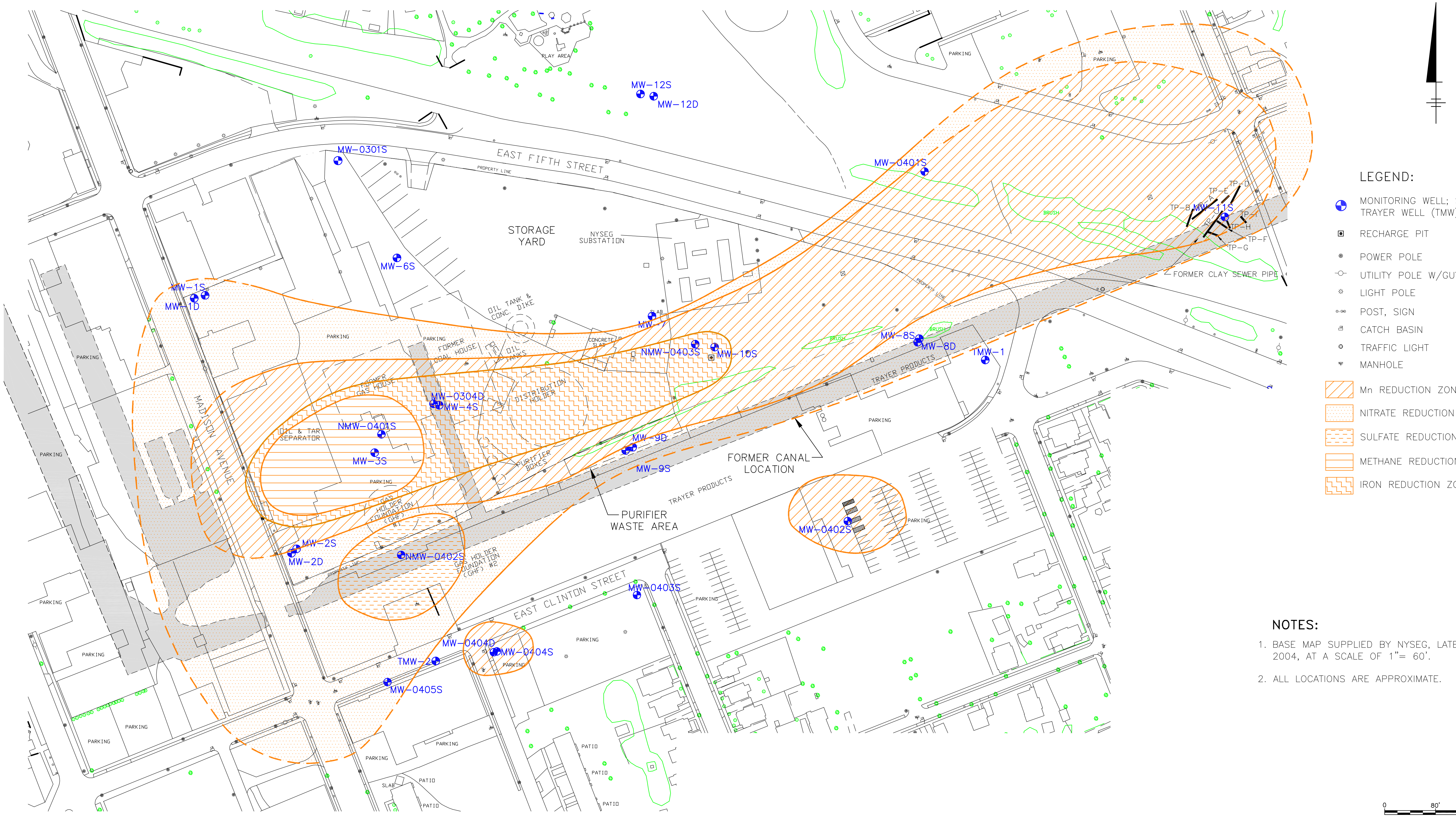
FIGURE
9



LEGEND:

- ● MONITORING WELL; SHALLOW (S), DEEP (D), TRAYER WELL (TMW)
- ▣ RECHARGE PIT
- • POWER POLE
- -○- UTILITY POLE W/GUY
- ☼ LIGHT POLE
- ○-○ POST, SIGN
- ▭ CATCH BASIN
- ○ TRAFFIC LIGHT
- ● MANHOLE
- ▨ Mn REDUCTION ZONE
- ▨ NITRATE REDUCTION ZONE
- ▨ SULFATE REDUCTION ZONE
- ▤ METHANE REDUCTION ZONE
- ▨ IRON REDUCTION ZONE

NOTES:

1. BASE MAP SUPPLIED BY NYSEG, LATEST REVISION DATED APRIL 2004, AT A SCALE OF 1"= 60'.
2. ALL LOCATIONS ARE APPROXIMATE.

0 80' 160'
GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP SITE
SUPPLEMENTAL REMEDIAL INVESTIGATION

REDUCTION ZONES

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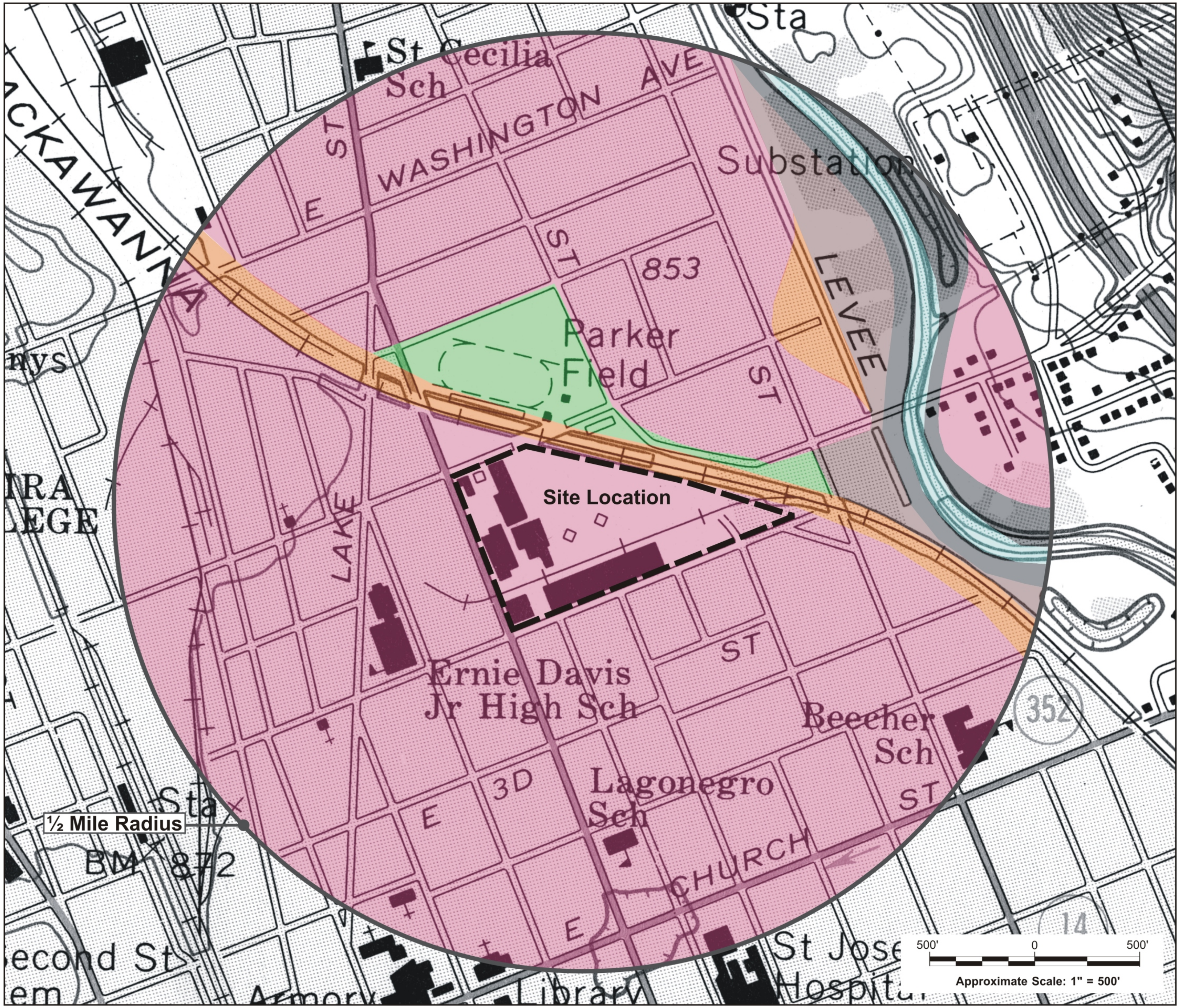
FIGURE
10

L: ON=*, OFF=REF*
P: PAGESET/PLT-DL2B1
5/23/05 SYR-85-RCA NJR RCA
13043003/13043B03.DWG



Legend

🟪 Commercial/Industrial/Residential

🟩 Mowed Lawn

🟧 Scrub/Shrub and Early Successional Hardwood Forest

🟫 Managed Floodplain

⬛ Riparian Scrub/Shrub

🟦 Perennial Stream

▬ ▬ Property Boundary

— ½ Mile Radius

NOTE:
Field reconnaissance was conducted on October 29, 2003.

NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP SITE

SUPPLEMENTAL REMEDIAL INVESTIGATION

COVERTYPE MAP

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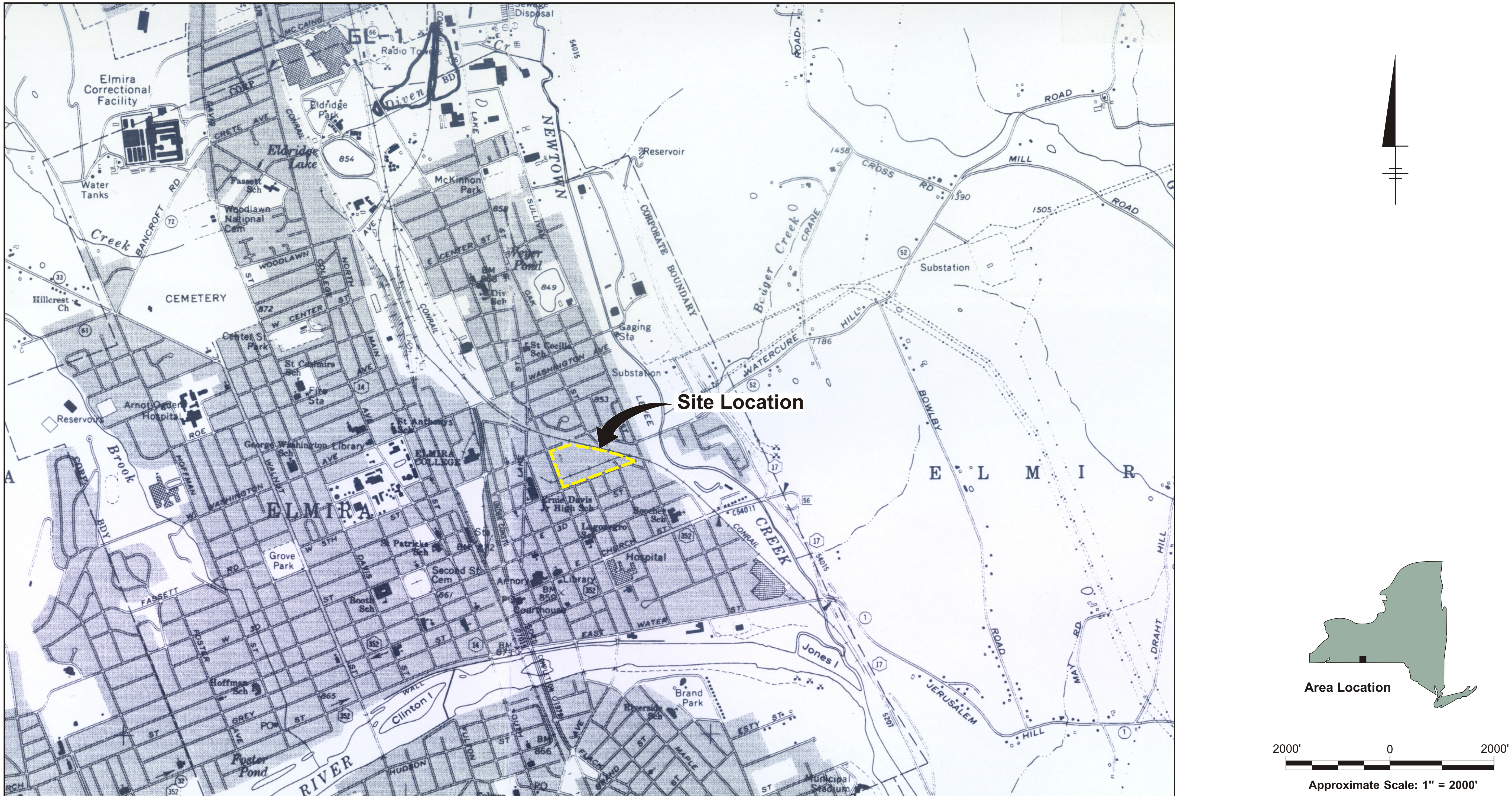
FIGURE
11

04/13/05 SYR-D85-LBR, DJH
13043003/13043n02.cdr

REFERENCE: Base Map USGS 7.5 Min. Quad., Elmira, N.Y.-P.A., 1969.



NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP SITE

SUPPLEMENTAL REMEDIAL INVESTIGATION

NEW YORK STATE FRESHWATER WETLANDS MAP

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FIGURE
12

REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., AMSTERDAM, NY, 1954, PHOTOREVISED 1980.

03/31/05 SYR-D85-DJH
13043003/13043n03.cdr

REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., AMSTERDAM, NY, 1954, PHOTOREVISED 1980.

04/13/05 SYR-D85-DJH
13043003/13043n01.cdr

NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP SITE

SUPPLEMENTAL REMEDIAL INVESTIGATION

NATIONAL WETLANDS INVENTORY MAP

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FIGURE
13

APPENDICES

Appendix A

Subsurface Logs

Date Start/Finish: 10/3/03 - 10/6/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyon/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764643
Easting: 760931.39
Casing Elevation: 852.64' AMSL

Borehole Depth: 24' below grade
Surface Elevation: 853.1' AMSL

Geologist: Jason Sents

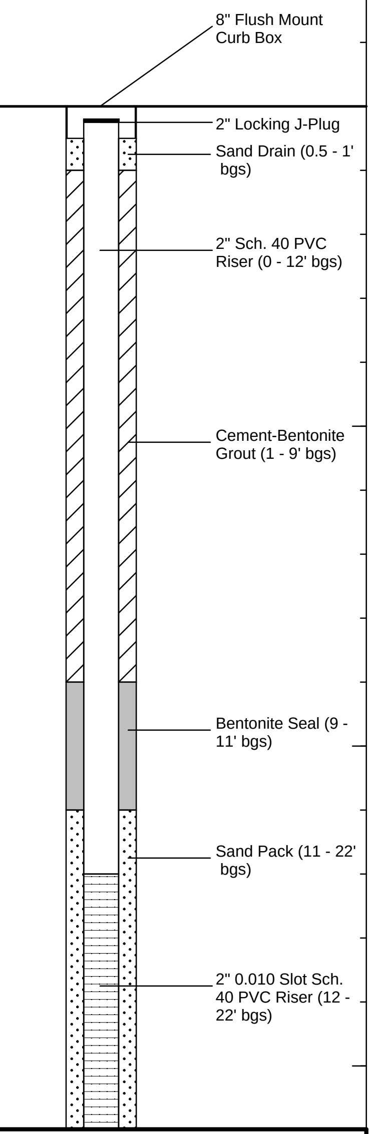
Well/Boring ID: MW-0301S

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	855									
0		1	0-2	0.7	3 5 6 6	11	0.3			Dark brown fine to medium SAND, crushed Stone, loose, damp.
	850	2	2-4	0.6	5 8 14 9	22	0.5			
5		3	4-6	0.6	9 27 22 14	49	0.2			Some black Cinders, Ash, and Cobble, at 4.6' bgs.
		4	6-8	0.1	7 3 7 7	10	ND			Brown fine to medium SAND and GRAVEL, loose, dry.
	845	5	8-10	0.0	7 7 15 7	22	NA			No Recovery.
10		6	10-12	0.1	3 5 6 7	11	ND			Brown fine to medium SAND and GRAVEL, some coarse Sand, loose, wet.
	840	7	12-14	0.4	6 16 11 12	27	0.1			
15		8	14-16	1.2	35 17 21 12	38	ND			

Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL =Above Mean Sea Level.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: MW-0301S

Borehole Depth: 24' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	1.1	14 12 14 20	26	ND			Brown fine to medium SAND and GRAVEL, some coarse Sand, loose, wet.	Sand Pack (11 - 22' bgs) 2" 0.010 Slot Sch. 40 PVC Riser (12 - 22' bgs)
	835	10	18-20	0.2	40 50/0.3 NA NA	NA	ND				
20		11	20-22	1.0	40 38 50/0.4 NA	NA	ND			Becoming more compact, trace Cobbles at 20' bgs.	
	830	12	22-24	0.2	50/0.4 NA NA NA	NA	ND			Gray SILT and subangular GRAVEL, dense. [TILL]	Bentonite Pellets (22 - 24' bgs)
25											
	825										
30											
	820										
35											

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Project: 130.43.003
Data File:MW-0301S.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/19/03

Date Start/Finish: 10/7/03 - 10/8/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyon/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764260.67
Easting: 761081.66
Casing Elevation: 851.18' AMSL

Borehole Depth: 60' below grade
Surface Elevation: 851.54' AMSL

Geologist: Jason Sents

Well/Boring ID: MW-0304D

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample
0		1	0-2	1.0	27 22 14 10	36	2.0	
	850	2	2-4	1.0	2 3 3 4	6	2.5	X
5		3	4-6	1.2	1 3 3 3	6	0.5	
	845	4	6-8	1.0	1 2 4 4	6	0.2	
		5	8-10	1.1	9 9 14 12	23	0.3	X
10	840	6	10-12	0.8	1 1 1 2	2	0.1	
		7	12-14	0.5	2 1 1 1	2	ND	
15		8	14-16	0.1	1 WOH 1 2	2	ND	X

Stratigraphic Description

ASPHALT.

Brown fine to medium SAND and Crushed STONE, loose, dry.

Black CINDERS and ASH, Coal, trace coarse Sand, Brick, Slag, loose, dry.

Dark gray-green Clayey SILT, trace Gravel, trace Roots, staining, sewage odor, soft, damp.

Come medium to coarse Sand, wet from 3.5' - 4.0' bgs.

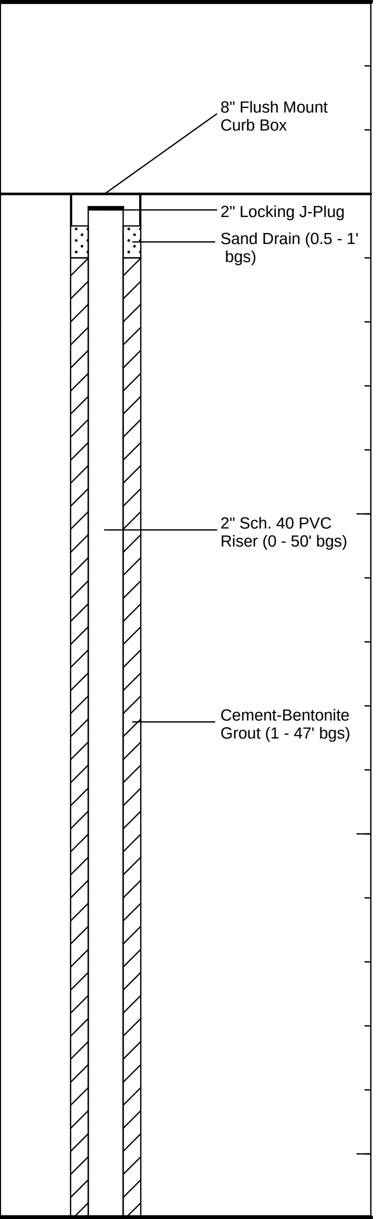
Becoming brown at 6.0' bgs.

Orange-brown color, gray mottling, trace fine Sand, Roots, damp below 9.5' bgs.

Olive medium to coarse SAND, trace Silt and fine Sand, loose, wet.

Brown fine to coarse SAND and GRAVEL, loose, wet.

Well/Boring Construction



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Soil sample collected from 2' - 4', 9' - 11', and 15' - 17', for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:MW-0304D.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/19/03

Client: New York State Electric and Gas

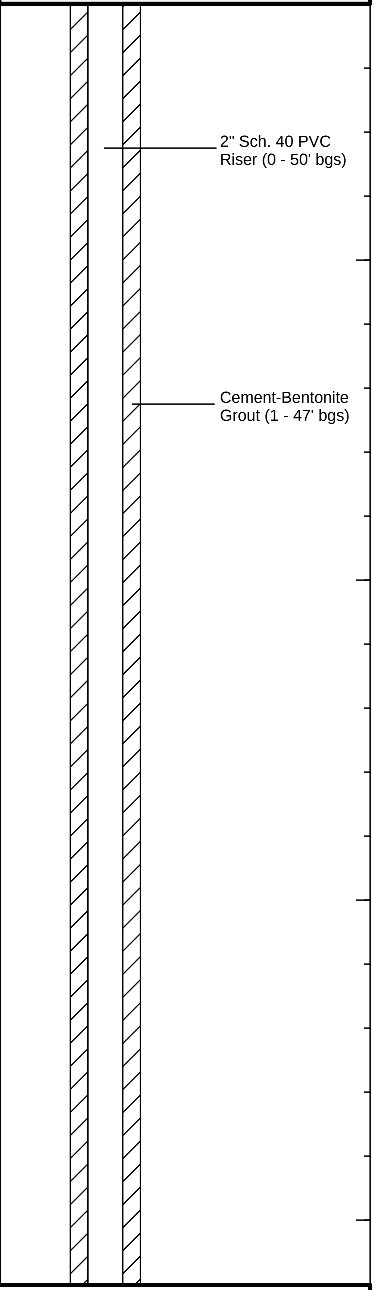
Well/Boring ID: MW-0304D

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 60' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
	835	9	16-18	1.0	7 20 20 24	40	ND	X	Brown fine to coarse SAND and GRAVEL, loose, wet. Olive brown SILT, fine to coarse Sand and Gravel, trace Clay. [TILL]
20		10	18-20	1.1	14 20 20 34	40	ND		
	830	11	20-22	0.9	23 30 30 34	60	ND		
		12	22-24	0.5	26 36 45 23	81	ND		Becoming gray at 22' bgs.
25		13	24-26	1.3	12 23 40 45	63	ND		Gray SILT and subangular GRAVEL, little fine to coarse Sand, trace Clay.
	825	14	26-28	2.0	40 35 21 20	56	ND		
30		15	28-30	1.0	15 20 27 30	47	ND		Trace Cobbles below 28' bgs.
	820	16	30-32	0.6	47 17 22 25	39	ND		Some Sand below 30' bgs.
		17	32-34	0.4	15 50/0.4 NA NA	NA	ND		
35		18	34-36	0.7	40 50/0.3 NA NA	NA	ND		

Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 2' - 4', 9' - 11', and 15' - 17', for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

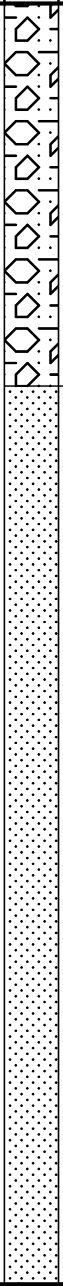
Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: MW-0304D

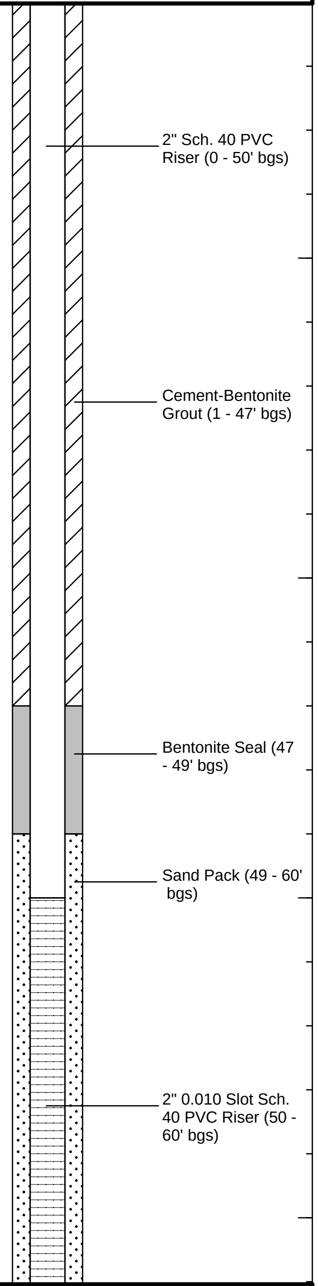
Borehole Depth: 60' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
	815	19	36-38	0.5	24 50/0.3 NA NA	NA	ND		Gray SILT and subangular GRAVEL, some fine to coarse Sand, trace Clay.
		20	38-40	0.4	50/0.3 NA NA NA	NA	ND		
40	810	21	40-42	0.0	35 50/0.3 NA NA	NA	ND		
		22	42-44	0.5	28 50/0.3 NA NA	NA	ND		Gray fine SAND, little Silt, trace subangular Gravel, dense, wet.
45		23	44-46	0.9	14 33 50/0.1 NA	NA	ND		
	805	24	46-48	0.3	38 50/0.3 NA NA	NA	ND		Some Silt at 46' bgs. Auger through Cobble to 48.5' bgs.
		25	48-50	0.3	NA 50 50/0.1 NA	NA	ND		
50	800	26	50-52	0.3	50/0.4 NA NA NA	NA	ND		
		27	52-54	0.2	50/0.4 NA NA NA	NA	ND		
55		28	54-56	0.5	30 50/0.3 NA NA	NA	ND		

Geologic Column



Well/Boring Construction



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Soil sample collected from 2' - 4', 9' - 11', and 15' - 17', for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

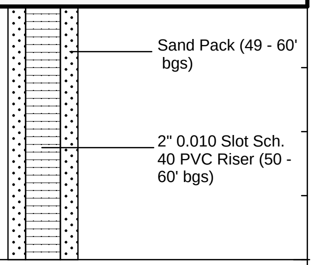
Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: MW-0304D

Borehole Depth: 60' below grade

DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
795	29	56-58	0.1	30 50/0.2 NA NA	NA	ND			Gray fine SAND, little Silt, trace subangular Gravel, dense, wet.	
60	30	58-60	0.3	50/0.2 NA NA NA	NA	ND			Numerous Shale Fragments from 58' - 60' bgs.	

790
65
785
70
780
75



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 2' - 4', 9' - 11', and 15' - 17', for BTEX, PAH, & Total Cyanide.

Date Start/Finish: 3/23/04
Drilling Company: Lyon Drilling
Driller's Name: H. Lyon
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-45B ATV
Sampling Method: NA

Northing: 764625.9
Easting: 761081.66
Casing Elevation: 853.34' AMSL

Borehole Depth: 26.5' below grade
Surface Elevation: 850.35' AMSL

Geologist: Dave Cornell

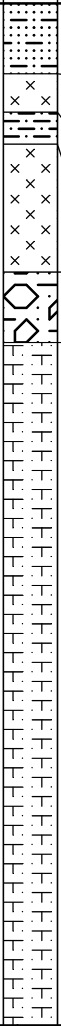
Well/Boring ID: MW-0401S

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample
0	850							
		1	0-4	3.3	NA	NA	ND	
5	845	2	4-8	2.2	NA	NA	ND	
10	840	3	8-12	1.1	NA	NA	ND	
		4	12-15	3.0	NA	NA	ND	
15	835	5	15-19	2.2	NA	NA	ND	

Geologic Column



Stratigraphic Description

Brown SILT and fine SAND, little Organics (grass and leaf littler), little medium Sand and fine to medium subrounded Gravel, non-plastic, moist.

Dark gray-brown ORGANICS and CINDERS (Roots and Wood), little Silt, non-plastic, moist.

Brown SILT, little fine Sand and fine to coarse Gravel, non-plastic, moist.

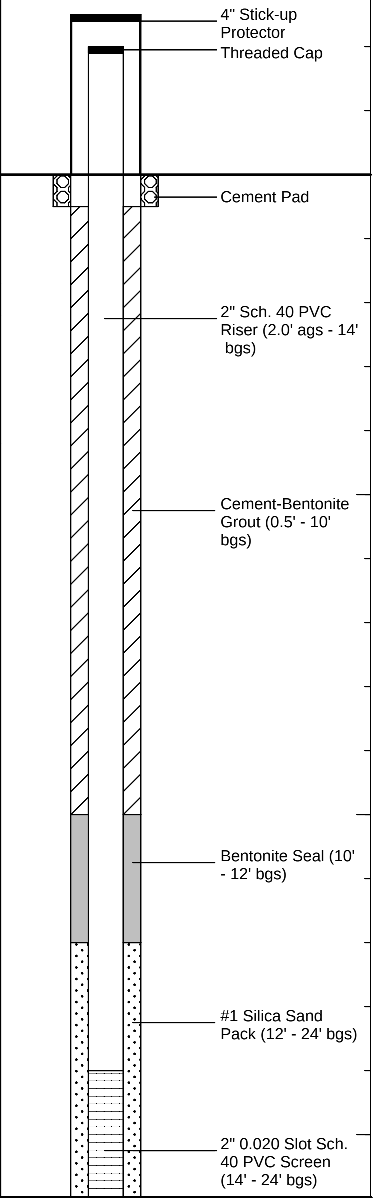
Dark gray-black CINDERS and ASH, trace Slag and Coal, non-plastic, moist.

Brown SILT and fine to coarse subrounded GRAVEL, trace fine Sand and Clay, non-plastic, moist.

Brown Silty fine to coarse SAND, some fine to coarse subrounded multicolored Gravel, non-plastic, saturated.

Little Cobbles below 12' bgs.

Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. AMSL = Above Mean Sea Level.

Monitoring well MW-0401S was installed adjacent to temporary well TW-0402S. Soil descriptions are from TW-0402S.

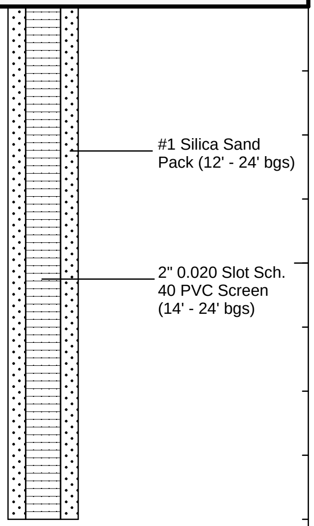
Client: New York State Electric and Gas

Well/Boring ID: MW-0401S

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 26.5' below grade

DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	5	15-19	2.2	NA	NA	ND			Brown Silty fine to coarse SAND, some fine to coarse subrounded multicolored Gravel, little Cobbles, non-plastic, saturated.	
20 830	6	19-22.5	2.0	NA	NA	ND	X			
25 825	7	22.5-26.5	3.0	NA	NA	ND			Gray SILT, little Clay, trace fine Sand, slightly plastic, saturated.	
30 820										
35 815										



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Monitoring well MW-0401S was installed adjacent to temporary well TW-0402S. Soil descriptions are from TW-0402S.

Project: 130.43.003
Data File:MW-0401S_TW-0402S.dat
Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

Date Start/Finish: 2/23/04
Drilling Company: Lyon Drilling
Driller's Name: J. Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-55
Sampling Method: 2" Split Spoon

Northing: 764075.94
Easting: 761733.37
Casing Elevation: 850.09' AMSL

Borehole Depth: 44' below grade
Surface Elevation: 850.71' AMSL

Geologist: Dave Cornell

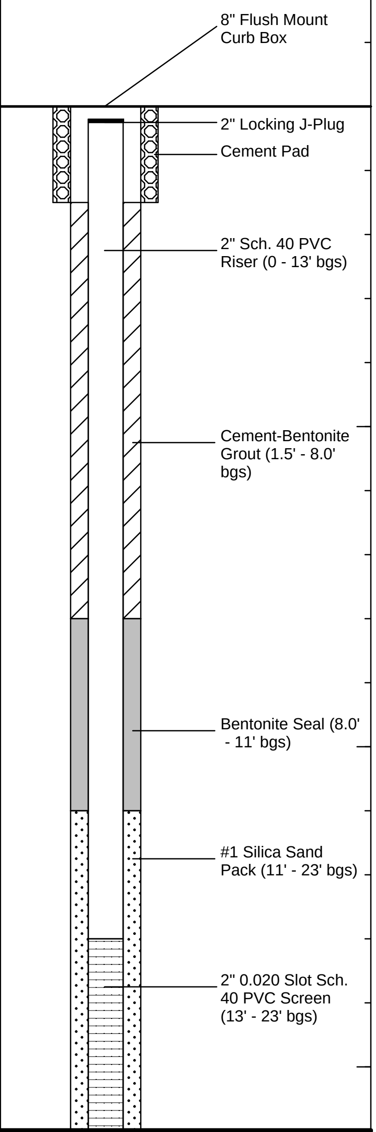
Well/Boring ID: MW-0402S

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0 850	NA	0-2	NA	NA	NA	NA			Auger through ASPHALT and Subbase.
	1	2-4	1.2	10 7 3 3	10	ND			Gray-brown fine to medium SAND and CINDERS, some Slag, little fine to coarse Gravel and Silt, non-plastic, moist.
5 845	2	4-6	0.8	2 2 4 3	6	ND			Dark gray-brown SILT, little fine Sand, trace Clay, non-plastic, moist.
	3	6-8	0.6	6 5 7 7	12	ND			
	4	8-10	0.0	7 9 16 11	25	NA			No Recovery.
10 840	5	10-12	1.3	5 12 14 14	26	ND			Brown SILT, little fine Sand, trace Clay, non-plastic, moist. Brown SILT and fine to coarse subrounded GRAVEL, little fine Sand, non-plastic, moist.
	6	12-14	0.9	6 8 8 10	16	ND			Brown SILT and fine to coarse subrounded GRAVEL, little fine to coarse Sand, trace Clay, non-plastic, moist. Trace Cobbles below 14' bgs.
15 835	7	14-16	1.1	5 7 10 11	14	ND			

Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOH = Weight of Hammer. AMSL = Above Mean Sea Level.

Client: New York State Electric and Gas

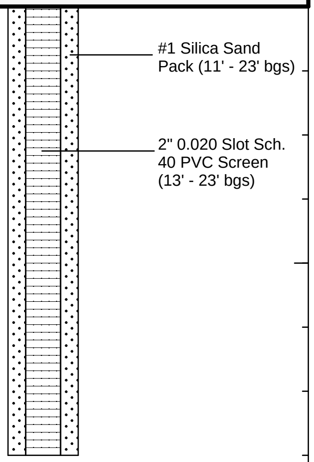
Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: MW-0402S

Borehole Depth: 44' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		8	16-18	0.5	10 12 20 17	32	ND			Brown SILT and fine to coarse subrounded GRAVEL, little fine to coarse Sand, trace Cobbles, non-plastic, moist.
		9	18-20	1.0	WOH 9 5 3	14	ND			Brown SILT, little fine to coarse subrounded Gravel and Clay, non-plastic, saturated.
20	830	10	20-22	1.2	WOH 5 6 14	11	ND			
		11	22-24	1.6	4 7 43 23	50	ND			Brown SILT, little fine to medium subrounded Gravel, trace fine Sand, non-plastic, wet. [Possible TILL]
25	825	12	24-26	1.3	12 20 22 33	42	ND			Gray SILT, little fine Gravel, trace medium to coarse Gravel, dense, non-plastic, moist. [TILL]
		13	26-28	1.4	26 23 27 30	50	ND			Increasing Gravel content with depth below 26' bgs.
		14	28-30	1.6	22 25 41 38	66	ND			Gray SILT, some fine to coarse subrounded Gravel, trace Clay, dense, non-plastic, moist. [TILL]
30	820	15	30-32	1.5	16 26 50/0.3 -	NA	ND			
		16	32-34	1.7	23 29 34 40	63	ND			
35	815	17	34-36	1.6	15 22 29 39	51	ND			

Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOH = Weight of Hammer. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:MW-0402S.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/8/04

Client: New York State Electric and Gas

Well/Boring ID: MW-0402S

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 44' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		18	36-38	0.0	42 50 50 44	100	ND			No Recovery.	
		19	38-40	1.6	4 12 28 36	35	ND		▨	Gray SILT, some fine to coarse subrounded Gravel, trace Clay and fine Sand, non-plastic to slightly plastic, wet. [TILL]	
40	810	20	40-42	1.8	40 50 50 54	100	ND		▨	Very dense, non-plastic below 40' bgs.	
		21	42-44	0.3	40 50/0.3 - -	NA	ND		▨		
45	805										
50	800										
55	795										

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOH = Weight of Hammer. AMSL = Above Mean Sea Level.

Date Start/Finish: 3/25/04 - 3/31/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-55
Sampling Method: 2" Split Spoon

Northing: 763959.9
Easting: 761400.22
Casing Elevation: 849.66' AMSL

Borehole Depth: 86.1' below grade
Surface Elevation: 850.24' AMSL

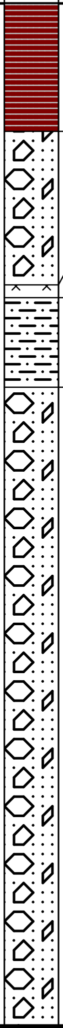
Geologist: Dave Cornell

Well/Boring ID: MW-0403S/SB-237

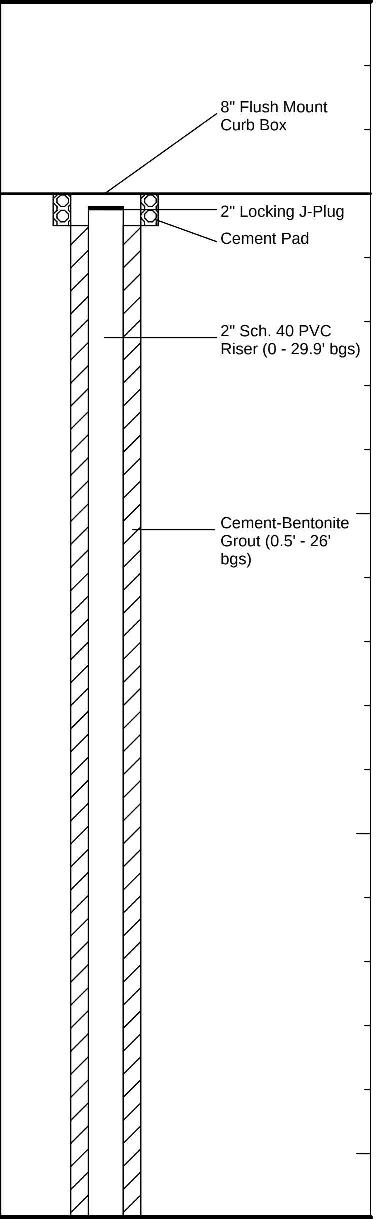
Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
0	850	NA	0-2	NA	NA	NA	NA		Auger through ASPHALT and Subbase.
		1	2-4	1.1	6 4 4 4	8	ND		Brown fine to coarse SAND and fine to medium subrounded GRAVEL, some coarse Gravel, trace Silt, non-plastic, moist.
5	845	2	4-6	1.1	10 6 4 7	10	ND		Black COAL fragments. Brown SILT, little fine to medium subrounded Gravel, trace fine Sand and Clay, non-plastic, moist.
		3	6-8	0.8	18 13 9 7	22	ND		Brown Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, non-plastic, moist to wet.
		4	8-10	1.0	5 6 7 6	13	ND		Trace Cobbles, saturated below 8.0' bgs.
10	840	5	10-12	0.4	4 2 4 2	6	ND		
		6	12-14	1.2	9 13 8 6	21	ND		Loose below 12' bgs.
15	835	7	14-16	0.7	3 2 3 2	5	ND		Increasing Silt content below 14' bgs.



Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 38' - 39.1' and 84' - 86.1' bgs (and DUP-103; CN only) for BTEX, PAH, and Total CN.

Project: 130.43.003
Data File:MW-0403S_SB-237.dat
Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:3/27/04

Client: New York State Electric and Gas

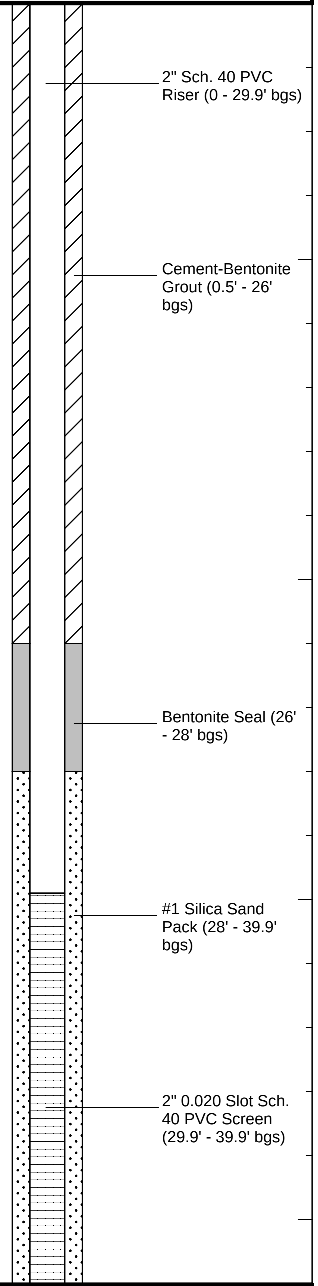
Well/Boring ID: MW-0403S/SB-237

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 86.1' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
		8	16-18	0.6	5 1 2 4	3	ND		Brown SILT and fine to coarse subrounded GRAVEL, little fine to medium Sand, trace Cobbles and coarse Sand, loose, non-plastic, saturated.
		9	18-20	1.2	13 11 3 3	14	ND		
20	830	10	20-22	0.6	5 5 5 2	10	ND		
		11	22-24	0.3	WOR WOR 2 17	2	ND		
25	825	12	24-26	1.4	14 19 21 30	40	ND		Brown Silty fine to coarse subrounded GRAVEL and fine to medium Sand, little coarse Sand and Cobbles, non-plastic, saturated.
		13	26-28	0.4	12 18 21 33	39	ND		
		14	28-30	1.3	45 34 21 17	55	ND		Brown-gray medium to coarse SAND, some fine to coarse subrounded Gravel, non-plastic, saturated.
30	820	15	30-32	0.7	9 6 6 9	12	ND		
		16	32-34	1.0	38 47 50/0.3 -	NA	ND		Brown fine to coarse subrounded GRAVEL, some to little Silt, little fine to medium Sand, trace coarse Sand, non-plastic, saturated.
35	815	17	34-36	1.4	25 24 18 33	42	ND		Brown fine to medium SAND, some coarse Sand, non-plastic, saturated.

Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 38' - 39.1' and 84' - 86.1' bgs (and DUP-103; CN only) for BTEX, PAH, and Total CN.

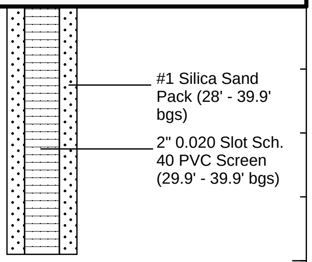
Client: New York State Electric and Gas

Well/Boring ID: MW-0403S/SB-237

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 86.1' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		18	36-38	1.0	8 10 14 15	24	ND			Brown fine to medium SAND, some coarse Sand, non-plastic, saturated. Brown-gray medium to coarse SAND, some to little fine Sand and fine to coarse subrounded multicolored Gravel,non-plastic, saturated.	
		19	38-40	1.1	17 15 13 15	28	ND	☒		Gray SILT, little Clay, trace fine to coarse Gravel, non-pastic, wet.	
40	810	20	40-42	1.3	8 8 10 15	18	ND			No Gravel present, slightly plastic below 40' bgs.	
		21	42-44	1.7	4 8 13 17	21	ND				
45	805	NA	44-48	0.0	NA	NA	ND			Attempted Shelby tube - No Recovery.	
		22	48-50	1.5	WOR 13 13 18	26	ND				
50	800	23	50-52	1.8	4 7 11 12	18	ND			Gray SILT, some Clay, slighty plastic, wet.	
		24	52-54	1.7	WOR WOR WOR 21	NA	ND				
55	795	25	54-56	2.0	5 7 10 13	17	ND				



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ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 38' - 39.1' and 84' - 86.1' bgs (and DUP-103; CN only) for BTEX, PAH, and Total CN.

Client: New York State Electric and Gas

Well/Boring ID: MW-0403S/SB-237

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 86.1' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		26	56-58	1.6	WOR WOR 10 23	10	ND			Gray SILT, some Clay, slightly plastic, wet. Gray SILT, little to trace fine Sand and fine to medium subrounded multicolored Gravel, trace Clay, non-plastic, moist to wet. [TILL]	
		27	58-60	1.0	12 15 22 17	37	ND				
60	790	28	60-62	1.2	9 12 14 16	26	ND			Gray SILT, little fine to medium gray subrounded Gravel (possible Shale). trace fine Sand, trace to little Clay, non-plastic, wet. [TILL]	
		29	62-64	1.2	10 16 25 26	41	ND			No fine Sand below 62' bgs.	
65	785	30	64-66	1.1	9 49 24 18	73	ND				
		31	66-68	1.0	6 14 14 12	28	ND			Gray SILT and CLAY, little to some fine to coarse subrounded gray Gravel, slightly plastic, wet. [TILL]	
		32	68-70	0.7	8 50/0.2 - -	NA	ND			Decreasing Clay content below 68' bgs.	
70	780	33	70-72	0.0	50/0.3 - - -	NA	NA			No Recovery.	
		34	72-74	0.9	28 50/0.4 - -	NA	ND			Gray SILT, little fine to coarse subrounded gray Gravel, little Clay, dense, non-plastic, moist. [TILL]	
75	775	35	74-76	1.3	14 26 55 50/0.4	81	ND				

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Soil samples collected from 38' - 39.1' and 84' - 86.1' bgs (and DUP-103; CN only) for BTEX, PAH, and Total CN.

Client: New York State Electric and Gas

Well/Boring ID: MW-0403S/SB-237

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 86.1' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		36	76-78	1.5	12 24 37 50/0.3	61	ND			Gray SILT and CLAY, trace fine Sand, layering, slightly plastic, moist.	
		37	78-80	0.7	37 50/0.3 - -	NA	ND			Gray Clayey SILT, little fine to medium subangular to subrounded slight multicolored Gravel, trace fine Sand, non-plastic, wet. [TILL] Driller notes a change in drilling at 78.7' bgs.	
80	770	38	80-82	0.4	50/0.4 - - -	NA	ND			Gray SILT, some fine to medium subrounded to subangular Gravel, little coarse Gravel, little Clay, trace fine Sand, non-plastic, wet. [TILL]	
		39	82-84	0.0	70/0.1 - - -	NA	ND			No Recovery, Shale chips in slough with similar soils as above.	
85	765	40	84-86	0.4	100/0.5 - - -	NA	ND	X		Gray SILT, some subangular Gravel (Shale fragments), possible weathered Rock, non-plastic, moist. Trace Shale Chips at 86.1' bgs.	
										Auger refusal at 86.1' bgs.	
90	760										
95	755										

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Soil samples collected from 38' - 39.1' and 84' - 86.1' bgs (and DUP-103; CN only) for BTEX, PAH, and Total CN.

Date Start/Finish: 3/31/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-55
Sampling Method: 2" Split Spoon

Northing: 763869.83
Easting: 761174.92
Casing Elevation: 849.55' AMSL

Borehole Depth: 67.3' below grade
Surface Elevation: 850.28' AMSL

Geologist: Dave Cornell

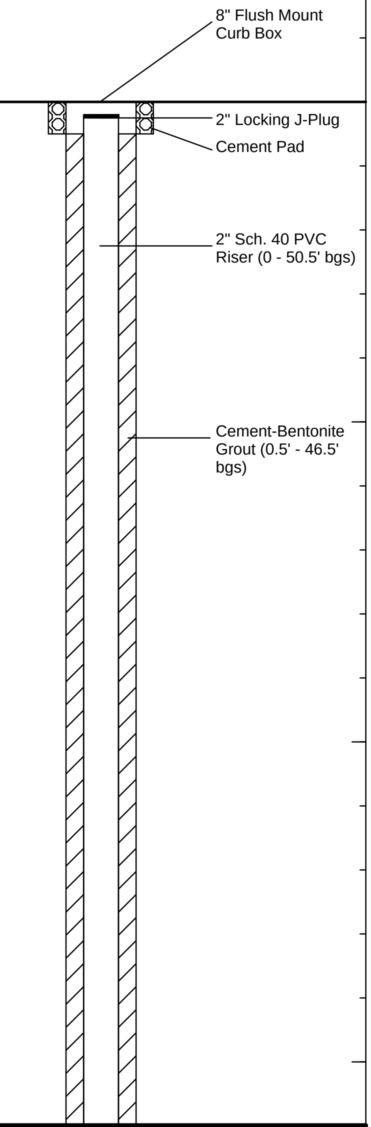
Well/Boring ID: MW-0404D/SB-238

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	850	NA	0-2	NA	NA	NA	NA			Auger through ASPHALT and Subbase.
		1	2-4	0.8	6 4 4 3	8	ND			Orange-brown SILT, some Clay, trace fine Sand, mottled, non-plastic, moist.
5	845	2	4-6	1.3	4 5 6 7	11	ND			
		3	6-8	1.0	6 7 7 9	14	ND			
		4	8-10	1.4	5 7 5 6	12	ND			
10	840	5	10-12	1.1	4 5 5 2	10	ND			Brown fine to coarse subangular GRAVEL, some Silt, trace fine to coarse Sand, non-plastic, saturated.
		6	12-14	0.7	4 4 2 2	6	ND			
15	835	7	14-16	0.0	1 1 WOH WOH	1	NA			No Recovery.

Well/Boring Construction



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ND = Non-Detect. WOH/R = Weight of Hammer/Rods. AMSL = Above Mean Sea Level.

Client: New York State Electric and Gas

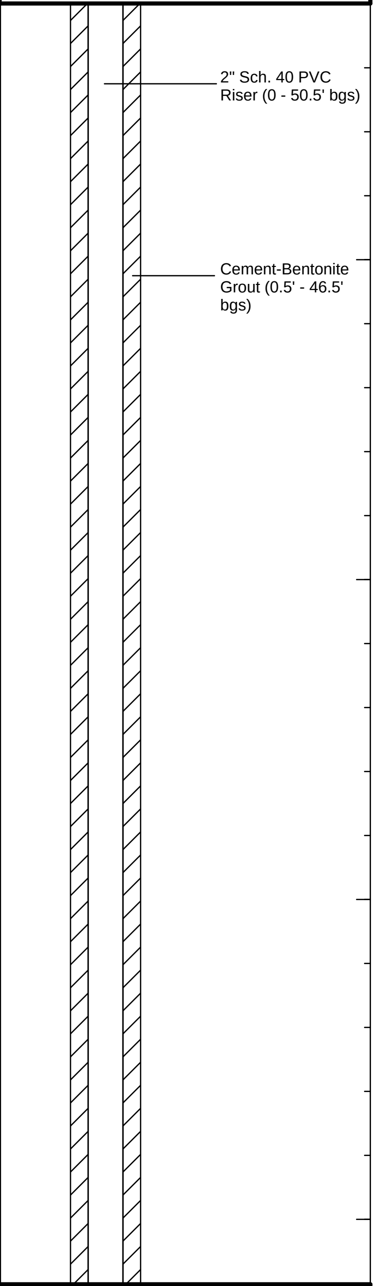
Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: MW-0404D/SB-238

Borehole Depth: 67.3' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		8	16-18	1.0	WOR WOR 30 31	30	ND			Dark brown Silty fine to medium Sand and fine multicolored Gravel, some coarse Sand, loose, non-plastic, saturated. Brown-gray Silty fine to medium SAND, some fine to coarse subrounded Gravel, non-plastic, saturated.
		9	18-20	1.2	23 27 44 29	71	ND			Brown-gray Silty fine to medium SAND and fine to coarse subrounded multicolored GRAVEL, little Cobbles and coarse Sand, non-plastic, wet to saturated.
20	830	10	20-22	1.1	11 13 15 15	28	ND			Saturated below 20' bgs.
		11	22-24	1.8	10 11 11 14	22	ND			Decreasing coarse Gravel content below 22' bgs.
25	825	12	24-26	1.5	15 15 15 14	30	ND			
		13	26-28	1.0	12 14 16 22	30	ND			Increased coarse Gravel and Cobble content below 26' bgs.
		14	28-30	1.5	5 6 9 13	15	ND			Gray SILT, little Clay, little lenses of fine Sand, slightly plastic, moist.
30	820	15	30-32	1.8	5 5 7 12	12	ND			Gray SILT, trace Clay and fine Sand, non-plastic, wet.
		16	32-34	1.2	6 7 12 16	19	ND			Gray SILT, little Clay, slightly plastic, wet.
35	815	17	34-36	1.7	3 8 12 13	20	ND			Trace seams of Silt with little fine Sand, moist, slightly plastic, below 34.0' bgs.

Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOH/R = Weight of Hammer/Rods. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:MW-0404D_SB-238.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:3/27/04

Client: New York State Electric and Gas

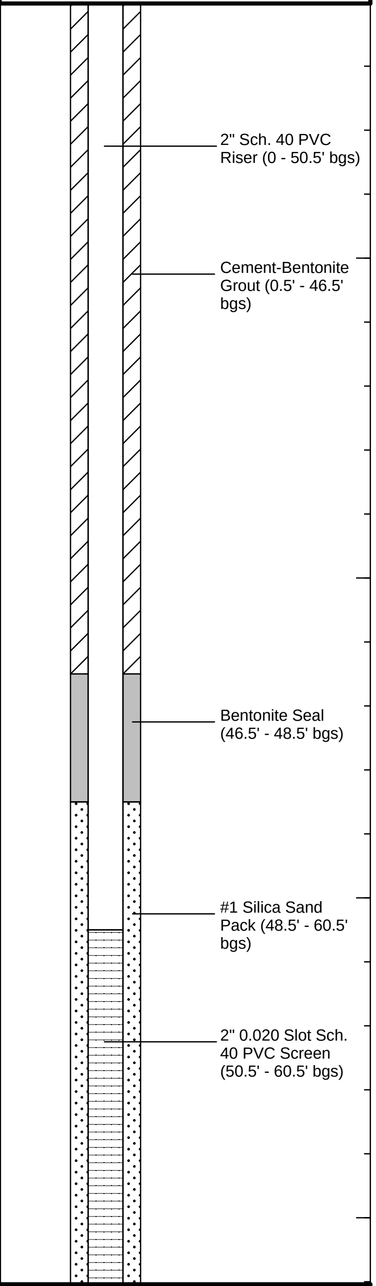
Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: MW-0404D/SB-238

Borehole Depth: 67.3' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
		18	36-38	1.5	14 15 19 22	34	ND		Gray SILT, little Clay, slightly plastic, wet.
		19	38-40	0.5	4 14 17 21	31	ND		COBBLE.
40	810	20	40-42	0.9	24 15 13 14	28	ND		Brown-gray Silty fine to coarse SAND and fine to coarse subrounded multicolored GRAVEL, little Cobbles, trace Clay, non-plastic, saturated. [TILL]
		21	42-44	1.1	19 50 33 27	83	ND		
45	805	22	44-46	0.7	13 15 14 16	29	ND		
		23	46-48	0.9	29 25 25 26	50	ND		Increased density below 46' bgs.
		24	48-50	0.7	15 17 19 24	36	ND		Decreased density below 48' bgs.
50	800	25	50-52	0.8	19 24 28 34	52	ND		
		26	52-54	0.0	50/0.3 - - -	NA	NA		No Recovery.
55	795	27	54-56	1.2	17 21 24 29	45	ND		Brown-gray fine to coarse SAND, some fine to coarse subrounded multicolored Gravel, little to trace Silt, trace Cobbles, non-plastic, saturated.

Well/Boring Construction



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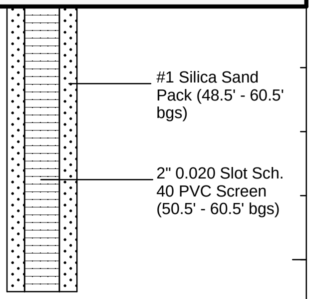
Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: MW-0404D/SB-238

Borehole Depth: 67.3' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		28	56-58	1.0	30 30 20 28	50	ND			Brown-gray fine to coarse SAND, some fine to coarse subrounded multicolored Gravel, little to trace Silt, trace Cobbles, non-plastic, saturated.	
		29	58-60	0.5	28 50/0.3 - -	NA	ND			Increased density, wet below 58' bgs.	
60	790	30	60-62	0.3	75/0.5 - - -	NA	ND				
		31	62-64	0.1	50/0.2 - - -	NA	ND			COBBLE chips.	
65	785	32	64-66	0.3	38 50/0.2 - -	NA	ND			Brown-gray Silty fine to medium SAND and fine to coarse GRAVEL, little coarse Sand and Cobbles, non-plastic, wet. [TILL]	
		33	66-67.3	0.2	50/0.2 - -	NA	ND				
70 75	780 775									Auger and spoon refusal at 67.3' bgs.	



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOH/R = Weight of Hammer/Rods. AMSL = Above Mean Sea Level.

Date Start/Finish: 4/5/03
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-55
Sampling Method: 2" Split Spoon

Northing: 763871.1
Easting: 761179.74
Casing Elevation: 849.99' AMSL

Borehole Depth: 29' below grade
Surface Elevation: 850.42' AMSL

Geologist: Dave Cornell

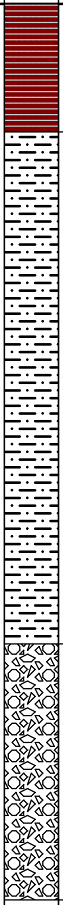
Well/Boring ID: MW-0404S

Client: New York State Electric and Gas

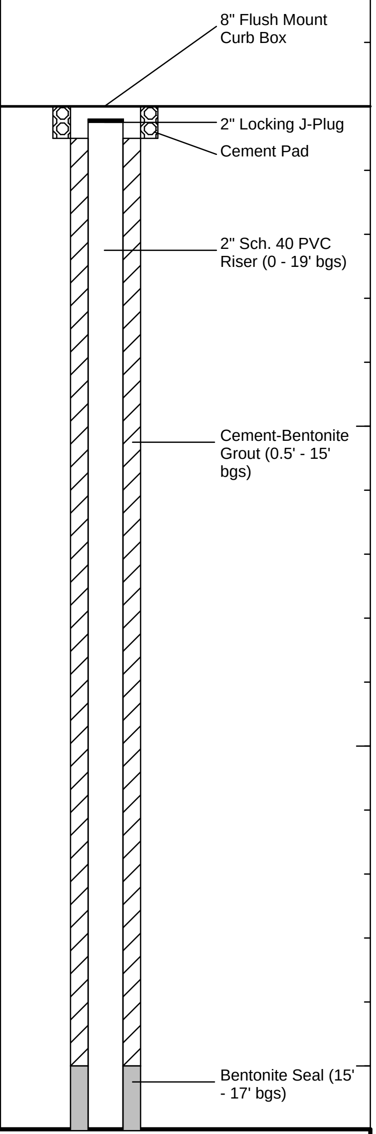
Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
0	850	NA	0-2	NA	NA	NA	NA		Auger through ASPHALT and Subbase.
		1	2-4	0.8	6 4 4 3	8	ND		Orange-brown SILT, some Clay, trace fine Sand, mottled, non-plastic, moist.
5	845	2	4-6	1.3	4 5 6 7	11	ND		
		3	6-8	1.0	6 7 7 9	14	ND		
		4	8-10	1.4	5 7 5 6	12	ND		
10	840	5	10-12	1.1	4 5 5 2	10	ND		Brown fine to coarse subangular GRAVEL, some Silt, trace fine to coarse Sand, non-plastic, saturated.
		6	12-14	0.7	4 4 2 2	6	ND		
15	835	7	14-16	0.0	1 1 WOH WOH	1	NA		No Recovery.

Geologic Column



Well/Boring Construction



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Sample information and descriptions from MW-0404D/SB-238.

Project: 130.43.003
Data File:MW-0404S.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:3/27/04

Client: New York State Electric and Gas

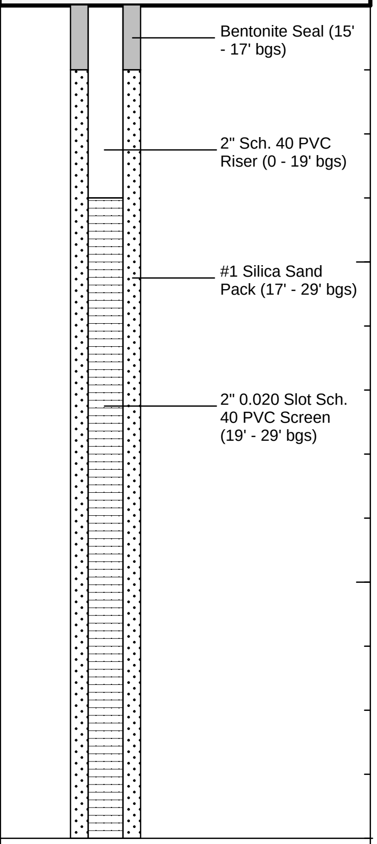
Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: MW-0404S

Borehole Depth: 29' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		8	16-18	1.0	WOR WOR 30 31	30	ND			Dark brown Silty fine to medium Sand and fine multicolored Gravel, some coarse Sand, loose, non-plastic, saturated. Brown-gray Silty fine to medium SAND, some fine to coarse subrounded Gravel, non-plastic, saturated.
		9	18-20	1.2	23 27 44 29	71	ND			Brown-gray Silty fine to medium SAND and fine to coarse subrounded multicolored GRAVEL, little Cobbles, non-plastic, wet to saturated.
20	830	10	20-22	1.1	11 13 15 15	28	ND			Saturated below 20' bgs.
		11	22-24	1.8	10 11 11 14	22	ND			Decreasing coarse Gravel content below 22' bgs.
25	825	12	24-26	1.5	15 15 15 14	30	ND			
		13	26-28	1.0	12 14 16 22	30	ND			Increased coarse Gravel and Cobble content below 26' bgs.
		14	28-29	1.0	5	NA	ND			Gray SILT, little Clay, little lenses of fine Sand, slightly plastic, moist.
30	820									
35	815									

Well/Boring Construction



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Sample information and descriptions from MW-0404D/SB-238.

Date Start/Finish: 4/1/04 - 4/5/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-55
Sampling Method: 2" Split Spoon

Northing: 763822.88
Easting: 761007.7
Casing Elevation: 850.59' AMSL

Borehole Depth: 68.5' below grade
Surface Elevation: 851.32' AMSL

Geologist: Dave Cornell

Well/Boring ID: MW-0405S/SB-239

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample
0								
	850	NA	0-2	NA	NA	NA	NA	
		1	2-4	1.1	14 2 1 2	3	ND	
5		2	4-6	0.9	2 2 1 2	3	ND	
	845	3	6-8	0.6	4 5 4 5	9	ND	
		4	8-10	0.6	4 6 9 12	15	ND	
10	840	5	10-12	0.6	4 5 5 2	10	ND	
		6	12-14	1.5	1 2 9 11	11	ND	
15		7	14-16	1.2	14 20 20 27	40	ND	

Stratigraphic Description

CONCRETE.

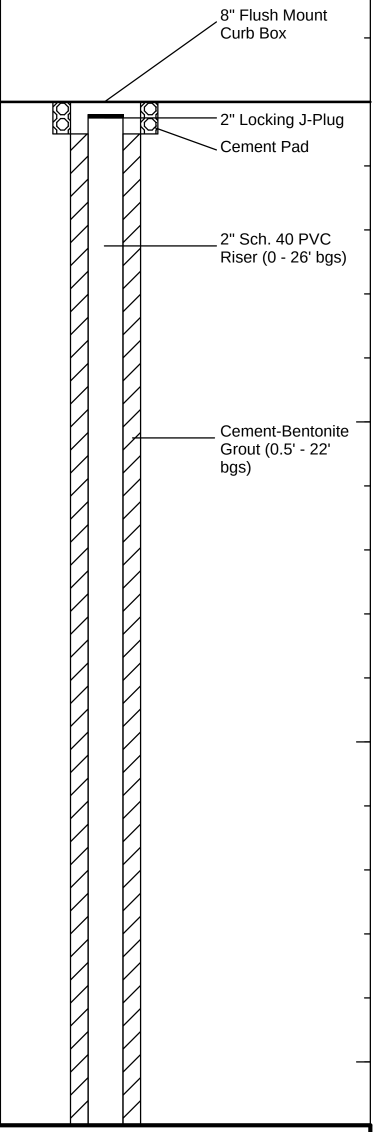
Red-orange BRICK and fine to medium GRAVEL, non-plastic, moist.

Brown SILT and CLAY, moderately plastic, moist.

Brown Silty fine to medium SAND, some coarse Sand and fine to medium subrounded Gravel, little coarse Gravel, non-plastic, moist.

Brown Silty fine to coarse subrounded to subangular fine to coarse GRAVEL, little fine to medium Sand, little coarse Sand and Cobbles, dense, non-plastic, wet to saturated.

Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 66' - 68.6' for BTEX, PAH, and Total CN.
MS/MSD collected for BTEX and CN only.

Client: New York State Electric and Gas

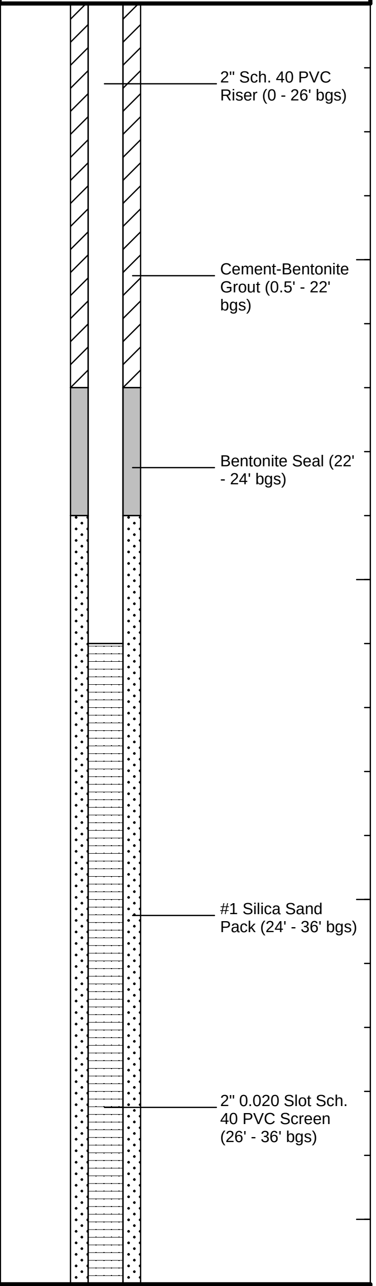
Well/Boring ID: MW-0405S/SB-239

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 68.5' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
	835	8	16-18	0.8	20 23 50/0.1 -	NA	ND		Brown Silty fine to coarse subrounded to subangular fine to coarse GRAVEL, little fine to medium Sand, little coarse Sand and Cobbles, dense, non-plastic, wet.
		9	18-20	0.9	18 31 50/0.4 -	NA	ND		
20	830	10	20-22	0.2	50/0.3 - - -	NA	ND		
		11	22-24	0.9	20 27 29 41	56	ND		
25		12	24-26	0.8	21 50/0.3 - -	NA	ND		Increased Silt content below 24' bgs.
	825	13	26-28	0.4	50/0.3 - - -	NA	ND		
		14	28-30	0.6	22 50 50/0.2 -	NA	ND		
30	820	15	30-32	0.9	28 50/0.4 - -	NA	ND		
		16	32-34	1.2	25 50/0.3 - -	NA	ND		Brown-gray fine to coarse SAND, non-plastic, saturated.
35		17	34-36	1.5	20 23 27 40	NA	ND		Gray-brown Silty fine to coarse GRAVEL, some fine Sand, little Cobbles, trace medium to coarse Sand, non-plastic, wet.

Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 66' - 68.6' for BTEX, PAH, and Total CN.
MS/MSD collected for BTEX and CN only.

Client: New York State Electric and Gas

Well/Boring ID: MW-0405S/SB-239

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 68.5' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	815	18	36-38	0.9	40 50/0.4 - -	NA	ND			Brown-gray Silty fine to coarse GRAVEL, some fine Sand, little Cobbles, trace medium to coarse Sand, non-plastic, wet.	
		19	38-40	0.7	39 50/0.2 - -	NA	ND				
40	810	20	40-42	0.5	72/0.5 - - -	NA	ND				
		21	42-44	0.7	50 50/0.2 - -	NA	ND			Dense below 42' bgs.	
45		22	44-46	1.2	21 37 50/0.4 -	NA	ND			Gray-brown fine to coarse SAND, little medium subrounded multicolored Gravel, non-plastic, saturated.	
	805	23	46-48	0.3	50/0.4 -	NA	ND			Gray Silty fine to coarse subrounded to subangular GRAVEL, some fine to coarse Sand, little Cobbles, non-plastic, wet. [TILL]	
		24	48-50	0.3	50/0.3 - - -	NA	ND				
50	800	25	50-52	0.2	50/0.2 - - -	NA	ND				
		26	52-54	0.3	100/0.3 - - -	NA	ND				
55		27	54-56	0.2	50/0.2 - - -	NA	ND			Saturated below 54' bgs.	

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Soil samples collected from 66' - 68.6' for BTEX, PAH, and Total CN.
MS/MSD collected for BTEX and CN only.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: MW-0405S/SB-239

Borehole Depth: 68.5' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	795	28	56-58	0.4	47 50/0.1 - -	NA	ND			Gray Silty fine to coarse subrounded to subangular GRAVEL, some fine to coarse Sand, little Cobbles, non-plastic, saturated.	
		29	58-60	0.4	39 50/0.3 - -	NA	ND				
60	790	30	60-62	0.3	37 50/0.2 - -	NA	ND				
		31	62-64	0.3	50/0.3 - - -	NA	ND				
65		32	64-66	0.2	50/0.3 - - -	NA	ND			Rock chips, trace fine to coarse Gravel, non-plastic, saturated.	
	785	33	66-68	0.3	50/0.3 - - -	NA	ND	×		Brown Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, little Cobbles, non-plastic, saturated.	
		34	68-70	0.5	50 50/0.1 - -	NA	ND				
70	780										
75											

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ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 66' - 68.6' for BTEX, PAH, and Total CN.
MS/MSD collected for BTEX and CN only.

Project: 130.43.003
Data File:MW-0405S_SB-239.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:3/27/04

Date Start/Finish: 3/2/04
Drilling Company: Lyon Drilling
Driller's Name: J. Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-55
Sampling Method: 3" Split Spoon

Northing: 764212.45
Easting: 760999.75
Casing Elevation: 851.25' AMSL

Borehole Depth: 18' below grade
Surface Elevation: 852.05' AMSL

Geologist: Dave Cornell

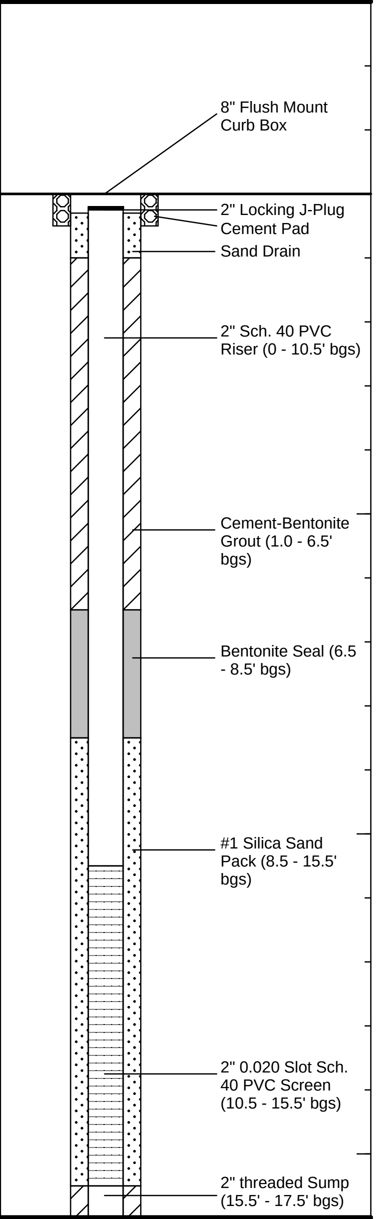
Well/Boring ID: NMW-0401/SB-232

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0		1	0-2	1.2	3 3 5 3	8	ND			Dark gray-black CINDERS and SLAG, little fine to coarse Sand and Brick, non-plastic, moist.
	850	2	2-4	0.9	2 2 2 1	4	ND			Little NAPL, wet below 4.0' bgs.
5		3	4-6	1.6	2 3 2 2	5	4.0 2.2			Gray-brown SILT, little Clay, faint odor, possible staining, slightly plastic, moist.
	845	4	6-8	1.8	2 8 13 15	21	2.0 1.0			Brown-gray SILT, little Clay, trace Root scars with possible gray staining, clearing up with depth, moderate sheen on slough, dense, non-plastic, moist.
		5	8-10	1.9	15 24 39 40	63	2.0 0.5			
10		6	10-12	1.9	9 10 11 12	21	2.5 191			Slightly plastic below 10' bgs. Brown-black Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, little NAPL, non-plastic, wet.
	840	7	12-14	1.7	4 4 4 10	8	394 85.9			Some NAPL from 12' - 12.5' bgs. Gray color, little NAPL, saturated below 12.5' bgs. Trace blebs and sheen below 13' bgs.
15		8	14-16	1.5	30 34 37 40	71	70.1 19.4			Brown Silty fine SAND and fine to coarse subrounded GRAVEL, some NAPL on top of Till, dense, non-plastic, moist. [TILL]

Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOH = Weight of Hammer. AMSL = Above Mean Sea Level.

Chemox sample collected from 14' - 15.1' bgs.

Project: 130.43.003
Data File:NMW-0401_SB-232.dat

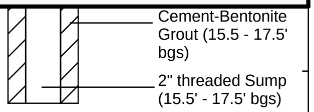
Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

Client: New York State Electric and Gas

Well/Boring ID: NMW-0401/SB-232

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 18' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	1.0	50 53 50/0.1 -	NA	39.5			Brown Silty fine SAND and fine to coarse subrounded GRAVEL, dense, non-plastic, moist. [TILL]	
20											
	830										
25											
	825										
30											
	820										
35											

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Chemox sample collected from 14' - 15.1' bgs.

Project: 130.43.003
Data File:NMW-0401_SB-232.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

Date Start/Finish: 3/15/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-45B ATV
Sampling Method: 2"/3" Split Spoon

Northing: 764022.91
Easting: 761029.19
Casing Elevation: 849.77' AMSL

Borehole Depth: 59.1' below grade
Surface Elevation: 850.38' AMSL

Geologist: Dave Cornell

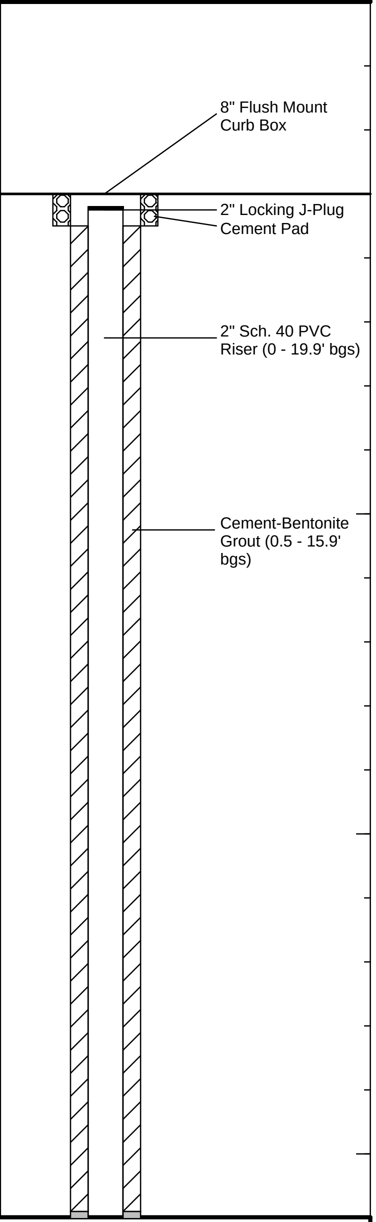
Well/Boring ID: NMW-0402/SB-223

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	850	1	0-2	1.4	3 6 6 6	12	ND			Dark gray-black CINDERS, little Slag, Silt, Brick, and fine Sand, trace Grass at surface, non-plastic, moist.
		2	2-4	0.7	4 5 5 3	10	ND			Brown Silty fine SAND, little Cinders and Brick, non-plastic, moist.
5	845	3	4-6	1.3	3 2 5 6	7	ND			Brown CLAY and SILT, trace Organics, Cinder, and Ash, non-plastic, moist. Brown-gray fine Sandy SILT, and fine to coarse subrounded GRAVEL, non-plastic, saturated.
		4	6-8	0.7	5 2 1 1	3	ND			Brown WOOD shavings, sewage/sulfer odor, non-plastic, saturated. Gray SILT and fine to coarse subrounded GRAVEL, little Clay, non-plastic, saturated.
		5	8-10	1.1	5 17 27 9	44	ND			Green-gray and brown SILT and CLAY, trace Root scars, mottled, moderately plastic, moist.
10	840	6	10-12	1.7	8 10 14 15	24	ND			Brown-gray color, trace fine Sand below 10.8' bgs.
		7	12-14	0.6	7 9 11 12	20	13.7			Dark gray Silty fine to coarse subrounded GRAVEL, little medium Sand, trace fine Sand, little to trace brown NAPL, non-plastic, saturated.
15	835	8	14-16	0.2	14 8 6 15	14	NA			Trace Cobbles, trace sheen below 14' bgs.

Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 20' - 21.3' and 36' - 38.6' bgs for BTEX, PAH, and Total CN. Waste characterization sample also collected from 20' - 21.3' bgs.

Client: New York State Electric and Gas

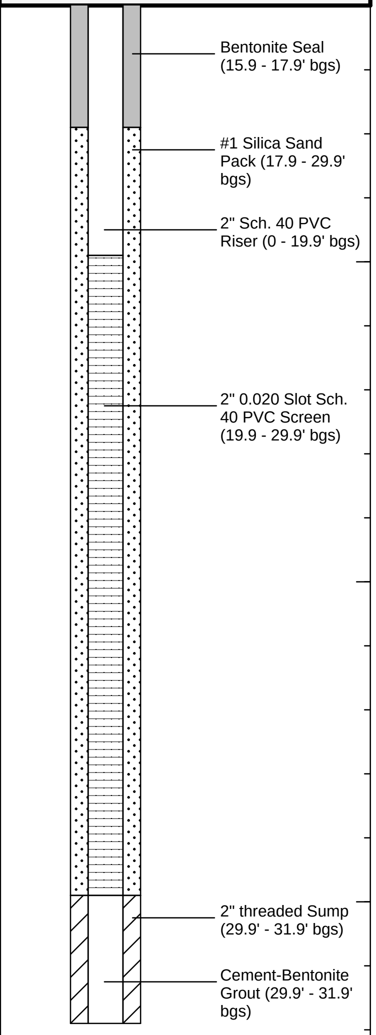
Well/Boring ID: NMW-0402/SB-223

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 59.1' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		9	16-18	1.1	35 34 34 37	68	13.1			Brown Silty fine SAND, some fine to coarse subrounded Gravel, trace Cobbles and medium Sand, non-plastic, moist. [TILL]
		10	18-20	0.0	37 50/0.2 - -	NA	NA			No recovery.
20	830	11	20-22	1.3	20 22 24 25	46	185	X		Brown Silty fine to medium SAND, and fine to coarse subrounded GRAVEL, some coarse Sand, little Cobbles, little to some red-brown NAPL, non-plastic, wet.
		12	22-24	1.1	16 17 19 23	36	21.1			Trace sheen below 22' bgs.
25	825	13	24-26	0.8	26 50/0.3 - -	NA	135			Little NAPL in shoe at 24' bgs.
		14	26-28	0.7	31 50/0.3 - -	NA	93.1			Little NAPL below 26' bgs.
		15	28-30	1.2	29 25 50/0.2 -	NA	138			Gray-brown fine Sandy SILT, some fine to coarse subrounded Gravel, trace Cobbles, little NAPL down to 29' bgs, non-plastic, wet. [TILL]
30	820	16	30-32	1.3	37 38 25 30	63	25.7			Brown-gray Silty fine SAND, some medium Sand and fine to coarse subrounded multicolored Gravel, faint odor, non-plastic, moist to wet. [TILL]
		17	32-34	0.8	25 50/0.3 - -	NA	40			Trace coarse Sand, wet below 32' bgs.
35	815	18	34-36	0.2	50/0.3 - - -	NA	8.7			Increased Gravel content below 34' bgs.

Well/Boring Construction



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Soil samples collected from 20' - 21.3' and 36' - 38.6' bgs for BTEX, PAH, and Total CN. Waste characterization sample also collected from 20' - 21.3' bgs.

Client: New York State Electric and Gas

Well/Boring ID: NMW-0402/SB-223

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 59.1' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		19	36-38	0.4	37 50/0.3 - -	NA	9.6	X		Brown fine to coarse SAND, non-plastic, saturated.	
		20	38-40	0.6	37 50/0.4 - -	NA	11.6			Gray-brown Silty fine to medium SAND, and fine to coarse GRAVEL, little Cobbles, trace coarse Sand, non-plastic, saturated.	
40	810	21	40-42	0.2	46 50/0.4 - -	NA	NA			Gray-brown fine to coarse SAND and fine to coarse subrounded GRAVEL, non-plastic, saturated.	
		22	42-44	0.6	29 50/0.4 - -	NA	11.1			Gray-brown Silty fine to coarse subrounded GRAVEL and fine to coarse SAND, trace Cobbles, non-plastic, saturated.	
45	805	23	44-46	0.6	40 50/0.3 - -	NA	9.6			Wet below 44' bgs.	
		24	46-48	0.7	42 50/0.4 - -	NA	1.7				
		25	48-50	0.5	27 50/0.4 - -	NA	5.8				
50	800	26	50-52	0.7	55 72 - -	NA	3.0			Gray Silty fine to coarse subrounded mulitcolored GRAVEL, little fine to medium Sand and Cobbles, non-plastic, moist. [Dense Till]	
		27	52-54	0.5	39 50/0.2 - -	NA	ND				
55	795	28	54-56	0.5	47 50/0.3 - -	NA	ND			Gray Silty fine to coarse SAND and fine to coarse subrounded multicolored GRAVEL, little Cobbles, non-plastic, moist.	

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Soil samples collected from 20' - 21.3' and 36' - 38.6' bgs for BTEX, PAH, and Total CN. Waste characterization sample also collected from 20' - 21.3' bgs.

Client: New York State Electric and Gas

Well/Boring ID: NMW-0402/SB-223

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 59.1' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		29	56-58	2.0	8 57 44 35	101	ND			Brown-gray fine to coarse SAND, little to trace fine to coarse subrounded multicolored Gravel, non-plastic, saturated.	
		30	58-60	0.8	30 24 50/0.1 -	NA	ND			Gray fine to coarse SAND, non-plastic, saturated. Gray Silty fine to coarse GRAVEL and fine to coarse SAND, little Cobbles, non-plastic, saturated.	
60	790										
65	785										
70	780										
75	775										

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Soil samples collected from 20' - 21.3' and 36' - 38.6' bgs for BTEX, PAH, and Total CN. Waste characterization sample also collected from 20' - 21.3' bgs.

Project: 130.43.003
Data File:NMW-0402_SB-223.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:3/27/04

Date Start/Finish: 3/22/04
Drilling Company: Lyon Drilling
Driller's Name: J. Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-45B ATV
Sampling Method: 2" Split Spoon

Northing: 764354.31
Easting: 761491.94
Casing Elevation: 851.83' AMSL

Borehole Depth: 22.6' below grade
Surface Elevation: 852.27' AMSL

Geologist: Dave Cornell

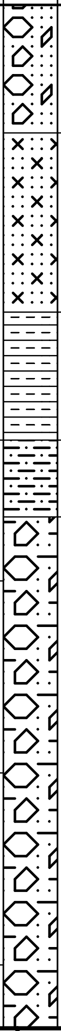
Well/Boring ID: NMW-0403

Client: New York State Electric and Gas

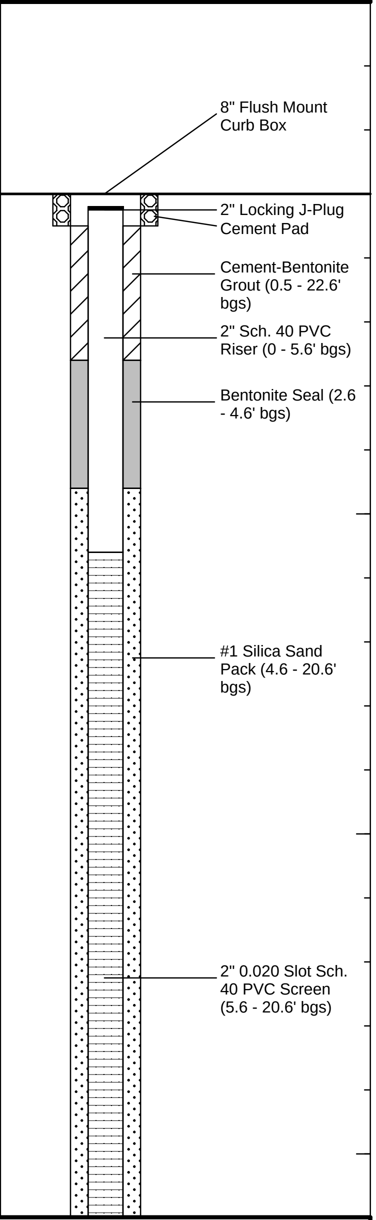
Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
	855								
0		1	0-2	1.5	9 13 11 12	24	ND		Brown Silty fine SAND and fine to coarse subrounded GRAVEL, non-plastic, moist.
	850	2	2-4	1.0	13 11 19 16	30	ND		Brown-gray Silty fine SAND and CINDERS, little Brick and fine to coarse Gravel, non-plastic, moist.
5		3	4-6	1.2	8 5 3 2	8	7.9		Wet below 4.0' bgs. Gray SILT and CLAY, organic odor, moderately plastic, wet.
	845	4	6-8	1.5	2 5 8 13	13	16.2	X	Trace Root scars below 6.0' bgs. Gray fine Sandy SILT, some fine to coarse subrounded Gravel, trace Clay, trace yellow-brown oil, moderately plastic, wet to saturated.
		5	8-10	1.0	7 8 34 24	42	17.1		Dark gray-brown Silty fine to coarse subrounded GRAVEL, little fine to coarse Sand, trace Cobbles and Clay, little yellowish-brown oil, degraded petroleum odor, non-plastic, saturated.
10		6	10-12	1.1	12 7 10 8	17	28.5		Trace to little oil below 10' bgs.
	840	7	12-14	1.0	7 9 13 17	22	33.6	X	No Clay present, brown oil below 12' bgs.
15		8	14-16	1.0	10 15 14 9	29	16		Trace brown oil below 14' bgs.

Geologic Column



Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOH = Weight of Hammer. AMSL = Above Mean Sea Level.

Soil samples collected from 6.8' - 9.0' bgs for waste characterization and from 12' - 15' for DRO.

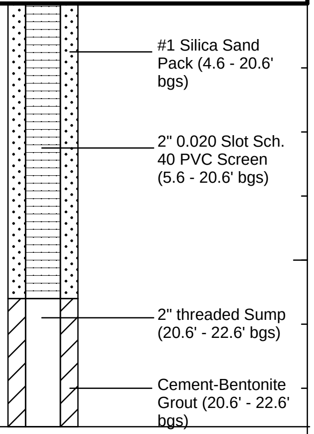
Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: NMW-0403

Borehole Depth: 22.6' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	1.4	18 30 50/0.3 -	NA	29.4			Gray-brown Silty fine to medium subrounded GRAVEL and fine to coarse SAND, some coarse Gravel, trace Cobbles, little to trace brown oil, non-plastic, saturated.	
		10	18-20	1.0	17 20 20 24	40	4.5			Trace sheens and trace brown oil below 18' bgs.	
20		11	20-22	1.2	15 15 24 26	39	4.2			Increased Cobbles and Silt, trace sheens below 20' bgs.	
	830										
25											
	825										
30											
	820										
35											



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOH = Weight of Hammer. AMSL = Above Mean Sea Level.

Soil samples collected from 6.8' - 9.0' bgs for waste characterization and from 12' - 15' for DRO.

Date Start/Finish: 9/30/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764376.25
Easting: 761952.29
Casing Elevation: NA

Borehole Depth: 24' below grade
Surface Elevation: 853.05' AMSL

Geologist: Jason Sents

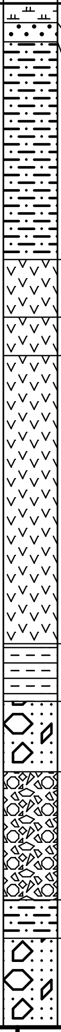
Well/Boring ID: SB-201

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample
	855							
0		1	0-2	1.0	18 10 8 8	18	ND	
	850	2	2-4	0.7	10 27 50/0.2 NA	NA	0.7	
5		3	4-6	1.5	16 14 11 11	25	ND	
		4	6-8	0.4	4 9 7 6	16	0.1	
	845	5	8-10	0.1	6 7 16 15	23	0.1	
10		6	10-12	1.0	3 4 7 10	11	0.7	
	840	7	12-14	0.8	11 14 11 9	25	0.3	
15		8	14-16	1.4	11 9 12 15	21	1.2	

Geologic Column



Stratigraphic Description

GRASS and dark brown CLAY. [TOPSOIL]

Black fine to coarse SAND, some Coal, loose.

Brown SILT, some fine to coarse Sand and Gravel, trace Clay, dense, damp.

Black CINDERS, Silt, fine to medium Sand, trace Coal Brick and Dust, Gravel.

Whitish ASH, possible Coal Ash.

Black CINDERS and SILT, some fine to medium Sand, trace Coal, Brick and Gravel.

Cobble of Coal at 8' bgs.

Brown SILT and CLAY, some fine Sand, subangular to subrounded Gravel, wet, soft.

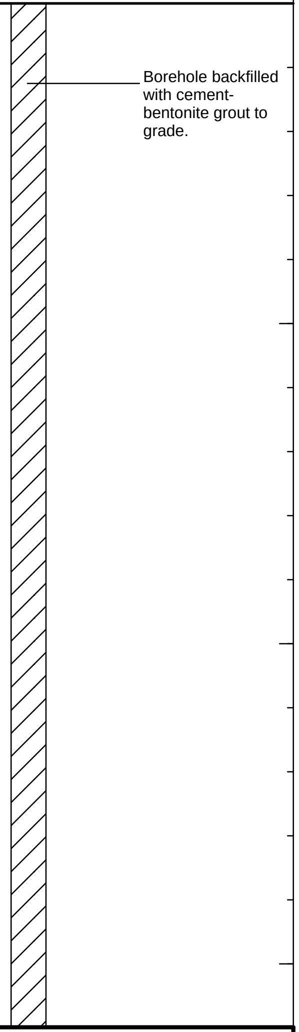
Fine to coarse SAND and GRAVEL, little Silt, wet, loose.

Gray GRAVEL, some fine to coarse Sand and Silt, some Clay, wet.

Dark gray SILT, some Clay and Gravel, soft, wet.

Gray to dark gray fine to coarse SAND and GRAVEL, loose, wet.

Well/Boring Construction



Borehole backfilled with cement-bentonite grout to grade.

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 16' - 18' bgs for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-201.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/17/03

Client: New York State Electric and Gas

Well/Boring ID: SB-201

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 24' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
										Red-brown fine to coarse SAND and GRAVEL, dense, wet.	
	835	9	16-18	1.0	28 27 30 32	57	1.5	X		Brown SILT, some subangular Gravel, dense.	Borehole backfilled with cement-bentonite grout to grade.
20		10	18-20	1.2	25 29 41 26	62	0.1				
		11	20-22	0.1	33 30 50 50/0.3	80	ND				
	830	12	22-24	0.1	43 50/0.3 NA NA	NA	ND			Brown SILT, some subangular Gravel, trace Cobbles, dense.	
25											
	825										
30											
	820										
35											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 16' - 18' bgs for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-201.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/17/03

Date Start/Finish: 9/25/03 - 9/26/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764443.26
Easting: 761821.09
Casing Elevation: NA

Borehole Depth: 30' below grade
Surface Elevation: 856.37' AMSL

Geologist: Jason Sents

Well/Boring ID: SB-202

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	855	1	0-2	0.7	1 16 22 NA	38	00.3			Brown SILT and fine SAND (Topsoil), Grass, and Roots, soft, damp to wet. Black CINDERS, ASH, and SLAG, little fine Gravel, trace Sandstone Cobble, loose, dry. Spoon refusal at 1.5' bgs.	Borehole backfilled with cement-bentonite grout to grade.
		2	2-4	1.5	5 8 15 8	23	0.1			Fine to medium SAND, some Gravel, Cinders, Slag, and Ash, trace Brick and Clay, loose, damp.	
5		3	4-6	1.3	4 7 15 15	22	0.5			Dark brown SILT, some fine to medium Sand and Crushed Stone, trace Cinders and Coal, moderately dense, damp.	
	850	4	6-8	1.5	22 38 32 19	70	0.4			Dark brown fine to medium SAND and CRUSHED STONE, some red shattered Sandstone Cobbles, little Silt, possible black staining from 7.2' - 7.4' bgs, no odor, loose, dry.	
		5	8-10	0.5	14 11 9 6	20	0.2				
10	845	6	10-12	0.0	3 4 5 3	9	NA			No Recovery. Cobble in shoe of spoon.	
		7	12-14	1.0	4 7 9 15	16	0.6			Dark brown fine to medium SAND and SILT, some Gravel, trace Brick, Clay, and Cobbles, loose, wet. Water at 13.7' bgs.	
15		8	14-16	1.0	14 25 21 25	46	0.6				

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 22' - 24' bgs for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-202

Borehole Depth: 30' below grade

DEPTH / ELEVATION: 840, 20, 835, 25, 830, 30, 825, 35

DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
840	9	16-18	2.0	12 23 25 21	48	0.2			Dark brown fine to medium SAND and SILT, some Gravel, trace Brick, Clay, and Cobbles, loose, wet.	Borehole backfilled with cement-bentonite grout to grade.
20	10	18-20	2.0	23 23 26 31	49	0.5				
835	11	20-22	1.0	22 14 10 10	24	0.1				
	12	22-24	1.0	15 17 50/0.4 NA	NA	0.4	X			
25	13	24-26	0.3	15 50/0.3 NA NA	NA	ND			Gray SILT, little subangular Gravel, dense, damp.	
830	14	26-28	1.0	20 20 25 25	45	0.1				
30	15	28-30	0.5	20 27 32 40	59	ND				

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 22' - 24' bgs for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-202.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/3/03

Date Start/Finish: 9/24/03 - 9/25/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764447.77
Easting: 761613.04
Casing Elevation: NA

Borehole Depth: 70' below grade
Surface Elevation: 853.19' AMSL

Geologist: Jason Sents

Well/Boring ID: SB-203

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample
	855							
0		1	0-2	ND	11 9 14 9	23	ND	
	850	2	2-4	0.5	9 9 5 4	14	0.5	
5		3	4-6	1.2	4 6 4 6	10	1.2	
		4	6-8	1.2	1 2 1 10	3	1.2	
	845	5	8-10	0.2	15 21 19 15	40	0.2	
10		6	10-12	ND	24 18 12 10	30	ND	
	840	7	12-14	0.6	9 7 8 8	15	0.6	
15		8	14-16	0.3	3 7 9 23	16	0.5	

Geologic Column / **Stratigraphic Description**

Brown fine to medium SAND and CRUSHED STONE, trace Silt and Grass, loose, dry.

Dark brown fine SAND grading to black Ash, some Glass, Cinders and red Brick, loose, dry.

Tan SILT, little Clay and fine Sand, gray mottling, soft, dry.

Black CINDERS and ASH, some Brick, Silt, and orange medium Sand, burnt odor, loose, dry.

Tan SILT, little Clay and fine Sand, trace blue-green mottling, no odor.

Tan SILT, little fine Sand, trace clear Glass, possible black staining.

Black SILT, burnt odor.

Red brown fine to medium SAND and GRAVEL, trace Silt, coarse Sand and Glass, loose, dry. Water at 9.5' bgs.

Tan brown SILT, little fine Sand and Clay, trace Gravel, possible black staining throughout, faint burnt odor.

Dark brown fine to medium SAND and GRAVEL, little Cobbles, trace Silt, loose, wet.

Well/Boring Construction

Borehole backfilled with cement-bentonite grout to grade.

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 24' - 26' bgs for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-203

Borehole Depth: 70' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
		9	16-18	0.3	9 10 7 5	17	0.3		Dark brown fine to medium SAND and GRAVEL, little Cobbles, trace Silt, loose, wet.
	835	10	18-20	1.0	6 8 15 16	23	1.7		
20		11	20-22	1.0	17 20 20 26	40	1.9		
	830	12	22-24	1.0	25 35 26 19	61	ND		
25		13	24-26	1.0	33 20 18 15	38	0.7	X	
		14	26-28	2.0	14 25 26 21	51	0.3		Subrounded GRAVEL, loose, wet. Brown SILT, trace Clay, soft, damp to wet. Gray SILT, little Clay, soft, damp to wet.
	825	15	28-30	2.0	5 7 9 11	16	0.1		Some Clay from 28' - 30' bgs.
30		16	30-32	2.0	4 5 5 5	10	ND		
	820	17	32-34	2.0	9 14 15 50/0.3	29	ND		Trace fine sub-angular Gravel, at 32' - 34' bgs.
35		18	34-36	0.5	19 23 29 40	52	ND		Gray SILT, little subangular Gravel, dense, damp.

Well/Boring Construction: Borehole backfilled with cement-bentonite grout to grade.

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 24' - 26' bgs for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

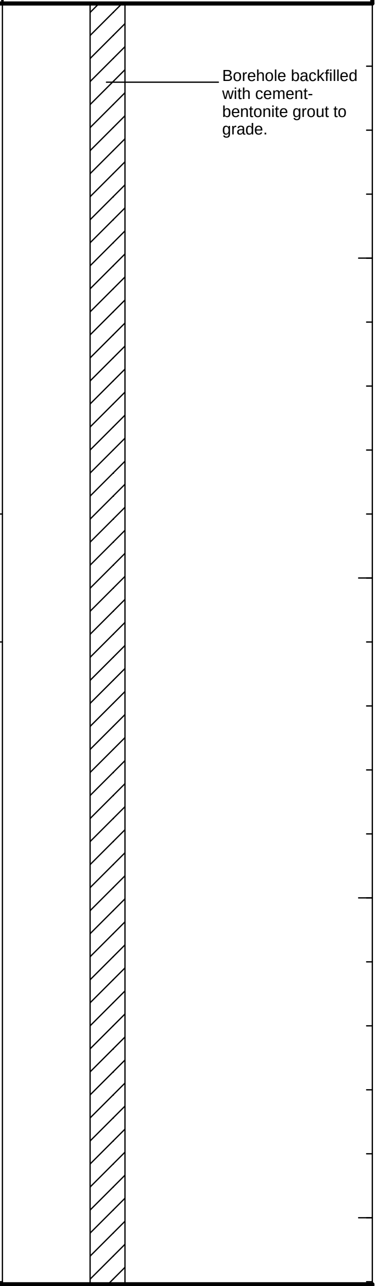
Well/Boring ID: SB-203

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 70' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		19	36-38	0.4	40 50/0.3 NA NA	NA	ND			Gray SILT, little subangular Gravel, dense, damp.
	815	20	38-40	0.5	40 42 50/0.3 NA	NA	0.1			
40		21	40-42	0.3	25 36 46 50	82	ND			
	810	22	42-44	0.2	30 50/0.4 NA NA	NA	ND			Increasing density below 42' bgs.
45		23	44-46	0.1	50/0.2 NA NA NA	NA	ND			Gray SHALE chips, little Silt, wet.
		24	46-48	0.5	40 50/0.5 NA NA	NA	ND			Gray SILT, little subangular Gravel, trace fine to coarse Sand, dense, damp.
	805	25	48-50	1.7	16 26 36 48	62	ND			Slight increase in Clay content at 48' bgs.
50		26	50-52	0.5	38 49 50/0.4 NA	NA	ND			
	800	27	52-54	1.0	26 38 50/0.4 NA	NA	ND			
55		28	54-56	0.0	40 42 50/0.3 NA	NA	NA			

Well/Boring Construction



Borehole backfilled with cement-bentonite grout to grade.

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 24' - 26' bgs for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-203.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/3/03

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-203

Borehole Depth: 70' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
		29	56-58	NA	NA NA NA NA	NA	NA		Spoon refusal at 56' bgs. Auger to 58' bgs.
	795	30	58-60	1.0	26 25 43 36	68	ND		Gray SILT, little subangular Gravel, trace fine to coarse Sand, damp, dense.
60		31	60-62	1.0	17 35 50/0.4 NA	NA	ND		
	790	32	62-64	1.0	24 32 32 40	64	ND		SHALE Cobble fragments, little Silt.
65		33	64-66	0.1	50 50/0.2 NA NA	NA	ND		Gray SILT, little sub-angular Gravel, trace fine to coarse Sand, dense, damp.
		34	66-68	0.5	24 38 50/0.4 NA	NA	ND		
	785	35	68-70	1.6	20 31 35 38	66	ND		
70									
	780								
75									

Well/Boring Construction

Borehole backfilled with cement-bentonite grout to grade.

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 24' - 26' bgs for BTEX, PAH, & Total Cyanide.

Date Start/Finish: 9/29/03 - 9/30/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764350.75
Easting: 761626.15
Casing Elevation: NA

Borehole Depth: 36' below grade
Surface Elevation: 853.79' AMSL

Geologist: Jason Sents

Well/Boring ID: SB-204

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	855										
0		1	0-2	0.4	7 7 8 7	15	0.1			ORGANICS (Grass, Roots, Sod), little fine to medium Sand, Crushed Stone, loose, dry. [TOPSOIL]	Borehole backfilled with cement-bentonite to grade.
	850	2	2-4	0.4	6 6 7 6	13	0.7			Dark brown fine to medium SAND and GRAVEL, some black Slag at 2.2' bgs, dry, loose.	
5		3	4-6	0.2	6 5 6 8	11	0.2			Dark brown fine SAND and SILT, some Organics (Wood), trace Slag, Crushed Stone, loose, dry. Dark brown SILT, some fine Sand, Wood, and Clay, trace Slag and Gravel, soft, damp.	
		4	6-8	0.7	11 17 13 13	30	0.1			Crushed BRICK, Stone, possible black staining. Brown SILT and fine SAND, trace angular Cobble.	
	845	5	8-10	2.0	10 18 25 27	43	0.3			Brown SILT and fine SAND, trace medium Sand, Gravel, Brick, and Wood, moderately dense, dry.	
10		6	10-12	1.0	22 14 14 14	28	1.3				
	840	7	12-14	2.0	4 9 7 12	16	49.4	X		Gray-brown fine to coarse SAND and GRAVEL, sheen, yellow oily blebs, possible fuel-oil odor, loose, wet.	
15		8	14-16	1.2	20 37 27 23	64	38.7			No oil and trace sheen below 14' bgs.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 12' - 14' bgs and 26' - 28' for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-204.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/3/03

Client: New York State Electric and Gas

Well/Boring ID: SB-204

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 36' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	1.2	13 24 18 19	42	27.7			Gray-brown fine to coarse SAND and GRAVEL, trace sheen, possible fuel-oil odor, loose, wet.	Borehole backfilled with cement-bentonite to grade.
	835	10	18-20	0.8	12 26 21 25	47	35.0				
20		11	20-22	0.4	42 32 36 27	68	31.1				
	830	12	22-24	NA	50/0.2 NA 50/0.2 NA	NA	NA			No Recovery. Auger to 24' bgs.	
25		13	24-26	1.8	22 24 15 15	39	2.3			Brown fine to coarse SAND and GRAVEL, shattered Cobbles, faint possible fuel-oil odor, dense, wet.	
		14	26-28	1.2	23 23 15 16	38	2.2	×			
	825	15	28-30	0.1	21 23 15 16	38	0.3			Little gray-brown Silt below 28' bgs.	
30		16	30-32	0.5	23 18 29 20	47	0.7			Gray SILT and subangular GRAVEL, dense, damp to wet.	
	820	17	32-34	0.8	15 23 25 45	48	0.2				
35		18	34-36	1.0	32 40 45 50/0.2	NA	0.1				

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 12' - 14' bgs and 26' - 28' for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-204.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/3/03

Date Start/Finish: 9/30/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764311.88
Easting: 761724.42
Casing Elevation: NA

Borehole Depth: 24' below grade
Surface Elevation: 849.46' AMSL

Geologist: Jason Sents

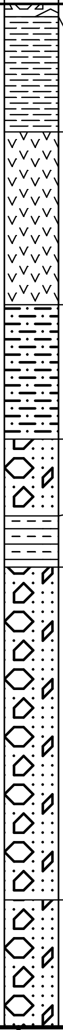
Well/Boring ID: SB-205

Client: New York State Electric and Gas

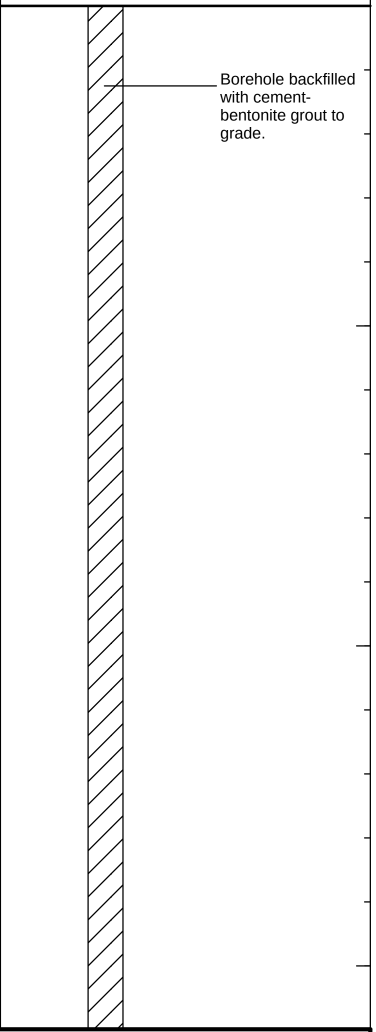
Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
	850								
0		1	0-2	0.7	10 13 9 11	22	2.0		GRAVEL (old railroad bed). Black CLAY and ROOTS, trace Ash and Gravel, possible weathered fuel-oil odor.
		2	2-4	0.5	3 5 8 5	13	5.4		Black CINDERS, ASH, and COAL, some Brick, trace Gravel, loose, possible fuel-oil odor, damp.
5	845	3	4-6	0.7	10 10 10 8	20	27.2		Gray SILT, some Clay, fine to coarse Sand, Gravel and Cobble, possible fuel-oil odor.
		4	6-8	0.8	7 6 4 3	10	48..6		Gray fine to coarse SAND and GRAVEL, possible product on tape from 6.2' - 6.5' bgs, strong posible fuel-oil odor, loose, wet. Coal at 8' bgs.
	840	5	8-10	1.6	3 7 14 14	21	23.8		Dark gray CLAY and SILT, some fine to coarse Sand and Gravel, possible black staining and fuel-oil odor, soft, wet. Black possibly stained fine to coarse SAND and GRAVEL, little Silt and Clay, possible fuel-oil odor, loose, wet.
10		6	10-12	0.2	9 7 8 7	15	16.1		
		7	12-14	0.3	7 10 12 17	22	11.2		
15	835	8	14-16	2.0	21 18 11 11	29	8.9		Brown fine to coarse SAND and GRAVEL, some crushed Cobble, slight possible fuel-oil odor, loose, wet.

Geologic Column



Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 16' - 18' bgs for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

Well/Boring ID: SB-205

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 24' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	1.6	15 19 19 30	38	5.1	X		Brown fine to coarse SAND and GRAVEL, some crushed Cobble, slight possible fuel-oil odor, loose, wet.	Borehole backfilled with cement-bentonite grout to grade.
20	830	10	18-20	1.2	20 40 50/0.4 NA	NA	4.2			Brown SILT and subangular GRAVEL, faint possible fuel-oil odor, dense, damp. Gray SILT and subangular GRAVEL, damp, dense, no odor.	
		11	20-22	1.0	14 43 38 50	81	0.2				
		12	22-24	0.9	50 30 36 32	66	0.3				
25	825										
30	820										
35	815										

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 16' - 18' bgs for BTEX, PAH, & Total Cyanide.

Date Start/Finish: 9/23/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764354.7
Easting: 761497.03
Casing Elevation: NA

Borehole Depth: 42' below grade
Surface Elevation: 852.25' AMSL

Geologist: Jason Sents

Well/Boring ID: SB-206

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
855										
0	1	0-2	1.0	5 17 17 12	34	3.5			Brown-gray fine to medium SAND and CRUSHED STONE, loose, wet. Crushed red BRICK, dry. Black CINDERS, some Ash, Wood, Cobbles, little Clay, Silt, fine Sand, possible black staining, slight odor, loose, damp.	Borehole backfilled with cement-bentonite grout to grade.
850	2	2-4	0.6	5 5 5 5	10	5.7				
5	3	4-6	1.4	6 5 5 50/0.2	10	1.9 23.8	X		Dark gray brown fine to medium SAND, Crushed Stone, little Silt, loose, damp. Water and black oily liquid, strong odor, at 4.8' bgs.	
845	4	6-8	1.0	4 7 4 11	14	72.6			Olive SILT, some Clay, soft, trace Cobble, slight sheen, trace odor.	
	5	8-10	NA	8 13 13 15	26	NA			No Recovery. Two pieces of radial tire in shoe of spoon. Interior of spoon coated with black oil. Possible Slough.	
10	6	10-12	0.1	12 22 22 15	44	30.4			Coarse SAND and GRAVEL, Tire, coated in black oil and water, odor.	
840	7	12-14	0.3	6 5 5 18	10	26.0			Brown fine to medium SAND and GRAVEL, some coarse Sand, red brown oil on interior of sample, loose, wet.	
15	8	14-16	0.3	6 9 11 12	20	29.7	X		Blebs and stringers of red brown oil on interior of sample, at 14' - 17' bgs.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil samples collected from 4' - 6', 14' - 16', 24' - 26', and 40' - 42' for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

Well/Boring ID: SB-206

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 42' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	1.0	11 19 20 19	39	34.6			Brown fine to medium SAND and GRAVEL, some coarse Sand, little Silt, blebs and stringers of red brown oil on interior of sample, loose, wet.	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	0.5	18 29 16 22	45	1.7			Brown fine to medium SAND and subrounded GRAVEL, trace Silt, sheens and odor on slough, loose, wet.	
20		11	20-22	0.8	18 15 18 37	33	2.0			Possible red stains at 20.7' bgs.	
	830	12	22-24	NA	50/0.3 NA NA NA	NA	NA			No Recovery. Shattered COBBLE.	
25		13	24-26	0.4	33 47 28 21	75	7.7	X		Brown fine SAND, little medium Sand and Silt, no odor, stains, or sheen, loose, wet.	
	825	14	26-28	0.4	50 29 27 30	56	6.8			Shattered COBBLE, sheen on slough.	
		15	28-30	0.5	22 50/0.2 NA NA	NA	4.1			Brown fine to medium SAND and GRAVEL, wet, loose.	
30		16	30-32	0.4	34 50/0.3 NA NA	NA	5.0				
	820	17	32-34	NA	50/0.1 NA NA NA	NA	NA			Gray Silty CLAY, odor, soft, wet.	
35		18	34-36	0.5	24 28 28 33	56	6.7				

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Soil samples collected from 4' - 6', 14' - 16', 24' - 26', and 40' - 42' for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-206

Borehole Depth: 42' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	815	19	36-38	2.0	8 8 12 12	20	5.2		▤	Gray Silty CLAY, odor, soft, wet.	▨ Borehole backfilled with cement-bentonite grout to grade.
		20	38-40	2.0	12 10 12 11	22	5.1		▤		▨
40		21	40-42	1.8	18 9 9 14	18	1.4	☒	▤		▨
	810										
45											
	805										
50											
	800										
55											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil samples collected from 4' - 6', 14' - 16', 24' - 26', and 40' - 42' for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-206.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/3/03

Date Start/Finish: 9/22/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764507.51
Easting: 761174.62
Casing Elevation: NA

Borehole Depth: 42' below grade
Surface Elevation: 853' AMSL

Geologist: Jason Sents

Well/Boring ID: SB-207

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	855										
0		1	0-2	1.1	9 15 20 20	35	1.2			Light brown-gray fine to medium SAND and GRAVEL, loose, dry. Black ASH, some Cinders and fine Sand, loose, dry.	Borehole backfilled with cement-bentonite grout to grade.
	850	2	2-4	1.0	6 5 4 3	9	2.4			Black ASH, some Cinders and fine to medium Sand, trace angular Gravel, Brick, and Slag, loose, dry.	
5		3	4-6	0.8	4 1 2 3	3	0.3			Wet at 4' bgs.	
		4	6-8	0.3	7 2 2 3	4	0.6			Tan ASH, Cinders, fine to medium Sand, trace angular Gravel, Brick, Slag, gray-brown Silty Clay, wet, loose. Brown SILT and CLAY, trace rounded Gravel, gray mottling, moderately dense, damp.	
	845	5	8-10	0.8	6 3 6 10	9	1.6			Red-brown fine to medium SAND and SILT, trace Clay, sub-angular Gravel, damp, loose. Brown SILT and CLAY, trace rounded Gravel, gray mottling, moderately dense, damp.	
10		6	10-12	1.0	6 4 4 4	8	7.5			Brown fine to medium SAND and angular to rounded GRAVEL, trace coarse Sand, Silt, Clay, loose, wet.	
	840	7	12-14	0.5	6 3 2 2	5	4.7				
15		8	14-16	0.0	2 3 2 2	5	NA			No Recovery.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 30' - 32' bgs for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-207.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/2/03

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-207

Borehole Depth: 42' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	0.7	1 2 12 21	14	4.2			Brown fine to medium SAND and GRAVEL, trace coarse Sand, Silt, Clay, loose, wet. Cobble at 16.4' bgs.	Borehole backfilled with cement-bentonite grout to grade.
	835	10	18-20	0.8	11 20 50/0.3 NA	NA	0.7			Brown fine to coarse SAND and GRAVEL, trace Silt and Clay, becoming more dense, less wet.	
20		11	20-22	0.1	11 50/0.4 NA NA	NA	1.2				
	830	12	22-24	0.9	4 7 7 10	14	0.8			Brown medium SAND, little fine Sand, Silt, loose, wet. Brown fine to coarse SAND and GRAVEL, trace Silt and Clay, becoming more dense, less wet.	
25		13	24-26	0.5	9 10 10 11	20	3.0			Crushed COBBLE, brown fine to coarse Sand, loose, wet.	
		14	26-28	0.8	10 15 21 36	36	3.0			Brown fine to medium SAND and GRAVEL, loose becoming dense with depth, wet.	
	825	15	28-30	1.0	26 18 16 28	34	ND			Gray CLAY, dense, trace fine to coarse Sand, Silt, Gravel.	
30		16	30-32	0.8	14 12 18 21	30	0.6	X		Gray CLAY, little Silt, trace Cobble at 30.6' bgs, medium stiff, damp.	
	820	17	32-34	0.0	50/0.1 NA NA NA	NA	NA			No Recovery.	
35		18	34-36	1.1	27 33 49 45	82	1.0			Gray-brown fine to medium SAND and GRAVEL, little Silt, Clay, damp, dense. [TILL]	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 30' - 32' bgs for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-207

Borehole Depth: 42' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		19	36-38	1.0	26 36 28 30	64	2.7			Brown-gray fine to medium SAND and GRAVEL, little coarse Sand, Silt, trace Cobble, Clay, dense, wet.	Borehole backfilled with cement-bentonite grout to grade.
	815										
		20	38-40	1.0	40 44 50/0.4 NA	NA	1.4				
40											
		21	40-42	1.0	20 36 50/0.4 NA	NA	0.6				
	810										
45											
	805										
50											
	800										
55											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 30' - 32' bgs for BTEX, PAH, & Total Cyanide.

Date Start/Finish: 9/18/03 **Drilling Company:** Lyon Drilling **Driller's Name:** H. Lyone/ R. Horne **Drilling Method:** Hollow Stem Auger **Bit Size:** NA **Auger Size:** 3-1/4" **Rig Type:** CME-55 **Sampling Method:** 2"/3" Split Spoon	**Northing:** 764381.53 **Easting:** 761230.93 **Casing Elevation:** NA **Borehole Depth:** 24' below grade **Surface Elevation:** 852.04' AMSL **Geologist:** David Cornell	**Well/Boring ID:** SB-208 **Client:** New York State Electric and Gas **Location:** Madison Ave. Former MGP Site Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0		1	0-2	1.0	8 9 12 19	21	ND			Brown fine to medium SAND, fine to coarse subangular Gravel, trace Silt, moist, non-plastic.	Borehole backfilled with cement-bentonite grout to grade.
	850	2	2-4	1.2	6 8 16 10	24	ND			Dark gray-black CINDERS, miost, non-plastic. Red-orange BRICK.	
5		3	4-6	1.2	4 2 2 1	4	ND			Red-orange to black SLAG and CINDERS, wet, non-plastic. Brown SILT and CLAY, mottled, moderately plastic, wet.	
	845	4	6-8	0.8	1 2 WOH 3	2	15.9			Brown-gray Silty CLAY, some to little Slag and Gravel, faint odor, moderately plastic, wet.	
		5	8-10	0.5	6 4 4 6	8	47.6			Dark gray Silty fine to coarse subrounded GRAVEL, little Clay, fine to medium Sand, trace sheen, moderate odor, non-plastic, saturated.	
10		6	10-12	1.0	8 9 8 10	17	36.8	☒		Dark gray Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, little Cobble, heavy sheen, trace NAPL, moderate odor, non-plastic, saturated.	
	840	7	12-14	1.1	3 1 2 2	3	23.2				
15		8	14-16	0.5	6 6 5 1	11	4.5	☒		Brown fine to coarse SAND and fine to coarse subrounded GRAVEL, little Cobble, faint odor, non-plastic, saturated.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 10' - 11' bgs for BTEX, PAH, Total Cyanide, and Waste Characterization.

Project: 130.43.003
Data File:SB-208.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/2/03

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-208

Borehole Depth: 24' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	0.2	WOH 19 23 10	19	ND			Brown fine to coarse SAND and fine to coarse subrounded GRAVEL, little Cobble, faint odor, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
20		10	18-20	1.1	11 13 19 12	24	0.3				
	830	11	20-22	0.7	30 47 26 50/0.2	77	0.2				
		12	22-24	0.2	NA NA NA	NA	ND				
25											
	825										
30											
	820										
35											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 10' - 11' bgs for BTEX, PAH, Total Cyanide, and Waste Characterization.

Date Start/Finish: 9/18/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: NA
Easting: NA
Casing Elevation: NA

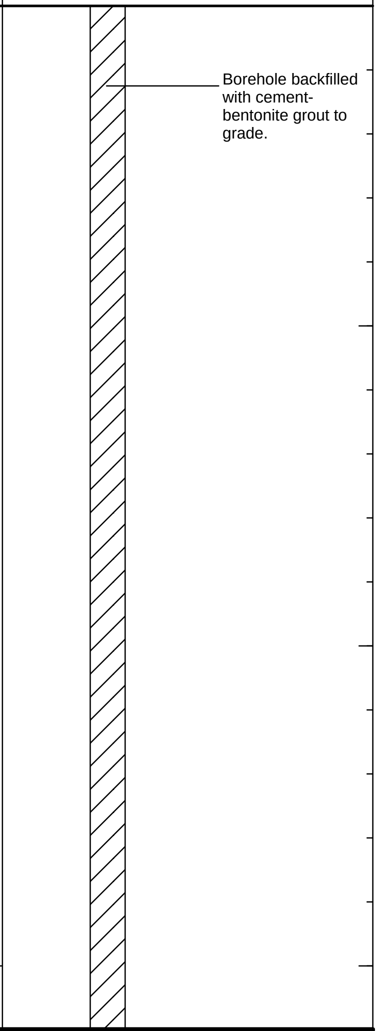
Borehole Depth: 45' below grade
Surface Elevation: NA

Geologist: David Cornell

Well/Boring ID: SB-208A

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0									Auger to 15' bgs without sampling.	 Borehole backfilled with cement-bentonite grout to grade.
5	-5										
10	-10										
15	-15	1	15-17	0.7	4 3	6	ND			Brown Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, trace to little Cobbles, dense, non-plastic, saturated.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR/H = Weight of Rod/Hammer.

Geotech (Grain Size) sample collected from 35' - 36.5' bgs.

Project: 130.43.003
Data File:SB-208A.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/2/03

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-208A

Borehole Depth: 45' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		1	15-17	0.7	3 3	6	ND			Brown Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, trace to little Cobbles, dense, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
20	20										
		2	22-24	1.2	17 43 22 37	65	ND			Brown Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, trace to little Cobbles, dense, non-plastic, saturated. Brown SILT, some fine to coarse subrounded Gravel, non-plastic, moist.	
25	25	3	24-26	1.6	18 28 50 50	78	ND			Brown Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, little Cobble, dense, non-plastic, saturated.	
		4	26-28	1.3	23 28 8 50	36	ND			Gray SHALE. Gray SILT, some fine to coarse subrounded Gravel, trace fine Sand, non-plastic, moist to wet. [TILL]	
		5	28-30	1.7	8 9 12 12	22	ND			Gray Silty fine to coarse SAND, some fine to coarse subrounded Gravel, trace Cobbles, non-plastic, saturated. [TILL]	
30	30	6	30-32	0.9	14 20 30 18	50	ND				
		7	32-34	0.3	22 21 15 20	36	ND				
										COBBLE from 34' - 35' bgs.	
35	35	8	35-37	1.5	14 20	41		X		Gray Silty fine to coarse SAND, some fine to coarse subrounded Gravel, trace Cobbles, non-plastic, saturated. Increasing density with depth. [TILL]	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR/H = Weight of Rod/Hammer.

Geotech (Grain Size) sample collected from 35' - 36.5' bgs.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-208A

Borehole Depth: 45' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		8	35-37	1.5	21 22	41	ND			Gray Silty fine to coarse SAND, some fine to coarse subrounded Gravel, trace Cobbles, non-plastic, saturated. [TILL]	Borehole backfilled with cement-bentonite grout to grade.
		9	37-39	1.2	15 18 27 31	45	ND			Gray fine to medium SAND, little to trace fine to medium subrounded Gravel, trace Silt, non-plastic, moist to wet.	
40	40	10	39-41	1.1	18 20 18 24	38	ND			Gray-brown fine to coarse SAND and multicolored fine to coarse subrounded GRAVEL, trace to little Cobble, Silt, non-plastic, moist. [TILL]	
		11	41-43	1.0	20 27 32 50/0.3	59	ND				
		12	43-45	0.2	28 40 50/0.4 NA	NA	ND				
45	45										
50	50										
55	55										

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR/H = Weight of Rod/Hammer.

Geotech (Grain Size) sample collected from 35' - 36.5' bgs.

Project: 130.43.003
Data File:SB-208A.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/2/03

Date Start/Finish: 9/19/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764495.64
Easting: 761032.09
Casing Elevation: NA

Borehole Depth: 30' below grade
Surface Elevation: 852.58' AMSL

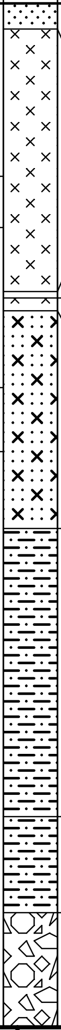
Geologist: David Cornell

Well/Boring ID: SB-209

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample
1	0-2	1.3	6 8 15 8	23	ND	
2	2-4	1.5	6 5 5 6	10	ND	☒
3	4-6	1.5	2 2 5 10	7	ND	
4	6-8	1.0	3 7 13 5	20	ND	☒
5	8-10	1.7	2 3 7 11	10	ND	
6	10-12	1.5	4 9 12 12	21	ND	
7	12-14	0.9	6 9 6 5	15	ND	
8	14-16	0.9	1 2 3 9	5	ND	



Stratigraphic Description

Brown Silty fine to medium SAND, some fine to coarse subangular Gravel, little Grass, non-plastic, moist.

Black CINDERS and SLAG, non-plastic, moist.

Blue staining below 2.7' bgs.

Brown fine Sandy SILT, non-plastic, moist.

Dark gray CINDER, some fine Sand.

Brown Silty fine to medium SAND and SLAG, fine to coarse subrounded Gravel, non-plastic, wet to saturated.

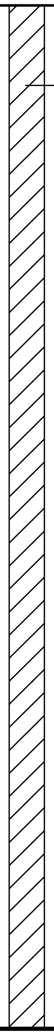
Gray-brown SILT, little fine Sand, trace Roots, mottled, non-plastic, wet.

Trace Clay, semi-plastic, wet.

Gray SILT, little fine to medium Sand, fine to medium subrounded Gravel, trace to little Clay, semi-plastic, wet to saturated.

Gray-brown Silty fine to coarse subangular GRAVEL, some to little fine to coarse Sand, trace Cobbles, non-plastic, saturated.

Well/Boring Construction



Borehole backfilled with cement-bentonite grout to grade.

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 22.0' - 23.4' bgs for BTEX, PAH, & Total Cyanide. Soil samples collected from 2.7' - 3.5' bgs and 6.0' - 7.0' bgs for Total

Project: 130.43.003
Data File:SB-209.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/2/03

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-209

Borehole Depth: 30' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	0.4	12 7 6 1	13	ND			Gray-brown Silty fine to coarse subangular GRAVEL, some to little fine to coarse Sand, trace Cobbles, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	0.5	5 6 5 50/0.3	11	ND			Brown Silty fine to coarse subangular GRAVEL, some to little fine to coarse Sand, trace Cobbles, non-plastic, saturated.	
20		11	20-22	0.9	22 26 30 28	56	ND			Brown Silty fine to coarse subrounded GRAVEL and fine to coarse SAND, dense, non-plastic, saturated.	
	830	12	22-24	1.4	20 27 21 22	48	ND	X		Gray fine SAND and SILT, some multicolored fine to coarse subrounded Gravel, dense, non-plastic, moist to wet. [TILL]	
25		13	24-26	1.3	20 18 20 23	38	ND				
	825	14	26-28	1.5	18 33 37 30	70	ND				
		15	28-30	1.1	35 45 43 50/0.3	88	ND				
30											
	820										
35											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 22.0' - 23.4' bgs for BTEX, PAH, & Total Cyanide. Soil samples collected from 2.7' - 3.5' bgs and 6.0' - 7.0' bgs for Total

Project: 130.43.003
Data File:SB-209.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/2/03

Date Start/Finish: 9/17/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764261.5
Easting: 761253.35
Casing Elevation: NA

Borehole Depth: 40' below grade
Surface Elevation: 851.92' AMSL

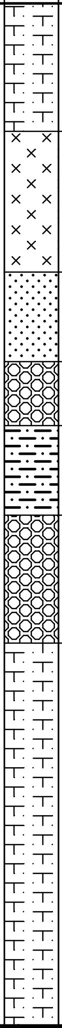
Geologist: David Cornell

Well/Boring ID: SB-210

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column
0		1	0-2	1.2	9 12 35 19	47	ND		
	850	2	2-4	1.2	10 14 10 4	24	ND		
5		3	4-6	0.8	1 2 10 NA	NA	ND		
	845	4	6-8	0.9	NA NA 3 2	NA	ND		
10		5	8-10	0.2	8 8 6 11	14	ND		
	840	6	10-12	0.8	19 4 9 6	13	ND		
		7	12-14	0.7	12 5 7	NA	ND		
15		8	14-16	0.9	2 2 2 3	4	ND		



Stratigraphic Description

Gray-brown Silty fine to medium SAND, some fine to coarse subangular Gravel, red-orange Brick, little Cobbles, little Cinders, moist, non-plastic.

Dark-gray-black CINDERS, Slag, little Ash, fine to medium Sand, little fine to medium subrounded Gravel, trace Brick, moist, non-plastic.

Brown Silty fine to medium SAND, some fine to coarse subangular Gravel, trace Concrete, moist, non-plastic.

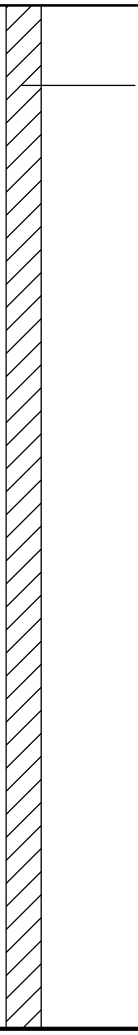
CONCRETE (slab).

Brown-gray SILT, little to some Clay, mottled, wet, moderately plastic.

CONCRETE fragments, Brick fragments.

Brown-gray Silty fine to coarse SAND, some fine to coarse subangular Gravel, trace Clay, wet to saturated, non-plastic.

Well/Boring Construction



Borehole backfilled with cement-bentonite grout to grade.

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil samples collected from 28.5' - 29.3' bgs and 38.0' - 39.5' bgs for BTEX, PAH, and Total Cyanide.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-210

Borehole Depth: 40' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	0.7	WOH 2 3 4	5	ND			Brown-gray Silty fine to coarse SAND, some fine to coarse subangular Gravel, trace Clay, wet to saturated, non-plastic.	Borehole backfilled with cement-bentonite grout to grade.
20		10	18-20	NA	NA NA NA NA	NA	NA				
	830	11	20-22	0.7	6 13 10 12	23	2.6			Faint odor at 20-20.7' bgs.	
		12	22-24	1.4	37 16 10 8	26	3.1			Brown-gray Silty fine to coarse SAND, fine to coarse subrounded GRAVEL, saturated, non-plastic, faint odor.	
25		13	24-26	1.0	12 4 3 3	7	5.9				
	825	14	26-28	0.9	5 27 23 31	50	2.7				
30		15	28-30	1.3	26 21 35 22	56	5.0 321.0	☒		Gray Silty fine to medium SAND, fine to coarse subrounded Gravel, little Cobbles, dense, saturated to non-plastic. [TILL] Little to some NAPL below 28.5' bgs.	
	820	16	30-32	0.4	50/0.4 NA NA NA	NA	53.9			Heavy sheen, trace NAPL, at 30-30.4' bgs.	
		17	32-34	0.9	25 21 14 25	35	65.3			Increasing Sand content with depth, moderate odor, no sheen or NAPL.	
35		18	34-36	0.4	NA 13 16 22	NA	10.4				

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil samples collected from 28.5' - 29.3' bgs and 38.0' - 39.5' bgs for BTEX, PAH, and Total Cyanide.

Project: 130.43.003
Data File:SB-210.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/2/03

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-210

Borehole Depth: 40' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	815	19	36-38	0.5	30 50 50/0.2 NA	NA	7.6			Gray Silty fine to medium SAND, fine to coarse subrounded Gravel, little Cobbles, dense, saturated to non-plastic. [TILL]	Borehole backfilled with cement-bentonite grout to grade.
40		20	38-40	1.5	27 29 29 29	58	0.7 ND	X		Brown-gray Silty fine to coarse SAND, gray fine to coarse subrounded Gravel, little Cobbles, saturated, non-plastic.	
	810										
45											
	805										
50											
	800										
55											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil samples collected from 28.5' - 29.3' bgs and 38.0' - 39.5' bgs for BTEX, PAH, and Total Cyanide.

Date Start/Finish: 9/11/03-9/15/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764179.96
Easting: 761183.08
Casing Elevation: NA

Borehole Depth: 80' below grade
Surface Elevation: 852.32' AMSL

Geologist: Jason Sents/ David Cornell

Well/Boring ID: SB-211

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample
1	0-2	0.4	1 3 5 4	8	1.4	
2	2-4	0.5	3 3 3 3	6	0.6	
3	4-6	0.2	5 WOH 1 1	1	6.7	
4	6-8	1.8	1 1 2 1	3	5.1	☒
5	8-10	1.7	2 2 5 10	7	6.5	
6	10-12	1.1	4 5 6 6	11	2.7	
7	12-14	0.8	3 4 3 4	7	8.3	
8	14-16	1.0	2 1 3 2	4	3.3	

DEPTH: 0, 5, 10, 15
ELEVATION: 855, 850, 845, 840

Stratigraphic Description

ASPHALT.

Brown fine to medium SAND, Gravel, Cinders, Ash, Brick, damp, loose.

Some Silt from 2.0' - 2.5' bgs.

Slight sewage odor at 4.0' - 4.2' bgs.

Black stained CLAY, Peat, some Silt, trace Brick or Cinder fragment, wet, soft.

Olive CLAY and PEAT, some Silt, becoming more dense, wet, black stains.

Black stained CLAY and PEAT, some Silt, dense, burnt odor throughout.

Olive-brown CLAY and SILT, some Peat, Roots, blue-gray mottling throughout, damp, moderately stiff, slight odor, trace staining on outside of sample.

Olive-brown CLAY and SILT, trace Peat; grading to SILT and fine SAND, slight sewage odor.

Dark olive-brown CLAY, trace Silt, fine Sand, wet, soft; grading to SILT and fine SAND, trace Clay, wet soft, slight sewage odor.

Dark olive-brown CLAY and SILT, some fine Sand, trace Gravel, wet, soft.

Dark gray-olive fine to medium SAND, some coarse Sand and Gravel, trace Silt, Clay, wet, loose, burnt odor.

Well/Boring Construction

Borehole backfilled with cement-bentonite grout to grade.

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil samples collected from 6' - 8' bgs and 20' - 22' bgs for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-211

Borehole Depth: 80' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	0.5	3 1 1 1	2	9.1			Gray-brown fine to coarse SAND and GRAVEL, wet, loose, no odor.	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	1.0	4 3 2 2	5	4.9			Gray-olive CLAY, trace Silt, fine Sand, Gravel, wet, very soft. Cobbles at 18.9-19' bgs.	
20		11	20-22	1.2	18 25 30 40	55	0.1	×		Olive-gray fine to coarse SAND and GRAVEL, wet, loose, trace MGP or burnt odor. Fractured gray fine grained SANDSTONE Cobble.	
	830	12	22-24	0.6	50 34 50/0.3 NA	NA	0.1			Olive-brown fine to coarse SAND, some Silt and Gravel, dense, wet. [TILL]	
25		13	24-26	0.4	19 16 17 35	33	ND				
	825	14	26-28	0.2	50 40 40 30	80	ND			Trace red staining at 26.1' bgs.	
		15	28-30	0.0	50/0.3 NA NA NA	NA	ND			Brass liner attempted from 28-32' bgs. No recovery.	
30		16	30-32	0.0	23 40 50/0.4 NA	NA	ND				
	820	17	32-34	0.0	14 18 27 34	45	ND			No Recovery.	
35		18	34-36	0.5	30 28 23 30	51	0.3			Olive brown fine to coarse SAND, some Silt and Gravel, trace red staining/mottling, dense, wet. [TILL] Medium SAND, wet, loose.	

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Soil samples collected from 6' - 8' bgs and 20' - 22' bgs for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-211

Borehole Depth: 80' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	815	19	36-38	1.0	45 25 25 25	50	0.1			Crushed COBBLE. Medium to coarse SAND, Silt, Gravel, wet, dense, trace red mottling. [TILL] Crushed COBBLE.	Borehole backfilled with cement-bentonite grout to grade.
		20	38-40	0.0	50/0.4 NA NA NA	NA	ND			No Recovery.	
40		21	40-42	0.5	50 50/0.2 NA NA	NA	ND			Gray brown fine to coarse SAND and GRAVEL, trace Silt, wet, dense. [TILL]	
	810	22	42-44	0.0	50/0.3 NA NA NA	NA	ND			Spoon refusal at 42.3' bgs. No recovery.	
45		23	44-46	0.7	50 50/0.2 NA NA	NA	0.1			Gray-brown medium to coarse SAND and GRAVEL, trace Silt, wet, moderately dense. [TILL]	
	805	24	46-48	0.3	50/0.3 NA NA NA	NA	ND			Olive-brown medium to coarse SAND, Silt, Gravel, wet, dense. [TILL]	
		25	48-50	0.2	42 50/0.2 NA NA	NA	ND				
50		26	50-52	0.2	50/0.3 NA NA NA	NA	ND			Shale fragments in shoe from 50' - 50.2' bgs.	
	800	27	52-54	0.1	50/0.1 NA NA NA	NA	NA			Sandstone block from 52' - 52.1' bgs.	
55		28	54-56	0.0	50/0.2 NA NA NA	NA	NA			Brown fine to coarse SAND and GRAVEL, little Silt, wet, dense. [TILL]	

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Soil samples collected from 6' - 8' bgs and 20' - 22' bgs for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-211.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/1/03

Client: New York State Electric and Gas

Well/Boring ID: SB-211

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 80' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	795	29	56-58	0.2	50/0.4 NA NA NA	NA	ND			Brown fine to coarse SAND and GRAVEL, little Silt, wet, dense. [TILL]	Borehole backfilled with cement-bentonite grout to grade.
		30	58-60	0.3	50/0.4 NA NA NA	NA	ND				
60		31	60-62	0.1	50/0.3 NA NA NA	NA	ND			Olive fine to coarse SAND and GRAVEL, little Silt, wet, dense.	
	790	32	62-64	0.4	10 50/0.3 NA NA	NA	ND				
65		33	64-66	0.1	50/0.2 NA NA NA	NA	ND				
	785	34	66-68	0.3	32 50/0.3 NA NA	NA	ND				
		35	68-70	0.2	50/0.5 NA NA NA	NA	ND			Shattered Limestone Cobble from 68' - 68.2' bgs. Shattered Sandstone COBBLE.	
70		36	70-72	0.2	50/0.3 NA NA NA	NA	ND			Oilve fine to coarse SAND and GRAVEL, shattered Limestone Cobble, little Silt, wet, dense.	
	780	37	72-74	0.1	50/0.2 NA NA NA	NA	ND			Shattered red Sandstone COBBLE.	
75		38	74-76	0.1	50/0.1 NA NA NA	NA	ND			Gray fine to coarse subrounded GRAVEL, some fine to coarse Sand, Silt, saturated, non-plastic.	

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Soil samples collected from 6' - 8' bgs and 20' - 22' bgs for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-211

Borehole Depth: 80' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	775	39	76-78	0.3	50/0.3 NA NA NA	NA	ND			Brown-gray Silty fine to coarse subangular GRAVEL, some fine to coarse Sand, saturated, non-plastic.	Borehole backfilled with cement-bentonite grout to grade.
		40	78-80	0.4	50/0.4 NA NA NA	NA	ND			Gray weathered SHALE.	
80											
	770										
85											
	765										
90											
	760										
95											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil samples collected from 6' - 8' bgs and 20' - 22' bgs for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-211.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/1/03

Date Start/Finish: 2/17/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-45B ATV
Sampling Method: 2"/3" Split Spoon

Northing: 764106.76
Easting: 761084.52
Casing Elevation: NA

Borehole Depth: 45.2' below grade
Surface Elevation: 852.53' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-212

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
855										
0	NA	0-1	NA	NA	NA	NA			SILT and SAND.	
	1	1-2	1.0	33 40	NA	ND			Brown Silty fine SAND and fine to coarse subrounded GRAVEL, frost, non-plastic, moist.	Borehole backfilled with cement-bentonite grout to grade.
850	2	2-4	1.3	40 33 50/0.3 -	NA	ND				
5	3	4-6	1.5	13 22 25 16	47	ND				
845	4	6-8	1.6	22 33 30 24	63	ND				
	5	8-10	0.7	3 4 3 4	7	ND			Brown fine SAND and SILT, little to some fine to coarse subrounded Gravel, non-plastic, moist.	
10	6	10-12	1.1	3 1 2 1	3	ND			Little medium Sand, wet below 10.9' bgs.	
840	7	12-14	0.4	3 2 5 3	7	ND			Brown Silty fine to medium SAND, little to some coarse Sand and fine to coarse subrounded Gravel, non-plastic, wet to saturated.	
15	8	14-16	0.1	3 1 2 3	3	ND				

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 32' - 33.2' and 42' - 45.2' bgs for BTEX, PAH, and total Cyanide.

Client: New York State Electric and Gas

Well/Boring ID: SB-212

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 45.2' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	1.1	2 3 6 8	9	1.8 2.2			Brown Silty fine to coarse SAND, little fine to coarse subrounded Gravel, non-plastic, saturated. Red-orange BRICK, trace sheen, faint odor, non-plastic, saturated. Brown Silty fine to medium SAND, little sheen, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
20		10	18-20	1.0	10 17 29 40	46	2.1 2.2			Brown Silty fine SAND and fine to coarse subrounded GRAVEL, trace medium Sand, little sheen, non-plastic, saturated.	
		11	20-22	1.2	41 31 43 50/0.3	82	7.1 12.3			Gray to brown Silty fine SAND and fine to coarse subrounded GRAVEL, faint odor, trace bleb on slough water, non-plastic, moist.	
	830	12	22-24	1.1	15 18 27 31	45	1.2 0.7				
25		13	24-26	1.0	38 32 28 33	60	0.6 0.1			Brown-gray Silty fine SAND and fine to coarse subrounded GRAVEL, trace medium Sand, non-plastic, moist to wet.	
	825	14	26-28	1.9	12 17 21 25	38	ND 0.1			Sheen in spoon shoe, wet to saturated from 26' - 28' bgs.	
		15	28-30	1.3	15 48 50/0.4 -	NA	2.1 0.7			Little sheen, trace NAPL blebs below 28' bgs. Increased Gravel content from 28' - 28.5' bgs.	
30		16	30-32	1.3	17 12 16 25	28	ND 19.5 7.1			Gray Silty fine to medium SAND and fine to coarse subrounded GRAVEL, non-plastic, wet to saturated. Little NAPL below 30.5' bgs.	
	820	17	32-34	1.2	18 20 30 32	50	12.9 12.4	X		Some NAPL, moderate sheen, saturated below 32' bgs.	
35		18	34-36	1.4	16 12 27 22	39	3.1 8.4			Little NAPL below 34' bgs.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 32' - 33.2' and 42' - 45.2' bgs for BTEX, PAH, and total Cyanide.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-212

Borehole Depth: 45.2' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	815	19	36-38	1.7	32 30 40 43	70	27.3 3.2			Gray Silty fine to medium SAND and fine to coarse subrounded GRAVEL, heavy sheen and some NAPL on slough, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
		20	38-40	0.5	40 50/0.3 - -	NA	2.7			Brown-gray Silty fine SAND and fine to coarse subrounded GRAVEL, some medium Sand, dense, sheen on slough, non-plastic, wet.	
40		21	40-42	0.3	50/0.3 - - -	NA	34.7			Little NAPL at 40' bgs.	
	810	22	42-44	0.7	33 50/0.3 - -	NA	1.6	×		Faint odor, wet to saturated below 42' bgs.	
45		23	44-45.2	1.0	26 33 50/0.2	NA	2.1 3.2			Wet below 44' bgs.	
	805										
50											
	800										
55											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 32' - 33.2' and 42' - 45.2' bgs for BTEX, PAH, and total Cyanide.

Project: 130.43.003
Data File:SB-212.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

Date Start/Finish: 2/16/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2" Split Spoon

Northing: 764079
Easting: 761002.88
Casing Elevation: NA

Borehole Depth: 36.6' below grade
Surface Elevation: 852.8' AMSL

Geologist: Dave Cornell

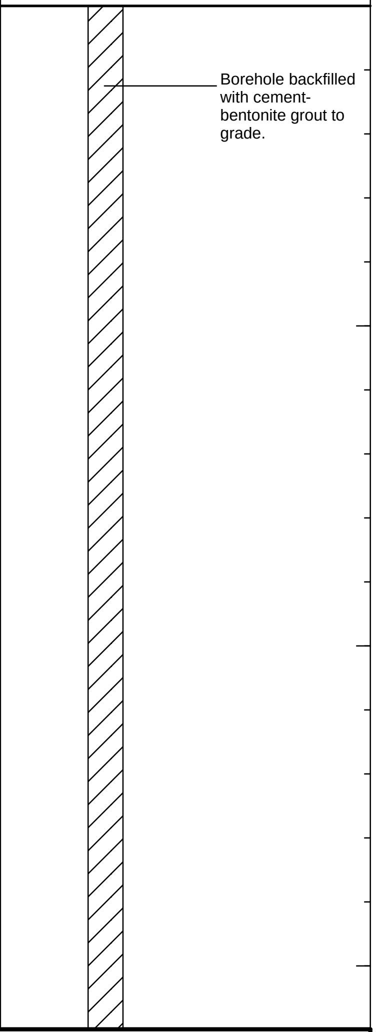
Well/Boring ID: SB-213

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	855									
0		1	0-2	0.8	14 50/0.3 - -	NA	ND			Brown Silty fine SAND, little fine to coarse subrounded Gravel, non-plastic, moist.
	850	2	2-4	0.9	11 50/0.4 - -	NA	ND			Some Gravel, Frost to 2.9' bgs.
5		3	4-6	1.4	13 15 19 23	34	ND			
	845	4	6-8	2.0	15 17 16 14	33	ND			
		5	8-10	1.6	5 9 7 5	16	ND			
10		6	10-12	0.9	3 4 2 3	6	ND			Brown Silty fine to medium SAND, some coarse Sand and fine to coarse subrounded Gravel, trace Cobbles, non-plastic, wet.
	840	7	12-14	1.1	3 2 2 3	4	ND			Saturated below 12' bgs.
15		8	14-16	1.3	2 1 2 2	3	1.5 2.5			Brown SILT, trace fine Sand and Clay, non-plastic, saturated. Trace fine Sand seams with trace sheen at 14.6' and 14.8' bgs. Gray fine to medium SAND, non-plastic, faint odor, trace sheen, saturated.

Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 26' - 26.5' (DUP 100-2-16-04) and 30' - 31.3' bgs for BTEX, PAH, and total Cyanide.

Project: 130.43.003
Data File:SB-213.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/12/04

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-213

Borehole Depth: 36.6' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	1.8	5 12 18 24	27	0.1 0.1			Brown SILT, little fine Sand, non-plastic, saturated. Brown Silty fine to medium SAND, little coarse Sand, trace fine Gravel, faint odor, non-plastic, saturated. Gray Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	1.6	15 31 30 30	61	ND			Brown SILT and fine to coarse subrounded GRAVEL, little fine Sand, dense, non-plastic, wet.	
20		11	20-22	1.2	12 17 19 28	36	ND 1.4			Brown-gray color below 20' bgs. Faint odor below 20.5' bgs.	
	830	12	22-24	1.3	8 16 12 18	28	7.1 3.6			Little NAPL below 22.9' bgs.	
25		13	24-26	1.2	10 11 13 15	24	6.6 17.1				
	825	14	26-28	1.3	29 17 25 24	42	18.1 14.2	☒		Gray Silty fine to medium SAND and fine to coarse subrounded GRAVEL, little to some NAPL, non-plastic, saturated. Brown-gray SILT and fine to coarse subrounded GRAVEL, little fine Sand, trace NAPL, faint odor, non-plastic, wet.	
		15	28-30	1.0	14 21 23 28	44	2.1			Dense, moist to wet below 28' bgs,	
30		16	30-32	1.3	11 15 20 23	35	ND ND	☒		Gray color, moist below 30' bgs.	
	820	17	32-34	1.5	12 15 19 24	34	ND ND			Brown-gray fine Sandy SILT and fine to coarse subrounded GRAVEL, trace medium Sand, very faint odor, non-plastic, saturated.	
35		18	34-36	0.8	12 29 50/0.2 -	NA	ND				

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Soil samples collected from 26' - 26.5' (DUP 100-2-16-04) and 30' - 31.3' bgs for BTEX, PAH, and total Cyanide.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-213

Borehole Depth: 36.6' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		19	36-36.6	0.6	72 50/0.1	NA	ND			Brown fine Sandy SILT and fine to coarse subrounded GRAVEL, trace medium Sand, dense, very faint odor, non-plastic, moist.	Borehole backfilled with cement-bentonite grout to grade.
	815										
40											
	810										
45											
	805										
50											
	800										
55											

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ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 26' - 26.5' (DUP 100-2-16-04) and 30' - 31.3' bgs for BTEX, PAH, and total Cyanide.

Date Start/Finish: 10/6/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyon/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764205.15
Easting: 761081.36
Casing Elevation: NA

Borehole Depth: 24' below grade
Surface Elevation: 852.67' AMSL

Geologist: Jason Sents

Well/Boring ID: SB-214

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	855										
0		1	0-2	0.6	23 8 6 18	14	0.2			Gray-brown fine to medium SAND and CRUSHED STONE, dry, loose. Black CINDERS, Ash, Coal, dry, loose. Orange Sand seam at 0.5' bgs.	Borehole backfilled with cement-bentonite grout to grade.
	850	2	2-4	0.8	6 4 4 3	8	0.7			Blue gray SILT, trace Clay, orange mottling throughout. Trace stains and odor at 4' - 6' bgs.	
5		3	4-6	2.0	2 3 3 4	6	2.5				
	845	4	6-8	2.0	4 5 7 11	12	97.0	X			
		5	8-10	2.0	8 11 15 19	26	47.0			Olive SILT, Roots, trace Clay, tortuous stringers of brown-black NAPL, sheen, odor. Root structures may be providing conduits for NAPL migration downward. Progressively lesser NAPL impacts down to 10' bgs. Trace odor at 10' bgs. Water at 9.2' bgs. No NAPL or sheen on measuring tape.	
10		6	10-12	2.0	6 6 6 6	12	8.6	X		Fine SAND, odor, Roots. Coarse SAND, well graded, little fine to medium Sand, wet, lose, odor.	
	840	7	12-14	1.7	3 4 3 3	7	5.2			Gray medium SAND, trace fine to coarse Sand, Silt, wet, loose, odor. Brown SILT, fine Sand seam, wet, odor.	
15		8	14-16	1.0	1 1 5 7	6	3.3			Gray brown SILT and fine SAND, wet, soft, odor. Brown fine to coarse SAND and GRAVEL, wet, loose, odor.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 6' - 8' bgs for Waste Characterization.
Soil sample collected from 10' - 12' for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-214

Borehole Depth: 24' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	0.4	3 2 12 16	14	1.9			Brown fine to coarse SAND and GRAVEL, wet, loose, odor.	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	0.8	18 30 38 38	68	0.8			Gray-brown SILT, fine Sand, Gravel, little medium to coarse Sand and Clay, wet, compact. [TILL]	
20		11	20-22	1.0	24 25 27 28	52	0.5				
	830	12	22-24	1.0	20 20 23 23	43	0.2				
25											
	825										
30											
	820										
35											

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Soil sample collected from 6' - 8' bgs for Waste Characterization.
Soil sample collected from 10' - 12' for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-214.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/19/03

Date Start/Finish: 9/9/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764371.57
Easting: 761004.06
Casing Elevation: NA

Borehole Depth: 28' below grade
Surface Elevation: 851.73' AMSL

Geologist: Jason C. Sents

Well/Boring ID: SB-215

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	850	1	0-2	0.5	NA 4 4 4	8	3.6			ASPHALT. Black CINDERS and ASH, trace Brick, Wood, dry, loose. Trace brown Silt, 2-3' bgs.	Borehole backfilled with cement-bentonite grout to grade.
		2	2-4	1.0	4 2 2 2	4	5.0				
5		3	4-6	0.1	WOH 1 1 2	2	3.5			Black fine SAND, Silt and Organic matter, little Cinders, Ash, damp, loose.	
	845	4	6-8	0.8	2 3 6 8	9	4.1			Blue-gray and brown-orange CLAY and SILT, medium stiff, moist.	
		5	8-10	0.8	1 3 9 6	12	8.0	×		Gray SILT and fine SAND, trace Gravel, soft, wet. Gray SAND and GRAVEL, loose, wet.	
10	840	6	10-12	0.6	4 12 20 26	32	5.7			Gray CLAY and SILT, little fine Sand, Gravel, soft, wet. Gray SILT, some fine Sand and assorted Gravel, little Clay, medium to coarse Sand, very stiff, dense, dry.	
		7	12-14	1.2	33 40 50/0.4 NA	NA	8.4				
15		8	14-16	1.0	11 20 23 24	43	12.2			Dark gray SILT and assorted GRAVEL, little fine to coarse Sand, Clay, stiff, damp. [TILL]	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 8' - 10' bgs for BTEX, PAH, and Total Cyanide.

Client: New York State Electric and Gas

Well/Boring ID: SB-215

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 28' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	NA	25/0.0 NA NA NA	NA	5.5			Dark gray SILT and assorted GRAVEL, little fine to coarse Sand, Clay, stiff, damp. [TILL]	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	0.3	NA 38 17 20	55	2.3				
20	830	11	20-22	1.2	10 11 12 14	23	0.0				
		12	22-24	0.3	7 17 19 18	36	0.0			Gray SILT, fine to coarse Sand, Gravel, little Clay, damp, friable.	
25		13	24-26	1.0	18 20 30 30	50	0.0			Gray fine SAND and GRAVEL, little medium to coarse Sand, Silt, trace Clay, wet, loose.	
	825	14	26-28	0.0	50/0.2 NA	NA	NA			Auger to 27.3' bgs.	
30	820									Refusal at 27.3' bgs.	
35											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 8' - 10' bgs for BTEX, PAH, and Total Cyanide.

Date Start/Finish: 9/16/03
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55 Truck Mount
Sampling Method: 2" Split Spoon

Northing: 764272.49
Easting: 761328.59
Casing Elevation: NA

Borehole Depth: 44' below grade
Surface Elevation: 851.07' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-216

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	850	1	0-2	1.1	10 12 14 8	26	ND			Brown fine to medium SAND and fine to coarse subangular GRAVEL, trace Coal, non-plastic, moist.	Borehole backfilled with cement-bentonite grout to grade.
		2	2-4	1.0	6 7 6 6	13	ND			Brown-gray Silty fine to medium SAND, some fine to coarse subangular Gravel, little Cinders and Coal, non-plastic, moist.	
5	845	3	4-6	1.1	1 2 1 1	3	ND			Gray-brown fine Sandy SILT, little medium Sand, trace Clay, slightly plastic, moist.	
		4	6-8	1.6	3 3 5 8	8	ND			Brown-gray SILT, little Clay, trace Root scars, mottled, slightly plastic, wet.	
10		5	8-10	1.5	2 3 5 6	8	ND			Clay content decreasing with depth below 8.0' bgs. Brown-gray fine to medium SAND, non-plastic, wet to saturated.	
	840	6	10-12	0.9	10 8 10 10	18	ND			Brown Silty fine to coarse subrounded GRAVEL, some fine to medium Sand, non-plastic, saturated.	
		7	12-14	0.9	2 3 5 11	8	ND				
15		8	14-16	1.2	4 7 9 9	16	ND				

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 16.0' - 17.4' bgs for TOC, and 34.0' - 36.4' bgs for BTEX, PAH, and Total CN.
Geotech sample collected from 40.0' - 41.6' bgs for grain size analysis.

Project: 130.43.003
Data File:SB-216.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:7/1/04

Client: New York State Electric and Gas

Well/Boring ID: SB-216

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 44' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	1.4	25 25 25 32	50	ND	✕		Brown Silty fine to coarse subrounded GRAVEL, some fine to medium Sand, dense, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	1.0	15 17 19 15	36	ND			Brown Silty fine to coarse subrounded GRAVEL, some fine to coarse Sand and some Cobbles, non-plastic, saturated.	
20	830	11	20-22	1.0	33 25 15 18	40	ND			Brown Silty fine to coarse subrounded GRAVEL and fine to coarse SAND, little subrounded Cobbles, dense, non-plastic, saturated. [TILL?]	
		12	22-24	1.1	17 17 12 20	29	ND ND				
25		13	24-26	1.0	17 31 34 17	65	ND				
	825	14	26-28	0.5	40 50/0.4 - -	NA	ND				
		15	28-30	1.2	36 23 21 16	45	ND				
30	820	16	30-32	0.9	12 14 14 23	28	ND				
		17	32-34	1.2	9 23 21 24	45	ND				
35		18	34-36	1.0	21 33 50/0.4 -	NA	ND	✕			

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 16.0' - 17.4' bgs for TOC, and 34.0' - 36.4' bgs for BTEX, PAH, and Total CN.
Geotech sample collected from 40.0' - 41.6' bgs for grain size analysis.

Project: 130.43.003
Data File:SB-216.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:7/1/04

Client: New York State Electric and Gas

Well/Boring ID: SB-216

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 44' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	815	19	36-38	0.4	50/0.4 - - -	NA	ND			Brown Silty fine to coarse subrounded GRAVEL and fine to coarse SAND, little subrounded Cobbles, dense, non-plastic, saturated. [TILL?]	Borehole backfilled with cement-bentonite grout to grade.
		20	38-40	1.5	5 8 10 12	18	ND			Gray SILT, little Clay, slightly to moderately plastic, wet to saturated.	
40	810	21	40-42	1.6	5 7 11 11	18	ND	×			
		22	42-44	NA	NA	NA	ND			Shelby tube collected from 42' - 44' bgs.	
45	805										
50	800										
55											

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ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 16.0' - 17.4' bgs for TOC, and 34.0' - 36.4' bgs for BTEX, PAH, and Total CN.
Geotech sample collected from 40.0' - 41.6' bgs for grain size analysis.

Project: 130.43.003
Data File:SB-216.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:7/1/04

Date Start/Finish: 9/10/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764200.16
Easting: 761002.5
Casing Elevation: NA

Borehole Depth: 20' below grade
Surface Elevation: 851.92' AMSL

Geologist: Jason C. Sents

Well/Boring ID: SB-217

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample
0		1	0-2	0.0	NA 9 9 5	18	ND	
	850	2	2-4	0.1	6 8 3 1	11	2.3	
5		3	4-6	1.5	7 4 10 10	14	2.7	
	845	4	6-8	1.8	2 3 5 9	8	1.7	
		5	8-10	2.0	3 7 8 10	15	2.9	
10		6	10-12	2.0	3 4 3 4	7	21.2	
	840	7	12-14	1.8	WOH WOH 19 15	19	215	
15		8	14-16	2.0	10 17 24 30	41	176	X

Stratigraphic Description
ASPHALT.
No Recovery in split spoon. Fine to coarse SAND, fine to coarse Gravel, Cobbles and crushed Concrete, dry observed in auger hole.
Crushed CONCRETE, some fine to coarse Sand, Gravel, wet.
Black fine to coarse SAND, some Gravel, Wood at 4.4' bgs, wet, loose, trace burnt odor.
Gray PEAT, black mottling, damp, medium stiff, burnt odor. Trace Gravel at 5.3' bgs.
Gray PEAT, little Clay, black mottling, damp, soft.
Olive CLAY, some Silt, gray-blue mottling, medium stiff, damp.
Brown stiff CLAY, dry, trace burnt odor across entire sample. Trace Root at 8.1' bgs. Fine Sand seam at 9.4' bgs. Black Sand stained seam at 9.8' bgs. Petroleum and MGP odor at 10' bgs.
Fine to coarse SAND, little Clay, little Gravel, wet, loose. Sheen and petroleum odor, blebs and trace brown-red oil throughout.
Soft brown CLAY, trace Silt, damp, MGP odor.
Fine to coarse SAND and GRAVEL, loose, wet, trace sheen, MGP odor, red-brown blebs.
Soft brown CLAY, some Silt, damp, strong MGP odor.
Black fine to coarse SAND and GRAVEL, strong MGP odor, trace sheen, wet. Red-brown oil from 15.5' - 16' bgs.

Well/Boring Construction

Borehole backfilled with cement-bentonite grout to grade.

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil samples collected from 14' - 16' bgs and 18' - 20' bgs for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

Well/Boring ID: SB-217

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 20' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	1.5	15 26 40 48	66	50.5		⁘	Black stained fine to coarse SAND, Clay, Gravel, MGP odor, damp, dense. [TILL] Tan fine to coarse SAND, Silt, Gravel, some Clay, dry, friable, no odor, stains, sheens, or oils.	▨ Borehole backfilled with cement-bentonite grout to grade.
20		10	18-20	1.0	33 25 20 35	45	67.1	☒	⁘		▨
	830										
25											
	825										
30											
	820										
35											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil samples collected from 14' - 16' bgs and 18' - 20' bgs for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-217.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/1/03

Date Start/Finish: 10/1/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764131.66
Easting: 761234.45
Casing Elevation: NA

Borehole Depth: 40' below grade
Surface Elevation: 848.82' AMSL

Geologist: Jason Sents

Well/Boring ID: SB-218

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	850										
0		1	0-2	2.0	7 4 5 4	9	2.1			Brown fine to medium SAND and Crushed Stone. Black ASH, Cinders, Coal, Slag, some Clay, Organics, trace brick, damp, loose. Tan Clayey SILT, brown, gray and orange mottling, trace Brick, Wood, decayed Organics, Ash, Gravel, fine to coarse Sand, blue Purifier Waste, burnt odor. High angle bedding. [FILL]	Borehole backfilled with cement-bentonite grout to grade.
	845	2	2-4	2.0	6 8 8 12	16	2.2	X		Tan Clayey SILT, trace Organics, brown, gray, and orange mottling. Horizonal bedding.	
5		3	4-6	2.0	6 10 16 17	26	1.2				
		4	6-8	1.7	11 12 14 21	26	1.7			SILT and fine SAND, little Clay, orange mottling. Cobble of Coal at 8' bgs.	
	840	5	8-10	1.2	8 15 15 9	30	1.2			Brown fine to coarse SAND and GRAVEL, little Silt, wet, loose.	
10		6	10-12	1.6	6 7 6 4	13	0.9				
	835	7	12-14	2.0	4 3 3 3	6	1.2			Becomes gray-brown at 13.5' bgs.	
15		8	14-16	0.5	1 7 27 25	34	4.3			Gray fine to coarse SAND and GRAVEL, Silt, wet, becoming hard.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 2' - 4' bgs for BTEX, PAH, & Total Cyanide.
Soil sample collected from 22' - 24' bgs for Waste Characterization and Total

Project: 130.43.003
Data File:SB-218.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/17/03

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-218

Borehole Depth: 40' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	1.3	10 10 10 17	20	3.3			Gray fine to coarse SAND and GRAVEL, Silt, wet, becoming hard.	Borehole backfilled with cement-bentonite grout to grade.
	830	10	18-20	0.3	4 5 5 6	10	2.0				
20		11	20-22	0.2	2 2 2 9	4	2.2				
		12	22-24	0.3	9 7 7 7	14	15.1	X		Trace sheen and MGP odor at 22' bgs. Black tarry spots on inside of sample bag for soil sample 22' - 24' bgs.	
25	825	13	24-26	0.7	17 9 9 9	18	4.5			Brown fine to coarse SAND, Gravel, Cobble fragments, Silt, wet, loose, MGP odor.	
		14	26-28	NA	7 11 15 15	26	NA				
	820	15	28-30	0.2	12 12 13 18	25	1.3				
30		16	30-32	0.1	28 45 12 13	57	0.5			Brown fine to medium SAND, very well sorted.	
		17	32-34	2.0	10 24 50/0.3 NA	NA	0.1				
35	815	18	34-36	0.7	35 25 20 19	45	ND			Gray SILT and subangular GRAVEL, little Sand, wet, hard.	

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ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 2' - 4' bgs for BTEX, PAH, & Total Cyanide.
Soil sample collected from 22' - 24' bgs for Waste Characterization and Total

Client: New York State Electric and Gas

Well/Boring ID: SB-218

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 40' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		19	36-38	0.3	14 22 29 22	51	ND			Gray SILT and subangular GRAVEL, little Sand, wet, hard.	Borehole backfilled with cement-bentonite grout to grade.
	810	20	38-40	1.5	10 10 20 20	30	0.1				
										Gray SAND and subangular GRAVEL, little Silt. wet, hard.	
40											
	805										
45											
	800										
50											
	795										
55											

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Soil sample collected from 2' - 4' bgs for BTEX, PAH, & Total Cyanide.
Soil sample collected from 22' - 24' bgs for Waste Characterization and Total

Project: 130.43.003
Data File:SB-218.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/17/03

Date Start/Finish: 10/1/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764156.82
Easting: 761297.6
Casing Elevation: NA

Borehole Depth: 10' below grade
Surface Elevation: 848.46' AMSL

Geologist: Jason Sents

Well/Boring ID: SB-219

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	850										
0		1	0-2	1.7	10 10 6 4	16	1.2			Dark brown SILT and fine SAND (Topsoil), little Grass, Roots, Cobble, soft, damp. Black CLAY, some Organics, Cinders, Ash, Coal, Slag, trace Brick. [FILL]	Borehole backfilled with cement-bentonite grout to grade.
	845	2	2-4	1.5	6 7 6 6	13	2.6			Gray brown Clayey SILT, decayed Organics, orange mottling, soft, damp.	
5		3	4-6	1.9	7 15 24 20	39	3.1	☒		Black stains at 4.0' - 4.3' bgs. Orange brown Clayey SILT, fine to coarse Sand and Gravel, hard, damp.	
		4	6-8	1.3	20 17 14 19	31	2.9			Brown fine to coarse SAND and GRAVEL, little Silt, loose, wet.	
	840	5	8-10	1.0	6 8 12 11	10	1.3			Brown Clayey SILT, trace fine to coarse Sand and Gravel, soft, wet. Brown fine to coarse SAND, Gravel, Silt, trace Clay, soft, wet.	
10											
	835										
15											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 4' - 6' bgs for Waste Characterization and Total Cyanide.

Date Start/Finish: 10/2/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyone/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764169.51
Easting: 761330.16
Casing Elevation: NA

Borehole Depth: 10' below grade
Surface Elevation: 848.49' AMSL

Geologist: Jason Sents

Well/Boring ID: SB-220

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description	Well/Boring Construction
	850									
0		1	0-2	2.0	8 9 12 12	21	0.5	X	Brown SILT and fine SAND (Topsoil) and Grass. Black CLAY, some Orgaincs, Coal, Ash, Cinders, trace Wood, Brick, loose, damp. [FILL] Slight odor, possibly MPG from 2.0' - 2.2' bgs.	Borehole backfilled with cement-bentonite grout to grade.
	845	2	2-4	2.0	5 7 5 9	12	3.5		Gray brown Clayey SILT, decayed Organics, orange mottling, damp, soft, becoming coarse with fine to coarse Sand and trace Gravel at depth.	
5		3	4-6	1.0	5 7 7 9	14	1.8		Black/gray coloration throughout from 4.0' - 4.9' bgs. Dark gray Clayey SILT, some Gravel, trace fine to coarse Sand.	
		4	6-8	2.0	17 14 15 11	29	1.1		Brown fine to coarse SAND and GRAVEL, wet, loose. Cobble at 7.0' bgs.	
	840	5	8-10	0.9	5 8 16 11	24	1.1		Some Silt below 8.0' bgs.	
10										
	835									
15										

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Soil sample collected from 0' - 2' bgs for Waste Characterization and Total Cyanide.

Project: 130.43.003
Data File:SB-220.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/17/03

Date Start/Finish: 10/2/03
Drilling Company: Lyon Drilling
Driller's Name: H. Lyon/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764112.68
Easting: 760933.63
Casing Elevation: NA

Borehole Depth: 24' below grade
Surface Elevation: 852.45' AMSL

Geologist: Jason Sents

Well/Boring ID: SB-221

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample
	855							
0		1	0-2	1.3	15 9 8 6	17	0.3	
	850	2	2-4	1.0	4 4 4 4	8	1.1	
5		3	4-6	1.5	9 4 4 5	8	0.9	
	845	4	6-8	2.0	6 8 8 9	16	0.6	
		5	8-10	2.0	5 10 15 11	25	1.0	
10		6	10-12	0.5	10 12 7 7	19	1.2	
	840	7	12-14	0.7	3 4 3 3	7	ND	
15		8	14-16	1.0	3 2 8 11	10	0.2	

Stratigraphic Description

Dark brown fine to medium SAND and Crushed STONE.

Red BRICK.

Black ASH, Cinders, Coal, Coal Ash, trace Brick and Gravel, loose, damp. [FILL]

Brown fine SAND and SILT, trace Clay, medium to coarse Sand, Brick, Gravel, Cinders, Ash, Coal. [FILL]

Gray to dark gray Clayey SILT, trace Ash, Cinders, fine to coarse Sand, Gravel and Brick throughout.

Gray Clayey SILT, orange mottling.

Silty CLAY, trace Gravel, orange mottling.

Gray brown fine SAND, little Silt and medium to coarse Sand, trace Gravel, Slag, Coal and Brick fragments.

Brown fine SAND and SILT, trace medium to coarse Sand, Brick fragments, Cobble, orange mottling, soft, damp.

Gray CLAY, Silt, fine to coarse Sand, Gravel, dense ,wet.

Brown SILT and CLAY, trace fine to coarse Sand, Gravel, Cobble, wet.

Brown fine to coarse SAND, some Clay, Silt, and Gravel, wet.

Well/Boring Construction

Borehole backfilled with cement-bentonite grout to grade.

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR/H = Weight of Rod/Hammer. AMSL = Above Mean Sea Level.

Soil sample collected from 16' - 18' bgs for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-221.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/17/03

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-221

Borehole Depth: 24' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	1.0	12 13 26 35	39	1.0	X		Fine to medium SAND, some Gravel, trace Silt and Clay, loose, wet. Brown SILT, fine to coarse Sand and Gravel, hard, wet. [TILL]	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	0.3	27 25/0.3 NA NA	NA	0.2			Gray SILT, fine to coarse Sand and Gravel, very hard, wet. [TILL]	
20		11	20-22	0.2	22 25 30 32	55	0.8				
	830	12	22-24	1.0	25 24 39 41	63	0.7				
25											
	825										
30											
	820										
35											

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Soil sample collected from 16' - 18' bgs for BTEX, PAH, & Total Cyanide.

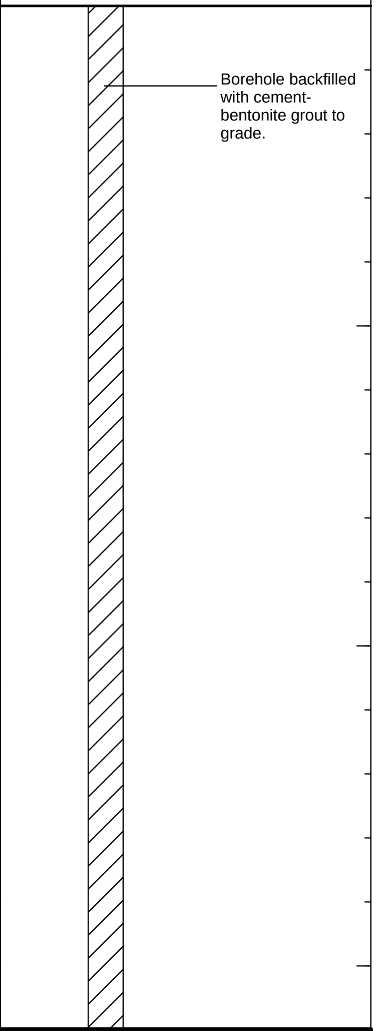
Project: 130.43.003
Data File:SB-221.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/17/03

Date Start/Finish:	10/3/03
Drilling Company:	Lyon Drilling
Driller's Name:	H. Lyon/ R. Horne
Drilling Method:	Hollow Stem Auger
Bit Size:	NA
Auger Size:	3-1/4"
Rig Type:	CME-55
Sampling Method:	2"/3" Split Spoon
Northing:	764235.35
Easting:	760932.14
Casing Elevation:	NA
Borehole Depth:	21' below grade
Surface Elevation:	851.75' AMSL
Geologist:	Jason Sents
Well/Boring ID:	SB-222
Client:	New York State Electric and Gas
Location:	Madison Ave. Former MGP Site Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0		1	0-2	1.0	37 5 5 5	10	1.9			Crushed ASPHALT. Dark brown fine to medium SAND, Cinders, Ash, Coal, Wood, Slag, dry, loose.
	850	2	2-4	0.5	3 3 7 5	10	3.5			Gray brown fine to coarse SAND, Cobble, black staining, odor.
5		3	4-6	2.0	4 5 7 8	12	608	X		Black stained gray SILT, trace Sand and Gravel, Clay, mottled zones, heavy odor. Blue gray SILT, trace Sand and Gravel, Clay, orange to olive mottling throughout.
	845	4	6-8	1.1	9 8 11 16	19	23.8			
		5	8-10	1.8	4 7 11 8	18	3.6			
10	840	6	10-12	1.3	5 3 3 3	6	8.0			Brown fine to coarse SAND and GRAVEL, little Silt, wet, loose.
		7	12-14	1.2	11 12 16 16	28	4.1			
		NA	NA	0.0	50/0.2	NA	NA			COBBLE.
15		8	15-17	1.1	14 15	35	0.7			Gray SILT and subangular GRAVEL, trace fine to coarse Sand, Clay, hard, dry. [TILL]

Well/Boring Construction



Borehole backfilled with cement-bentonite grout to grade.

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR/H = Weight of Rod/Hammer.

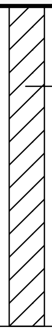
Soil sample collected from 4' - 6' bgs for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-222

Borehole Depth: 21' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	8	15-17	1.1	20 35	35	0.7			Gray SILT and subangular GRAVEL, trace fine to coarse Sand, Clay, hard, dry. [TILL]	 Borehole backfilled with cement-bentonite grout to grade.
		9	17-19	1.0	14 14 17 17	31	0.1				
20		10	19-21	0.7	10 14 17 22	31	0.1				
	830										
25											
	825										
30											
	820										
35											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR/H = Weight of Rod/Hammer.

Soil sample collected from 4' - 6' bgs for BTEX, PAH, & Total Cyanide.

Project: 130.43.003
Data File:SB-222.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:12/17/03

Date Start/Finish: 3/11/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-45B ATV
Sampling Method: 2"/3" Split Spoon

Northing: 764045.23
Easting: 761066.47
Casing Elevation: NA

Borehole Depth: 58.5' below grade
Surface Elevation: 850.42' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-224

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	850	1	0-2	1.1	2 6 5 5	11	ND			Brown Silty fine SAND, little Organics, Topsoil, non-plastic, moist. WOOD. Dark gray-black CINDERS, some Ash, little Slag, non-plastic, moist.	Borehole backfilled with cement-bentonite grout to grade.
		2	2-4	1.2	6 6 7 8	13	ND			Brown SILT and CLAY, trace fine to medium Gravel, trace Root scars, slightly plastic, moist. Dark brown-gray SILT and fine SAND, little fine to medium Gravel, trace Clay, non-plastic, wet.	
5	845	3	4-6	1.5	6 6 6 5	12	ND			Brown Silty fine to coarse subrounded GRAVEL and fine to coarse SAND, trace Cobbles, non-plastic, wet below 5.3' bgs. Saturated below 6.0' bgs.	
		4	6-8	1.7	3 3 4 5	7	ND			Olive-green SILT and CLAY, little Organics (roots), trace fine sand, moderately plastic, wet.	
		5	8-10	1.4	5 10 13 20	23	ND			Brown-gray SILT and CLAY, trace root scars, mottled, moderately plastic, wet. Piece of Slag at 8.7' bgs.	
10	840	6	10-12	0.0	15 18 19 20	37	NA			No recovery.	
		7	12-14	1.6	13 11 8 1	19	ND			Brown-gray SILT and CLAY, trace root scars, mottled, trace fine Gravel, moderately plastic, saturated. Gray Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, trace Clay, loose, non-plastic, saturated.	
15	835	8	14-16	1.0	2 5 6 9	11	ND			Gray Silty fine to coarse SAND and fine to coarse subrounded	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Client: New York State Electric and Gas

Well/Boring ID: SB-224

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 58.5' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	1.1	14 23 25 28	45	3.4/ 1.2			GRAVEL, trace Clay, loose, non-plastic, saturated. Little NAPL on TILL to 16.6' bgs. Gray SILT, some to little fine to coarse subrounded Gravel, trace Clay, non-plastic, moist. [TILL]	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	0.3	15 24 34 50/.4	58	NA			Wet at 18' bgs.	
20	830	11	20-22	1.0	34 17 33 40	50	0.5			Dense below 20' bgs.	
		12	22-24	0.9	37 50/.4 - -	NA	ND				
25	825	13	24-26	1.2	35 57 50/.2 -	NA	ND				
		14	26-28	0.4	50/.4 - - -	NA	ND			Little fine to medium Sand, dense, wet.	
		15	28-30	0.8	16 8 10 8	18	64.3			Brown SILT and fine to coarse subrounded GRAVEL, little fine to medium Sand, loose, non-plastic, saturated. Some NAPL below 28.3' bgs.	
30	820	16	30-32	0.3	24 27 37 47	64	NA			Little NAPL from 30' - 30.3' bgs.	
		17	32-34	0.8	37 44 50/.3 -	NA	8.2			Gray Silty fine to coarse subrounded GRAVEL and fine to coarse SAND, little Cobble, faint odor, non-plastic, moist to wet. [TILL]	
35	815	18	34-36	0.0	50/.2 - - -	NA	NA			No recovery. Cobble from 35.0' - 35.2' bgs.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:SB-224.dat

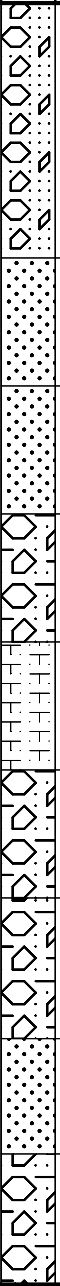
Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:3/29/04

Client: New York State Electric and Gas

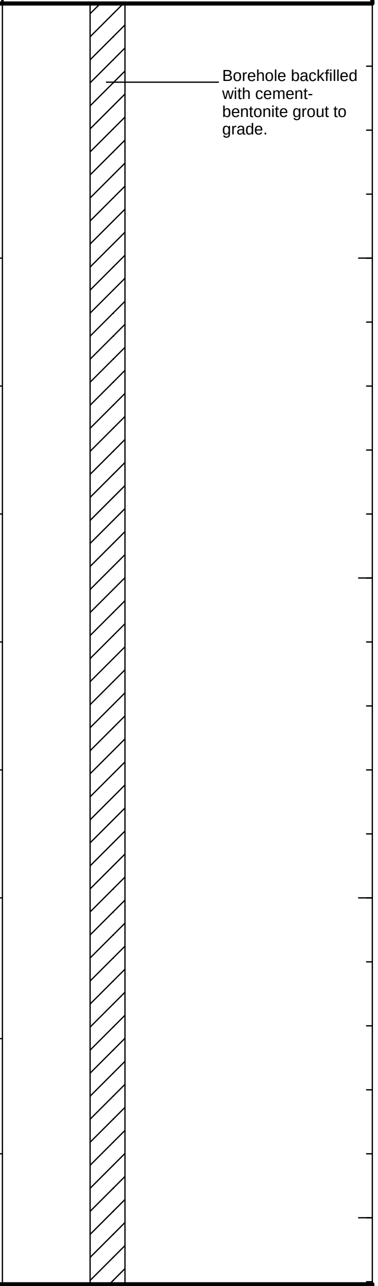
Well/Boring ID: SB-224

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 58.5' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		19	36-38	0.3	39 50/.4 - -	NA	ND			Gray Silty fine to coarse subrounded GRAVEL and fine to coarse SAND, little Cobble, non-plastic, moist to wet, sheen on slough. [TILL]
		20	38-40	0.2	50/.3 - - -	NA	ND			
40	810	21	40-42	1.0	48 50 50/.1 -	NA	50.2			Brown fine to coarse SAND, some fine to coarse subrounded Gravel, trace Cobbles and Silt, little red-brown NAPL, non-plastic, moist.
		22	42-44	1.0	47 70 - -	NA	20.7			Brown fine to coarse SAND, little fine to coarse Gravel. Trace NAPL at 42.6' bgs.
45	805	23	44-46	0.2	50/.3 - - -	NA	4.1			Brown-gray Silty fine to coarse subrounded GRAVEL and fine to coarse SAND, trace Cobbles, trace sheen, non-plastic, saturated.
		24	46-48	1.0	43 50 50/.2 -	NA	3.6			Gray-brown Silty fine to coarse SAND, some fine to coarse subrounded Gravel, non-plastic, wet.
		25	48-50	0.9	36 47 50/.2 -	NA	24.7			Brown-gray Silty fine to coarse subrounded GRAVEL and fine to coarse SAND, little Cobbles, little NAPL in shoe, non-plastic, saturated.
50	800	26	50-52	0.5		NA	4.5			Brown SILT and fine to coarse GRAVEL, little Cobbles and fine to coarse Sand, trace Clay, trace sheen, non-plastic, saturated.
		27	52-54	1.0		NA	11.8			Gray fine to coarse SAND, non-plastic, wet.
55	795	28	54-56	0.2		NA	NA			Gray brown SILT and fine to coarse GRAVEL, little fine to coarse Sand and Cobbles, non-plastic, moist to saturated. [TILL]

Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Client: New York State Electric and Gas

Well/Boring ID: SB-224

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 58.5' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		29	56-58	0.5		NA	1.1			Gray brown SILT and fine to coarse GRAVEL, little fine to coarse Sand and Cobbles, non-plastic, moist to saturated. [TILL]	Borehole backfilled with cement-bentonite grout to grade.
		30	58-58.5	0.4		NA	ND				
										Auger and spoon refusal at 58.5' bgs.	
60	790										
65	785										
70	780										
75	775										

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Date Start/Finish: 3/8/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-45B ATV
Sampling Method: 2" Split Spoon

Northing: 764069.18
Easting: 761126.2
Casing Elevation: NA

Borehole Depth: 70.5' below grade
Surface Elevation: 849.67' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-225

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	850	1	0-2	1.0	4 4 4 3	8	ND			Dark brown SILT, little Organics (grass, roots), trace Sand, non-plastic, moist. Dark gray-black CINDERS and SLAG, little fine to medium Sand and Coal, non-plastic, moist.	Borehole backfilled with cement-bentonite grout to grade.
		2	2-4	0.3	1 1 1 2	2	ND				
5	845	3	4-6	0.9	5 4 3 3	7	ND			Trace Ash, moist to wet from 4.0' - 4.9' bgs.	
		4	6-8	1.6	2 3 4 7	7	ND			Wet below 6' bgs. Gray-olive Silty CLAY, trace roots scars, moderately plastic, moist to wet.	
		5	8-10	1.8	5 5 4 3	9	ND			Olive-brown color, moderately plastic to slightly plastic, moist below 8.0' bgs. Silt, trace Gravel at 9.3' bgs.	
10	840	6	10-12	1.7	8 8 9 10	17	ND			Little fine Sand, slightly plastic, wet below 11' bgs.	
		7	12-14	1.7	5 4 5 4	9	ND			Saturated below 12' bgs. Olive SILT and subrounded fine to coarse GRAVEL, trace fine to coarse Sand, trace Clay, non-plastic, saturated. Gray color below 13.5' bgs.	
15	835	8	14-16	1.1	4 6 8 7	14	ND				

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR = Weight of Rod. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:SB-225.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:3/28/04

Client: New York State Electric and Gas

Well/Boring ID: SB-225

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 70.5' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	0.5	5 2 1 2	3	ND			Gray SILT and subrounded fine to coarse GRAVEL, trace fine to coarse Sand, trace Clay, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	0.6	15 17 14 13	31	ND				
20	830	11	20-22	1.5	22 15 8 50/.2	23	55.2 8.7			Some dark brown NAPL from 20' - 21.2' bgs. Brown-gray SILT, little fine to coarse subrounded Gravel, trace to little Clay, non-plastic, saturated.	
		12	22-24	1.0	44 39 29 19	68	4.6 17.4			Gray fine to coarse SAND, little fine to medium Gravel, little to some NAPL, non-plastic, saturated.	
25	825	13	24-26	0.6	25 19 50/.4 -	NA	7.1			Gray-brown Silty fine to coarse subrounded GRAVEL, little Cobbles, little to trace fine to coarse Sand, faint odor, non-plastic, saturated.	
		14	26-28	1.1	27 18 22 23	40	23.0			Gray-brown Silty fine to coarse subrounded GRAVEL (multicolored), some fine to coarse Sand, trace Cobbles, faint odor, non-plastic, saturated.	
		15	28-30	1.2	26 19 15 22	34	13.1			Faint odor at 28' bgs.	
30	820	16	30-32	0.2	24 27 25 26	52	NA				
		17	32-34	0.3	17 21 19 16	40	5.6				
35	815	18	34-36	0.4	50/.4 - - -	NA	4.6			Sandy TILL, wet to saturated below 34' bgs.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR = Weight of Rod. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:SB-225.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:3/28/04

Client: New York State Electric and Gas

Well/Boring ID: SB-225

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 70.5' below grade

DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	19	36-38	0.6	25 50/.4 - -	NA	5.4			Gray-brown Silty fine to coarse subrounded GRAVEL (multicolored), some fine to coarse Sand, trace Cobbles, faint odor, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
810	20	38-40	0.9	27 25 19 17	44	2.4			Gray color, dense, moist to wet below 38' bgs. [TILL]	
40	21	40-42	1.4	30 41 50/.4 -	NA	3.6 9.5			Dense TILL, moist below 40' bgs. Gray fine to medium SAND, non-plastic, wet.	
	22	42-44	1.1	20 24 28 37	52	43.5			Gray-brown fine to coarse SAND, trace rounded medium Gravel at 42.5' bgs and at 43.1' bgs, non-plastic, saturated. Red-brown NAPL, approximately 1/2" thick, at 42.5' bgs.	
805 45	23	44-46	0.2	50/.4 - - -	NA	7.2			Trace fine Sand and Silt seams, faint odor, wet below 44' bgs.	
	24	46-48	0.2	50/.3 - - -	NA	1.7			Gray fine to coarse SAND and fine to coarse subrounded GRAVEL, trace Silt, dense, non-plastic, moist. [TILL]	
800	25	48-50	0.3	50 50/.2 - -	NA	1.0				
50	26	50-52	0.1	50/.1 - - -	NA	NA			Cobble at 50' bgs.	
	27	52-54	1.2	WOR WOR 100/.6 -	NA	ND ND			Brown-gray fine to coarse SAND, non-plastic, wet. Brown-gray Silty fine to coarse SAND and fine to coarse subrounded GRAVEL (multicolored), trace Cobbles, non-plastic, wet.	
795 55	28	54-56	0.0	50/.1 - - -	NA	NA			No recovery.	

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ND = Non-Detect. WOR = Weight of Rod. AMSL = Above Mean Sea Level.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-225

Borehole Depth: 70.5' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		29	56-58	1.4	17 19 50/.4 -	NA	ND ND			Gray-brown Silty fine to coarse SAND and fine to coarse subrounded GRAVE, trace Clay, non-plastic, saturated. Gray-brown fine to medium SAND, some coarse Sand, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
60	790	30	58-60	0.0	50/.1 - - -	NA	NA			No recovery.	
		31	60-62	0.1	50/.1 - - -	NA	NA			Gray-brown Silty fine to coarse subrounded GRAVEL, some to little fine to coarse Sand and Cobbles, non-plastic, saturated.	
		32	62-64	0.0	50/.1 - - -	NA	NA			No recovery.	
65	785	33	64-66	0.1	50/.1 - - -	NA	NA			Gray-brown Silty fine to coarse subrounded GRAVEL, some to little fine to coarse Sand and Cobbles, non-plastic, saturated.	
		34	66-68	0.2	50/.3 - - -	NA	1.7			Faint odor, possibly from slough below 66' bgs.	
70	780	35	68-70	0.0	- - - -	NA	NA			No recovery.	
		36	70-70.5	0.0	100/.05	NA	NA			SHALE chips. Sandy TILL.	
75	775										

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ND = Non-Detect. WOR = Weight of Rod. AMSL = Above Mean Sea Level.

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Project: 130.43.003
Data File:SB-225.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:3/28/04

Date Start/Finish: 3/8/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-45B ATV
Sampling Method: 2"/3" Split Spoon

Northing: 764081.68
Easting: 761155.13
Casing Elevation: NA

Borehole Depth: 60' below grade
Surface Elevation: 849.74' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-226

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	850	1	0-2	1.6	1 4 6 8	10	ND			Dark brown-gray CINDERS and fine to medium SAND, little Brick and Coal fragments, non-plastic, moist to wet. [FILL] Gray Silty CLAY (in spoon shoe), moderately plastic, moist.	Borehole backfilled with cement-bentonite grout to grade.
		2	2-4	0.1	3 4 4 5	8	ND			COBBLE in shoe, non-plastic, moist.	
5	845	3	4-6	1.6	4 36 12 6	48	ND			Gray-brown Silty CLAY, mottled, moderately plastic, wet. White-pink fire BRICK, non-plastic, saturated	
		4	6-8	1.7	7 8 5 4	13	ND			Gray-brown Silty CLAY, mottled, moderately plastic, saturated.	
		5	8-10	1.9	6 8 12 15	20	ND			Brown-gray SILT and CLAY, trace root scars, mottled, slightly plastic, moist to wet.	
10	840	6	10-12	1.8	5 5 7 8	12	ND			Wet below 10' bgs. Brown SILT and fine SAND, little medium Sand, trace Clay, non-plastic, saturated.	
		7	12-14	1.5	8 7 6 2	13	ND			Gray-brown Silty fine SAND and fine to coarse subrounded GRAVEL, trace Clay, loose, non-plastic, saturated.	
15	835	8	14-16	0.6	2 2 4 6	6	ND			Trace Cobbles below 14.6' bgs.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:SB-226.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:3/27/04

Client: New York State Electric and Gas

Well/Boring ID: SB-226

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 60' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	0.0	6 2 1 1	3	ND			No recovery.	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	0.2	2 1 4 2	5	ND			Gray-brown Silty fine SAND and fine to coarse subrounded GRAVEL, trace Clay, loose, non-plastic, saturated.	
20	830	11	20-22	1.0	8 3 2 1	5	ND				
		12	22-24	0.9	5 5 6 7	11	ND				
25	825	13	24-26	0.5	8 6 5 5	11	ND				
		14	26-28	1.1	6 4 26 16	30	ND			Gray color, decreasing Silt content with depth, some fine to coarse Sand below 26' bgs.	
		15	28-30	1.2	14 19 23 20	42	ND				
30	820	16	30-32	1.3	26 29 33 41	62	ND			Gray Silty fine to coarse subrounded GRAVEL, some to little fine to coarse Sand, little Cobbles, dense, non-plastic, saturated.	
		17	32-34	0.2	50/.3 - - -	NA	ND			Gray Silty fine SAND and fine to coarse subrounded GRAVEL, trace medium to coarse Sand, dense, non-plastic, saturated. [TILL]	
35	815	18	34-36	1.4	20 20 22 25	42	ND			Increasing medium to coarse Sand content (less dense) below 34' bgs.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
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Client: New York State Electric and Gas

Well/Boring ID: SB-226

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 60' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		19	36-38	1.3	28 25 21 17	46	ND			Gray Silty fine SAND and fine to coarse subrounded GRAVEL, trace medium to coarse Sand, dense, non-plastic, saturated. [TILL]	Borehole backfilled with cement-bentonite grout to grade.
		20	38-40	1.1	- 24 18 12	42	ND				
40	810	21	40-42	1.3	15 18 15 12	33	6.5			Gray-brown Silty fine to coarse subrounded GRAVEL, some to little fine to coarse Sand, little to trace dark brown to black NAPL blebs, non-plastic, saturated.	
		22	42-44	1.2	12 19 21 29	40	3.7			Faint odor from 42' - 46' bgs.	
45	805	23	44-46	0.5	29 31 50/.1 -	NA	2.5				
		24	46-48	0.4	37 50/.4 - -	NA	23.1			Decreasing medium to coarse Sand content, dense, wet below 46' bgs.	
		25	48-50	1.5	40 31 34 24	65	135			Gray-brown Silty fine to medium SAND, trace fine to medium subrounded Gravel, trace Silt and fine Sand seams (red-brown NAPL on seams)	
50	800	26	50-52	1.0	30 33 37 47	70	28.6			Trace NAPL below 50' bgs.	
		27	52-54	0.5	37 50/.1 - -	NA	0.4			Faint odor below 52' bgs.	
55	795	28	54-56	0.4	50/.4 - - -	NA	ND			Gray-brown Silty fine to coarse subrounded GRAVEL, little fine to coarse Sand, faint odor, non-plastic, saturated.	

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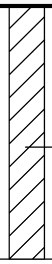
Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Client: New York State Electric and Gas

Well/Boring ID: SB-226

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 60' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		29	56-58	0.5	30 50/.2 - -	NA	ND			Gray-brown Silty fine to coarse subrounded GRAVEL, little fine to coarse Sand, faint odor, non-plastic, saturated.	 Borehole backfilled with cement-bentonite grout to grade.
		30	58-60	0.2	50/.2 - - -	NA	ND				
60	790										
65	785										
70	780										
75	775										

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable. ND = Non-Detect. AMSL = Above Mean Sea Level.

Date Start/Finish: 2/19/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-45B ATV
Sampling Method: 2"/3" Split Spoon

Northing: 764232.11
Easting: 761461.58
Casing Elevation: NA

Borehole Depth: 40' below grade
Surface Elevation: 849.74' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-227

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample
0	850							
		1	0-2	NA	NA	NA	NA	
		2	2-4	1.4	1 4 4 5	8	ND	×
5	845	3	4-6	1.8	4 6 26 14	32	ND	
		4	6-8	1.2	18 29 50/0.2 -	NA	ND	
		5	8-10	1.1	7 11 8 6	19	ND	×
10	840	6	10-12	0.9	2 3 12 6	15	ND	
		7	12-14	1.6	6 8 11 14	19	ND	
15	835	8	14-16	0.7	8 8 11 4	19	ND	

Stratigraphic Description

ASPHALT.

Dark gray-black CINDERS and WOOD chips, non-plastic, moist.

Brown SILT, little fine Sand, non-plastic, moist.

Gray Silty fine SAND, some fine to coarse subangular Gravel, trace Clay and Cinders, non-plastic, moist.

Brown SILT, little to trace fine Sand, non-plastic, moist.

Brown SILT, some fine to coarse subangular Gravel, trace Clay and fine Sand, non-plastic, moist.

Brown Silty fine to coarse subangular GRAVEL, little fine to medium Sand, trace Clay, non-plastic, moist.

Changing to subrounded Gravel at 8.0' bgs.

Wet to saturated below 8.5' bgs.

Faint odor, saturated below 10' bgs.

Well/Boring Construction

Borehole backfilled with cement-bentonite grout to grade.

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 2.0' - 2.3' bgs for total Cyanide and from 8.0' - 10.5' and 34' - 35.2' bgs for BTEX, PAH, and total Cyanide.

Client: New York State Electric and Gas

Well/Boring ID: SB-227

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 40' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	0.6	5 8 5 4	13	ND			Brown Silty fine to coarse rounded GRAVEL, little fine to medium Sand, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	1.4	6 24 22 25	46	ND			Little Cobbles below 18' bgs.	
20	830	11	20-22	1.5	20 26 30 24	56	ND				
		12	22-24	0.8	14 19 17 26	36	ND				
25	825	13	24-26	0.6	18 50/0.3 - -	NA	ND				
		14	26-28	1.2	30 18 10 12	28	ND			Brown fine to medium SAND, trace coarse Sand, trace fine Gravel, non-plastic, saturated.	
		15	28-30	1.4	3 7 13 18	20	ND			Brown Silty fine to coarse subrounded GRAVEL, some fine to coarse Sand, little to trace Cobbles, non-plastic, saturated.	
30	820	16	30-32	1.2	7 14 20 22	34	ND				
		17	32-34	0.8	15 28 14 15	42	ND				
35	815	18	34-36	1.2	9 5 9 9	14	ND	☒		Gray SILT, little Clay, moderately plastic, saturated.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 2.0' - 2.3' bgs for total Cyanide and from 8.0' - 10.5' and 34' - 35.2' bgs for BTEX, PAH, and total Cyanide.

Client: New York State Electric and Gas

Well/Boring ID: SB-227

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 40' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		19	36-38	1.2	4 6 8 11	11	ND			Gray SILT, little Clay, moderately plastic to semi-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
		20	38-40	1.6	5 9 7 12	16	ND			Wet below 38' bgs.	
40	810										
45	805										
50	800										
55	795										

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 2.0' - 2.3' bgs for total Cyanide and from 8.0' - 10.5' and 34' - 35.2' bgs for BTEX, PAH, and total Cyanide.

Date Start/Finish: 2/18/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-45B ATV
Sampling Method: 2" Split Spoon

Northing: 764322.5
Easting: 761427.57
Casing Elevation: NA

Borehole Depth: 44' below grade
Surface Elevation: 851.22' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-228

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	850	1	0-2	NA	NA	NA	NA			Auger through Frost. Brown SILT and fine SAND, trace fine Gravel, non-plastic, moist.	Borehole backfilled with cement-bentonite grout to grade.
		2	2-4	1.1	11 10 5 4	15	ND			Dark brown-black CINDERS, some fine Sand and Slag, little Brick, non-platic, moist.	
5		3	4-6	0.3	6 6 5 4	11	ND			Brown fine SAND and SILT, trace Brick and Coal, non-plastic, moist.	
	845	4	6-8	1.3	4 4 5 5	9	ND				
		5	8-10	1.4	6 7 8 10	15	ND			Brown fine to medium Sandy SILT, some fine to coarse subrounded Gravel, non-plastic, moist. Wet below 9.2' bgs.	
10	840	6	10-12	0.7	23 19 17 10	36	ND			Brown fine to medium Sandy SILT and fine to coarse subrounded GRAVEL, non-plastic, saturated.	
		7	12-14	1.3	10 22 30 25	52	ND	☒			
15		8	14-16	1.5	10 12 14 44	26	ND			Trace Cobbles and coarse Sand below 14' bgs.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 12' - 13.3' and 36' - 39' bgs for BTEX, PAH, and total Cyanide.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-228

Borehole Depth: 44' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	1.7	25 15 18 29	33	ND			Brown fine to medium Sandy SILT and fine to coarse subrounded GRAVEL, trace Cobbles and coarse Sand, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	1.5	19 15 50/0.1 -	NA	ND			Brown Silty fine to coarse subrounded GRAVEL, some fine to coarse Sand, little Cobbles, non-plastic, saturated.	
20	830	11	20-22	1.8	6 16 35 30	52	ND				
		12	22-24	1.5	27 25 21 18	46	ND				
25		13	24-26	0.5	12 18 18 15	36	ND				
	825	14	26-28	0.9	17 18 19 26	37	ND				
		15	28-30	0.4	5 5 20 21	25	ND				
30	820	16	30-32	1.4	18 36 44 27	80	ND			Brown fine SAND and fine to coarse subrounded GRAVEL, little to trace medium Sand, Silt, and Cobbles, dense, non-plastic, wet.	
		17	32-34	0.1	85/0.1 - - -	NA	ND			Possible Cobble at 32.5' bgs.	
35		18	34-36	0.0	- - - -	NA	NA			Augered through Cobble. No sample collected.	

Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 12' - 13.3' and 36' - 39' bgs for BTEX, PAH, and total Cyanide.

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Client: New York State Electric and Gas

Well/Boring ID: SB-228

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 44' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	815	19	36-38	0.6	50 50/0.1 - -	NA	ND	X		Brown Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
		20	38-40	1.5	3 4 5 4	9	ND			Brown-gray Silty CLAY, plastic, saturated.	
40	810	21	40-42	0.7	3 7 6 9	13	ND				
		22	42-44	1.7	6 5 7 7	12	ND				
45	805										
50	800										
55											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 12' - 13.3' and 36' - 39' bgs for BTEX, PAH, and total Cyanide.

Date Start/Finish: 3/1/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2" Split Spoon

Northing: 764343.67
Easting: 761367.63
Casing Elevation: NA

Borehole Depth: 42' below grade
Surface Elevation: 851.92' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-229

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	850	1	0-2	1.5	14 17 6 3	23	ND			Brown fine to medium SAND, some fine to medium angular Gravel, non-plastic, moist. Black CINDERS and SLAG, little fine to medium Sand and fine to medium Gravel, non-plastic, moist.	Borehole backfilled with cement-bentonite grout to grade.
		2	2-4	1.4	4 4 3 5	7	ND				
5		3	4-6	0.8	4 3 2 1	5	ND			Brown-gray SILT, little Clay, slightly plastic, wet.	
	845	4	6-8	1.0	1 2 9 18	11	ND			Brown SILT, little to trace fine Sand, trace Clay and fine Gravel, Cobble in shoe, non-plastic, wet.	
		5	8-10	0.4	26 18 8 5	26	0.5			Gray-brown fine to coarse subrounded GRAVEL, some Silt, little fine Sand, trace yellow-brown oil, non-plastic, wet to saturated.	
10	840	6	10-12	0.8	9 4 6 3	10	21.5				
		7	12-14	1.2	9 6 12 15	18	58.5			Gray-brown Silty fine to coarse GRAVEL, little fine to coarse Sand and Cobbles, little oil, non-plastic, saturated.	
15		8	14-16	1.4	17 24 19 12	43	13.2			Little sheen below 14' bgs.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:SB-229.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-229

Borehole Depth: 42' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	1.5	13 16 33 26	49	14.8			Gray-brown Silty fine to coarse GRAVEL, little fine to coarse Sand and Cobbles, little oil, little sheen, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	1.6	18 24 20 23	44	4.3			Sheen on slough at 18' bgs.	
20		11	20-22	1.6	15 12 17 20	29	6.8			Some fine to coarse Sand, faint odor below 20' bgs.	
	830	12	22-24	1.5	16 6 14 15	20	6.9				
25		13	24-26	1.7	20 23 18 24	41	8.1				
	825	14	26-28	1.0	45 25 20 22	45	2.2				
		15	28-30	0.2	50/0.2 - - -	NA	2.6			Brown Silty fine to medium SAND and fine to medium subrounded GRAVEL, some coarse Sand and Gravel, dense, non-plastic, moist.	
30		16	30-32	1.6	33 33 36 32	69	9.2			Brown fine Sandy fine to coarse subrounded GRAVEL, some medium Sand, little Silt and coarse Sand, dense, faint odor, non-plastic, moist.	
	820	17	32-34	1.3	34 19 24 36	43	2.7			Saturated below 32' bgs.	
35		18	34-36	0.3	50/0.3 - - -	NA	1.4				

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
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Project: 130.43.003
Data File:SB-229.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-229

Borehole Depth: 42' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	815	19	36-38	1.5	2 3 7 11	9	ND			Gray SILT, little to trace Clay, slightly plastic, wet.	Borehole backfilled with cement-bentonite grout to grade.
		20	38-40	2.0	8 10 11 14	21	ND			Little Clay, moist to wet below 38' bgs.	
40	810	21	40-42	1.9	9 12 14 17	26	ND			Gray SILT and CLAY, moderately plastic, wet.	
45	805										
50	800										
55											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
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Project: 130.43.003
Data File:SB-229.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

Date Start/Finish: 3/3/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55 ATV
Sampling Method: 2" Split Spoon

Northing: 764383.1
Easting: 761721.01
Casing Elevation: NA

Borehole Depth: 48.5' below grade
Surface Elevation: 853.43' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-230

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	855										
0		1	0-2	1.2	8 6 5 5	11	ND		× × ×	Black CINDERS and SLAG, little fine to medium Sand, trace Grass, non-plastic, moist.	Borehole backfilled with cement-bentonite grout to grade.
	850	2	2-4	0.4	6 3 3 3	6	ND		× × ×		
5		3	4-6	1.0	4 3 3 2	6	ND		× × ×	Little Wood below 4.0' bgs.	
		4	6-8	1.2	5 6 10 31	16	ND			Brown fine Sandy SILT, some fine to coarse Gravel, non-plastic, moist.	
	845	5	8-10	1.2	4 9 8 8	17	ND				
10		6	10-12	0.3	15 15 12 12	27	ND			Wet below 10' bgs.	
	840	7	12-14	0.3	5 6 8 7	14	5.6			Gray Silty fine to coarse subrounded GRAVEL, some fine to coarse Sand, little Cobbles, trace oil, sheen, non-plastic, saturated.	
15		8	14-16	1.0	2 7 10 15	17	5.2			Brown-gray color below 14' bgs.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 24' - 27.1' bgs for BTEX, PAH, and Total CN.

Project: 130.43.003
Data File:SB-230.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-230

Borehole Depth: 48.5' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	1.1	9 9 10 10	19	2.1			Brown-gray Silty fine to coarse subrounded GRAVEL, some fine to coarse Sand, little Cobbles, trace NAPL blebs in slough, trace sheen, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
	835	10	18-20	1.1	7 18 11 11	29	1.2				
20		11	20-22	0.7	4 6 6 6	12	1.5			Faint odor below 20' bgs.	
	830	12	22-24	1.0	17 30 50/0.2 -	NA	4.3 1.2			Trace NAPL blebs below 22' bgs. Brown SILT, some fine to medium subrounded Gravel, little coarse Gravel, trace fine Sand, trace to little Clay, trace NAPL blebs on top of Till, dense, non-plastic, moist. [TILL]	
25		13	24-26	1.3	27 31 50/0.3 -	NA	3.7	×		Gray-brown color below 24' bgs.	
		14	26-28	1.1	28 43 50/0.2 -	NA	2.6				
	825	15	28-30	0.1	50/0.1 - - -	NA	NA			Gray color below 28' bgs.	
30		16	30-32	1.2	28 37 50/0.4 -	NA	3.3				
	820	17	32-34	1.1	41 37 50/0.3 -	NA	1.0				
35		18	34-36	0.5	100/0.5 - - -	NA	ND				

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 24' - 27.1' bgs for BTEX, PAH, and Total CN.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-230

Borehole Depth: 48.5' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		19	36-38	1.0	26 41 50/0.2 -	NA	1.2			Gray SILT, some fine to medium subrounded Gravel, little coarse Gravel, trace fine Sand, trace to little Clay, dense, non-plastic, wet. [TILL]	Borehole backfilled with cement-bentonite grout to grade.
	815	20	38-40	1.2	29 47 50/0.4 -	NA	ND				
40		21	40-42	1.0	30 46 50/0.4 -	NA	ND			Moist below 40' bgs.	
	810	22	42-44	0.6	31 50/0.1 - -	NA	ND				
45		23	44-46	0.2	34 50/0.1 - -	NA	ND			Moist to wet below 44' bgs.	
		24	46-48	0.4	50/0.4 - - -	NA	ND				
	805	25	48-48.5	0.5	33 50/0.4	NA	ND			Little Clay, slightly plastic below 48' bgs.	
50											
	800										
55											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 24' - 27.1' bgs for BTEX, PAH, and Total CN.

Project: 130.43.003
Data File:SB-230.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

Date Start/Finish: 3/2/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-55
Sampling Method: 2"/3" Split Spoon

Northing: 764240.98
Easting: 761003.22
Casing Elevation: NA

Borehole Depth: 20' below grade
Surface Elevation: 851.75' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-231

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	850	1	0-2	0.7	2 50/0.2 - -	NA	ND			Dark brown-black CINDERS and SLAG, non-plastic, moist. Little Silt, soft, wet below 2.0' bgs.	Borehole backfilled with cement-bentonite grout to grade.
		2	2-4	1.3	2 1 2 1	3	ND 16.4			Brown SILT, little Clay, trace fine Gravel, slightly plastic, moist. Dark gray fine to medium SAND, little coarse Sand and fine to medium Gravel, little Cinders and Slag, non-plastic, wet. Trace NAPL below 4.0' bgs.	
5		3	4-6	1.2	1 2 1 2	3	16.2 2.6			Gray-blue SILT and CLAY, trace fine Sand, moderately plastic, moist. Trace NAPL below 6.0' bgs.	
	845	4	6-8	1.4	2 2 2 2	4	15.7 28.4				
		5	8-10	1.8	37 40 47 23	87	9.1			Gray-brown SILT, little to trace Clay, mottled, slightly plastic, moist.	
10		6	10-12	1.8	7 10 7 7	17	8.7 6.9			Little Clay, wet below 10' bgs. Dark gray-black Silty fine to coarse GRAVEL, little Cobbles, trace fine to coarse Sand, non-plastic, moist to wet.	
	840	7	12-14	1.9	7 10 32 39	42	2.7			Gray-brown Silty fine to coarse GRAVEL, little Cobbles, trace fine Sand, trace NAPL blebs, non-plastic, saturated.	
15		8	14-16	1.2	31 51 50/0.2 -	NA	3.5 2.7			Brown-gray Silty fine SAND and fine to coarse subrounded GRAVEL, trace Cobbles, little NAPL blebs on slough, non-plastic, saturated. [TILL]	

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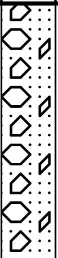
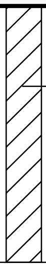
Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-231

Borehole Depth: 20' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	0.4	50/0.4 - - -	NA	18			Brown-gray Silty fine SAND and fine to coarse subrounded GRAVEL, trace Cobbles, trace to little NAPL blebs on slough, non-plastic, saturated. [TILL] Gray color below 18' bgs.	 Borehole backfilled with cement-bentonite grout to grade.
20		10	18-20	1.2	37 44 50/0.4 -	NA	5.1				
	830										
25											
	825										
30											
	820										
35											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:SB-231.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

Date Start/Finish: 3/5/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2" Split Spoon

Northing: 764468.46
Easting: 761257.67
Casing Elevation: NA

Borehole Depth: 36' below grade
Surface Elevation: 852.68' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-233

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
855										
0	1	0-2	1.2	9 20 50/0.3 -	NA	ND			Brown Silty fine to medium SAND, some fine to medium subangular Gravel, non-plastic, moist. Dark gray CINDERS, little Slag, non-plastic, moist.	Borehole backfilled with cement-bentonite grout to grade.
850	2	2-4	0.8	6 8 7 7	15	ND			Some Brick below 2.0' bgs.	
5	3	4-6	0.4	6 5 3 5	8	ND			Moist to wet below 4.0' bgs.	
845	4	6-8	0.0	3 2 3 4	5	NA			No Recovery.	
	5	8-10	0.3	2 1 1 2	2	ND			SLAG and FIREBRICK, non-plastic, moist.	
10	6	10-12	1.1	6 4 5 6	9	13.4			Gray Silty fine to coarse subrounded GRAVEL, some to little fine to medium Sand, trace coarse Sand, moderate sheen, possible petroleum odor, non-plastic, saturated.	
840	7	12-14	1.0	10 5 5 5	10	18.9	X		Little sheen, trace yellow oil, possible petroleum odor below 12' bgs.	
15	8	14-16	0.5	5 5 5 3	10	13.9			Little sheen below 14' bgs.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 12' - 13' bgs for PAH, PCBs, and DRO.

Client: New York State Electric and Gas

Well/Boring ID: SB-233

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 36' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	1.0	7 17 26 18	43	1.4			Brown Silty fine to coarse subrounded GRAVEL, some to little fine to medium Sand, trace coarse Sand, faint odor, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	0.6	32 33 31 9	64	1.8				
20		11	20-22	0.8	8 10 9 6	19	ND			Decreasing Sand content below 20' bgs.	
	830	12	22-24	0.4	4 9 12 15	21	ND				
25		13	24-26	0.8	10 13 6 7	19	ND				
	825	14	26-28	0.5	10 18 25 27	43	ND				
		15	28-30	0.5	28 50/0.1 - -	NA	ND			Moderately dense below 28' bgs.	
30		16	30-32	0.0	50/0.2 - - -	NA	NA			No Recovery. Brown Silty fine to coarse subrounded GRAVEL, some to little fine to medium Sand, trace coarse Sand, little Clay, non-plastic, saturated.	
	820	17	32-34	1.4	30 11 8 20	19	ND			Gray SILT and CLAY, moderately plastic, wet.	
35		18	34-36	1.6	4 5 13 14	18	ND				

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 12' - 13' bgs for PAH, PCBs, and DRO.

Date Start/Finish: 3/5/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2" Split Spoon

Northing: 764451
Easting: 761416.25
Casing Elevation: NA

Borehole Depth: 30' below grade
Surface Elevation: 853.38' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-234

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	855										
0		1	0-2	0.7	5 31 50/.3 -	NA	ND			Brown-gray Silty fine to medium SAND, some fine to medium subrounded Gravel, non-plastic, wet.	Borehole backfilled with cement-bentonite grout to grade.
	850	2	2-4	0.5	6 8 8 8	16	ND			Dark gray CINDERS and SLAG, some fine to medium Sand, little fine to medium Gravel, non-plastic, moist.	
5		3	4-6	1.0	5 5 8 5	13	ND			Dark gray CINDERS, some Slag and Brick, non-plastic, moist.	
		4	6-8	0.5	5 4 6 18	10	ND				
	845	5	8-10	0.7	6 7 7 9	14	ND			Moist to wet below 8' bgs.	
10		6	10-12	1.1	6 10 8 12	18	ND			Brown Silty fine to medium subrounded GRAVEL, some to little fine to coarse Sand, non-plastic, saturated.	
	840	7	12-14	0.8	10 10 11 14	21	ND	☒			
15		8	14-16	1.4	16 18 26 27	44	ND			Increase Sand content below 14' bgs.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 12' - 15.4' bgs for BTEX, PAH, & Total Cyanide.

Client: New York State Electric and Gas

Well/Boring ID: SB-234

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 30' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	0.9	50/.4 - - -	NA	ND			Brown Silty fine to medium subrounded GRAVEL, some fine to coarse Sand, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
	835	10	18-20	0.7	50 50/.4 - -	NA	ND				
20		11	20-22	1.0	11 26 28 31	54	ND				
	830	12	22-24	0.9	12 20 23 16	43	ND				
25		13	24-26	0.7	16 18 16 19	34	ND				
		14	26-28	1.2	12 18 21 50/.3	39	ND			Becoming increasing Silt content and density with depth below 26' bgs.	
	825	15	28-30	0.3	80/.3 - - -	NA	ND			Brown-gray SILT, some fine to medium subrounded Gravel, little fine Sand, non-plastic, dense, moist. [TILL]	
30											
	820										
35											

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ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 12' - 15.4' bgs for BTEX, PAH, & Total Cyanide.

Date Start/Finish: 3/4/03
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-55
Sampling Method: 2" Split Spoon

Northing: 764458.05
Easting: 761346.11
Casing Elevation: NA

Borehole Depth: 30' below grade
Surface Elevation: 852.63' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-235

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	855										
0		1	0-2	0.4	50/0.4 - - -	NA	ND			Brown to dark gray fine to medium SAND and SILT, little Cinders and fine to coarse Gravel, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
	850	2	2-4	0.1	8 4 2 1	6	ND			BRICK.	
5		3	4-6	1.2	2 3 4 4	7	ND			Red-black CINDERS and BRICK fragments, little Slag and fine to medium Gravel, non-plastic, satuated. Brown fine SAND, little Silt, non-plastic, moist.	
	845	4	6-8	0.9	8 9 14 8	23	ND			Brown to red-brown Silty fine SAND and fine to coarse GRAVEL, trace medium Sand, non-plastic, moist.	
		5	8-10	0.9	11 10 10 6	20	ND			Wet below 8.0' bgs.	
10		6	10-12	0.4	9 13 12 8	25	ND			Saturated below 10' bgs.	
	840	7	12-14	1.1	12 20 26 19	46	5.2	✕		Brown fine to coarse SAND and fine to coarse subrounded GRAVEL, little to trace Silt, trace sheen, faint odor, non-plastic, saturated.	
15		8	14-16	0.9	17 32 50/0.4 -	NA	1.7				

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Soil sample collected from 12' - 14.9' bgs for BTEX, PAH, and Total CN.

Client: New York State Electric and Gas

Well/Boring ID: SB-235

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 30' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	0.6	34 40 50/0.4 -	NA	ND			Brown Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, little Cobbles, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
		10	18-20	1.0	18 21 24 40	45	ND				
20		11	20-22	1.1	36 27 22 17	49	ND				
	830	12	22-24	1.4	15 17 19 18	36	ND				
25		13	24-26	0.8	13 10 12 14	22	ND				
	825	14	26-28	1.1	13 9 13 10	22	ND				
		15	28-30	1.3	23 19 20 17	39	ND				
30											
	820										
35											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 12' - 14.9' bgs for BTEX, PAH, and Total CN.

Date Start/Finish: 3/17/04
Drilling Company: Lyon Drilling
Driller's Name: J.Grant/ R. Horne
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 4-1/4"
Rig Type: CME-45B ATV
Sampling Method: 2" Split Spoon

Northing: 764002
Easting: 760957.16
Casing Elevation: NA

Borehole Depth: 60' below grade
Surface Elevation: 851.75' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-236

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	850	1	0-2	1.5	3 4 4 5	8	ND			Dark gray-black CINDERS and SLAG, little fine to medium Sand and Ash, non-plastic, moist.	Borehole backfilled with cement-bentonite grout to grade.
		2	2-4	1.4	4 4 5 6	9	ND			Brown SILT and CLAY, tracr Root scars, moderately plastic, moist.	
5		3	4-6	1.8	3 3 4 4	7	ND			Mottled below 4.0' bgs.	
	845	4	6-8	1.5	4 4 6 6	10	ND				
10		5	8-10	1.8	2 2 3 4	5	ND			Gray color, trace fine to medium Sand and fine to medium Gravel, wet below 8.5' bgs.	
	840	6	10-12	1.5	4 3 4 3	7	ND			Gray Silty CLAY, some fine to coarse Sand and fine to coarse subrounded Gravel, slightly plastic, saturated. Gray Silty CLAY, moderately plastic, wet.	
		7	12-14	0.7	3 6 2 1	8	ND			Gray Silty fine to coarse subrounded GRAVEL, little fine to coarse Sand, non-plastic, saturated.	
15		8	14-16	0.6	1 3 4 9	7	ND			Brown-gray color below 14' bgs.	

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Soil samples collected from 18' - 19.8' for BTEX, PAH, and Total CN.

Project: 130.43.003
Data File:SB-223.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/8/04

Client: New York State Electric and Gas

Well/Boring ID: SB-236

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 60' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	0.7	26 25 50/0.1 -	NA	ND			Brown Silty fine to coarse subrounded GRAVEL, little fine to coarse Sand, trace Cobbles, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
20		10	18-20	1.8	46 41 42 50	83	ND	X		Gray fine Sandy SILT and fine to coarse subrounded multicolored GRAVEL, dense, non-plastic, moist. [TILL]	
	830	11	20-22	0.5	25 26 50/0.4 -	NA	ND				
		12	22-24	1.1	18 32 34 25	66	ND			Little to trace medium to coarse Sand below 22.8' bgs.	
25		13	24-26	0.8	28 31 24 21	55	ND			Gray Silty fine to medium SAND, some coarse Sand and fine to coarse subrounded multicolored Gravel, trace Cobbles, non-plastic, wet. [TILL]	
	825	14	26-28	1.2	14 15 28 29	43	ND				
30		15	28-30	0.7	12 14 15 21	29	ND				
	820	16	30-32	1.2	20 21 21 24	52	ND				
		17	32-34	0.4	50 50/0.2 - -	43	ND				
35		18	34-36	0.4	50/0.4 - - -	NA	ND			Little Cobbles below 34' bgs.	

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ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil samples collected from 18' - 19.8' for BTEX, PAH, and Total CN.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	815	19	36-38	0.3	50/0.3 - - -	NA	ND			Gray Silty fine to medium SAND, some coarse Sand and fine to coarse subrounded multicolored Gravel, trace Cobbles, non-plastic, wet. [TILL]	Borehole backfilled with cement-bentonite grout to grade.
		20	38-40	0.5	37 50/0.4 - -	NA	ND			Brown-gray Silty fine to medium SAND, some coarse Sand, trace fine to medium subrounded Gravel, non-plastic, saturated.	
40	810	21	40-42	1.5	26 22 22 29	44	ND			Brown-gray fine to medium SAND, some coarse Sand, non-plastic, saturated.	
		22	42-44	1.0	25 25 50/0.3 -	NA	ND			Brown-gray Silty fine to coarse SAND, some coarse Sand and fine to coarse subrounded Gravel, trace Cobbles, non-plastic, saturated.	
45		23	44-46	0.8	37 50 50/0.2 -	NA	ND				
	805	24	46-48	0.4	48 50/0.1 - -	NA	ND				
		25	48-50	0.4	49 50/0.2 - -	NA	ND				
50	800	26	50-52	0.7	37 50/0.2 - -	NA	ND			Gray-brown fine to medium SAND, non-plastic, saturated. Brown-gray Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, little Cobbles, non-plastic, saturated.	
		27	52-54	0.3	50/0.4 - - -	NA	ND				
55		28	54-56	0.9	33 43 50/0.3 -	NA	ND			Decreasing Gravel content to some with depth below 54' bgs.	

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Soil samples collected from 18' - 19.8' for BTEX, PAH, and Total CN.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-236

Borehole Depth: 60' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	795	29	56-58	1.0	33 43 50/0.3 -	NA	ND			Brown-gray Silty fine to coarse SAND, some fine to coarse subrounded multicolored Gravel, little to trace Cobbles, non-plastic, wet.	Borehole backfilled with cement-bentonite grout to grade.
		30	58-60	1.1	29 40 50/0.4 -	NA	ND			Brown-gray fine to coarse SAND, non-plastic, wet.	
60											
	790										
65											
	785										
70											
	780										
75											

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Soil samples collected from 18' - 19.8' for BTEX, PAH, and Total CN.

Project: 130.43.003
Data File:SB-223.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/8/04

Date Start/Finish: 4/1/04
Drilling Company: Lyon Drilling
Driller's Name: H. Lyon/ C. Brown
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-45B Trailer
Sampling Method: 2"/3" Split Spoon

Northing: 764508.77
Easting: 761725.91
Casing Elevation: NA

Borehole Depth: 28' below grade
Surface Elevation: 859.36' AMSL

Geologist: Dave Cornell

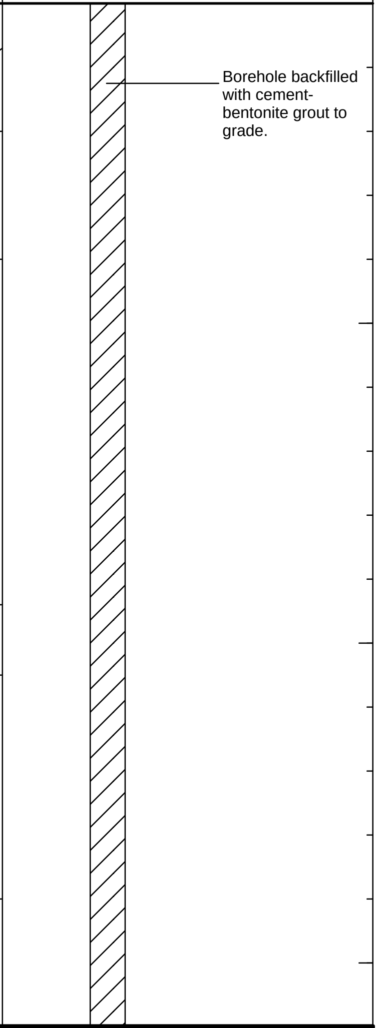
Well/Boring ID: SB-240

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	860									
0		1	0-2	1.2	2 8 8 9	16	ND			Brown SILT and fine SAND, trace Organics (Roots and Grass), non-plastic, moist. Brown Silty fine SAND and fine to coarse GRAVEL, some medium Sand, non-plastic, moist.
		2	2-4	0.0	6 6 7 7	15	NA			No Recovery.
5	855	3	4-6	1.5	11 15 25 30	40	ND			Brown Silty fine SAND and fine to coarse GRAVEL, some medium Sand, trace Cobbles and Cinders, non-plastic, moist.
		4	6-8	1.8	22 30 25 25	55	ND			
	850	5	8-10	1.6	7 25 18 8	43	ND			Brown SILT and fine SAND, little to trace Organics (Root scars and Roots), non-plastic, moist.
10		6	10-12	0.8	4 9 11 8	20	ND			Black CINDERS and SLAG, non-plastic, moist.
		7	12-14	0.2	5 7 5 9	12	ND			
15	845	8	14-16	1.5	5 7 5 5	12	ND			Brown SILT and fine to coarse subrounded GRAVEL, little fine Sand, trace Clay, non-plastic, moist. Little medium Sand below 15.3' bgs.

Well/Boring Construction


Borehole backfilled with cement-bentonite grout to grade.

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR = Weight of Rod. AMSL = Above Mean Sea Level.

Soil sample collected from 22' - 25.7' (with Dup-102) bgs for PAH and DRO. MS/MSD also collected.

Client: New York State Electric and Gas

Well/Boring ID: SB-240

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 28' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description	Well/Boring Construction
		9	16-18	1.6	4 6 4 4	10	ND		Red-brown Silty fine to coarse SAND, some fine to coarse subrounded Gravel, non-plastic, saturated.	Borehole backfilled with cement-bentonite grout to grade.
	840	10	18-20	0.2	WOR WOR WOR WOR	NA	ND			
20		11	20-22	1.5	6 8 10 10	18	ND		Brown Silty fine to coarse SAND and fine to coarse subrounded GRAVEL, non-plastic, saturated.	
		12	22-24	0.7	7 10 14 14	24	ND	X		
25	835	13	24-26	1.7	24 24 23 24	47	ND			
		14	26-28	1.4	12 9 16 18	25	ND			
30	830									
35	825									

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. WOR = Weight of Rod. AMSL = Above Mean Sea Level.

Soil sample collected from 22' - 25.7' (with Dup-102) bgs for PAH and DRO. MS/MSD also collected.

Project: 130.43.003
Data File:SB-240.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

Date Start/Finish: 4/1/04
Drilling Company: Lyon Drilling
Driller's Name: H. Lyon/ C. Brown
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-45B Trailer
Sampling Method: 2" Split Spoon

Northing: 764548.59
Easting: 761301.07
Casing Elevation: NA

Borehole Depth: 22' below grade
Surface Elevation: 852.99' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-241

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	855										
0		1	0-2	1.2	3 8 10 12	18	ND			Brown Silty fine to medium SAND, some fine to coarse Gravel, non-plastic, wet. Black CINDERS and fine SAND, some medium to coarse Gravel, trace Brick, non-plastic, moist.	Borehole backfilled with cement-bentonite grout to grade.
	850	2	2-4	0.5	15 9 4 4	13	ND				
5		3	4-6	0.6	4 2 2 2	4	ND				
		4	6-8	1.2	4 1 3 12	4	ND			Brown mottled SILT and CLAY, little Root scars, moderately plastic, moist.	
	845	5	8-10	1.0	8 9 12 15	21	ND			Brown Silty fine to medium SAND and fine to coarse subangular GRAVEL, non-plastic, wet to saturated.	
10		6	10-12	1.2	11 7 9 9	16	ND				
	840	7	12-14	1.0	3 7 5 7	11	ND				
15		8	14-16	0.8	5 6 9 8	15	ND				

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-241

Borehole Depth: 22' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	835	9	16-18	1.0	9 12 11 28	23	ND			Brown Silty fine to medium SAND and fine to coarse subangular GRAVEL, trace Cobbles, non-plastic, wet to saturated.	Borehole backfilled with cement-bentonite grout to grade.
20		10	18-20	1.5	9 48 18 20	66	ND				
		11	20-22	1.6	16 18 25 14	43	ND				
	830										
25											
	825										
30											
	820										
35											

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:SB-241.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

Date Start/Finish: 4/2/04
Drilling Company: Lyon Drilling
Driller's Name: H. Lyon/ C. Brown
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-45B Trailer
Sampling Method: 2"/3" Split Spoon

Northing: 764237.44
Easting: 761734.8
Casing Elevation: NA

Borehole Depth: 20' below grade
Surface Elevation: 849.78' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-242

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0	NA	0-2	NA	NA	NA	NA			Auger to 2.0' bgs.	Borehole backfilled with cement-bentonite grout to grade.
		1	2-4	1.3	3 3 2 4	5	ND			Gray-brown fine SAND and CINDERS, some Ash and Slag, trace Gravel, non-plastic, moist. Brown SILT, little Clay, trace Root scars, non-plastic, wet.	
5	-5	2	4-6	1.0	36 6 8 11	14	ND			Brown SILT and fine to coarse subrounded GRAVEL, little fine Sand, non-plastic, moist to wet. Saturated below 5.5' bgs.	
		3	6-8	1.0	5 8 5 4	13	6.2			Gray-brown to dark gray Silty fine to coarse subrounded GRAVEL, little fine to medium Sand, trace coarse Sand, staining, possible cutting oil odor, non-plastic, saturated.	
		4	8-10	0.4	3 8 9 27	16	9.1	X		Dark gray color, trace sheen below 8.0' bgs.	
10	-10	5	10-12	0.7	20 10 12 7	22	24.2				
		6	12-14	0.4	3 6 14 17	20	6.0			Trace sheen below 12' bgs.	
15	-15	7	14-16	0.7	2 5 25 18	30	4.8			Gray Silty fine to coarse GRAVEL, little fine to coarse Sand, little Cobbles, faint odor, non-plastic, saturated.	

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 8.0' - 10.7' bgs for PAH and DRO.

Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: SB-242

Borehole Depth: 20' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		8	16-18	1.3	22 34 20 17	54	2.8			Gray-brown Silty fine to coarse GRAVEL, some fine to coarse Sand, little Cobbles, dense, non-plastic, wet.	Borehole backfilled with cement-bentonite grout to grade.
		9	18-20	1.2	22 34 44 46	78	4.0			Gray color, little fine to coarse Sand, very dense, moist below 18' bgs. [TILL]	
20	20										
25	25										
30	30										
35	35										

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 8.0' - 10.7' bgs for PAH and DRO.

Project: 130.43.003
Data File:SB-242.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

Date Start/Finish: 4/5/04
Drilling Company: Lyon Drilling
Driller's Name: H. Lyon/ C. Brown
Drilling Method: Hollow Stem Auger
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-45B Trailer
Sampling Method: 2" Split Spoon

Northing: 764268.32
Easting: 761915.89
Casing Elevation: NA

Borehole Depth: 18' below grade
Surface Elevation: 850.92' AMSL

Geologist: Dave Cornell

Well/Boring ID: SB-243

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	850	1	0-2	1.6	2 4 14 11	18	ND			Brown fine SAND and SILT, little Organics, non-plastic, moist. Black CINDERS and ASH, little Brick, non-plastic, moist.	Borehole backfilled with cement-bentonite grout to grade.
		2	2-4	0.6	5 4 3 5	7	ND				
5	845	3	4-6	1.0	2 3 3 3	6	ND			Dark brown fine to medium SAND and CINDERS, some Ash, little Slag, non-plastic, saturated.	
		4	6-8	0.9	1 3 5 6	8	ND			Gray-brown SILT and CLAY, trace Root scars, mottled, moderately plastic, saturated.	
		5	8-10	1.7	4 5 7 10	12	ND				
10	840	6	10-12	1.5	7 10 10 10	20	ND			Trace fine Sand below 10' bgs.	
		7	12-14	1.4	2 6 8 5	14	ND	×		Gray-brown SILT and CLAY, plastic, saturated. Brown fine Sandy SILT and fine to coarse subrounded GRAVEL, non-plastic, saturated.	
15	835	8	14-16	1.7	18 15 12 20	27	ND			Gray SILT, little fine to medium subrounded Gravel, trace coarse Gravel, non-plastic, moist. [TILL]	

Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 13.3' - 15' bgs for PAH and DRO.

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Client: New York State Electric and Gas

Well/Boring ID: SB-243

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Borehole Depth: 18' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	1.5	20 34 44 50	78	ND			Gray SILT, little fine to medium subrounded Gravel, trace coarse Gravel, non-plastic, moist. [TILL]	Borehole backfilled with cement-bentonite grout to grade.
20											
	830										
25											
	825										
30											
	820										
35											
	815										

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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 13.3' - 15' bgs for PAH and DRO.

Date Start/Finish: 2/24/04 - 2/25/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764403.17
Easting: 761768.06
Surface Elevation: 852.57' AMSL

Test Pit Depth: 11.5' below grade

Field Person (s): David Cornell

Test Pit No. TP-200

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
	855							
0							Fine to coarse SAND, some Brick, Glass, Cinders, Slag, Bottles, little fine to coarse subrounded Gravel, moist, non-plastic. [FILL]	TP-200 excavated to 11.5' bgs 2/24/04. TP-200 re-excavated to 12.5' bgs 2/25/04.
	850							
5								
	845							
							Brown SILT and fine to coarse subrounded GRAVEL, little to trace fine to medium Sand, Cobbles, moist.	
10							Saturated at 10.5' bgs.	
				16.7			Yellow-brown oil at 12.0' bgs.	
	840							
15								

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Remarks: NA = Not Available/Not Applicable. bgs = below ground surface. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:TP-200.dat
Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/24/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764374.44
Easting: 761815.22
Surface Elevation: 855.43' AMSL

Test Pit Depth: 12.5' below grade

Field Person (s): David Cornell

Test Pit No. TP-201

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
0	855						Dark gray-black CINDERS and SLAG, some fine to medium Sand, trace Gravel, moist, non-plastic. [FILL]	
5	850							
							Brown Clayey SILT and fine to coarse subrounded GRAVEL, some Cobbles, moist.	
10	845							
							Saturated at 12.0' bgs.	
15	840							

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Remarks: NA = Not Available/Not Applicable. bgs = below ground surface. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:TP-201.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/25/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764377.3
Easting: 761798.48
Surface Elevation: 855.88' AMSL
Test Pit Depth: 14.5' below grade
Field Person (s): David Cornell

Test Pit No. TP-201A
Client: New York State Electric and Gas
Location: Madison Ave.
Former MGP Site
Elmira, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
0						× × ×	Gray CINDERS and fine to coarse SAND, little Slag and fine to coarse Gravel, moist. [FILL]	
	855							
5								
	850							
						▤	Brown SILT, some fine to coarse subrounded Gravel, little fine Sand, moist to wet.	
10								
	845							
				9.8		◇	Brown fine to coarse subrounded to rounded GRAVEL, some Silt, little fine to coarse Sand, moist to wet. Saturated at 13.0' bgs. Gray staining and sheen below 13.5' bgs. Possible degraded petroleum odor at 14.0' bgs.	
15								
	840							

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Remarks: NA = Not Available/Not Applicable.
bgs = below ground surface.

Project: 130.43.003
Data File:TP-201A.dat
Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/24/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764379.67
Easting: 761742.46
Surface Elevation: 854.22' AMSL

Test Pit Depth: 12.5' below grade

Field Person (s): David Cornell

Test Pit No. TP-202

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
	855							
0							Cinders, Brick, Wood, Slag, Concrete, and Sand. [FILL]	
	850							
5								
							Brown SILT and fine to coarse subrounded GRAVEL, little Cobbles and Clay, miost.	
	845							
10				12.7				
							Saturated at 12.0' bgs.	
							Yellow oil at 12.5' bgs.	
	840							
15								

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Project: 130.43.003
Data File:TP-202.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/24/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764389.1
Easting: 761704.56
Surface Elevation: 853.35' AMSL

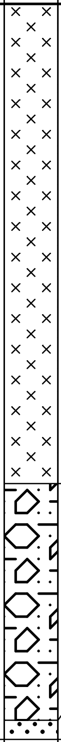
Test Pit Depth: 11.5' below grade

Field Person (s): David Cornell

Test Pit No. TP-203

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York



DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
0	0						FILL. (Similar to TP-200.)	
5	-5							
							Brown SILT and fine to coarse subrounded GRAVEL, little Cobbles and Clay.	
10	-10							
							Saturated at 10.8' bgs.	
				5.4			Gray fine to coarse SAND, yellow-brown oil.	
15	-15							

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Project: 130.43.003
Data File:TP-203.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/24/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764387.37
Easting: 761672.26
Surface Elevation: 854.36' AMSL

Test Pit Depth: 12.0' below grade

Field Person (s): David Cornell

Test Pit No. TP-204

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
	855							
0							FILL. Possible degraded petroleum odor. (Fill similar to TP-200.)	
				1.2				
	850							
5								
							SILT, some fine to coarse subrounded Gravel, little Clay and Cobbles, moist, slightly plastic. Light gray staining below 7.0' bgs.	
				22.9				
	845							
10								
							Little fine to coarse Sand, yellow-brown oil, below 11.0' bgs. Saturated at 11.5' bgs.	
	840							
15								

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Project: 130.43.003
Data File:TP-204.dat
Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/24/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764315.01
Easting: 761623.5
Surface Elevation: 852.49' AMSL

Test Pit Depth: 12.0' below grade

Field Person (s): David Cornell

Test Pit No. TP-205

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
	855							
0							FILL. (Fill similar to TP-200.)	
	850							
							Brown SILT and fine to coarse subrounded GRAVEL, some to little Cobbles, little fine to coarse Sand.	
5								
	845							
				35.4			Grey SILT and fine to coarse subrounded GRAVEL, some to little Cobbles, little fine to coarse Sand, saturated, possible petroleum odor, trace oil.	
10								
				17.8				
	840							
15								

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Project: 130.43.003
Data File:TP-205.dat
Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/25/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764362.21
Easting: 761568.16
Surface Elevation: 853.02' AMSL

Test Pit Depth: 11.5' below grade

Field Person (s): David Cornell

Test Pit No. TP-206

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
	855							
0							Sand, Concrete, Brock, Tires, Gravel. [FILL]	
	850							
5								
				10.7			Gray-brown SILT and fine to coarse subrounded GRAVEL, little Cobbles. Dark gray staining and degraded petroleum odor from 6.0' - 7.5' bgs.	
							Odor is less degraded below 7.5' bgs.	
	845							
				58.1				
10							Saturated at 10.0' bgs. Little fine to coarse Sand, yellow-oil below 10.0' bgs.	
				30.4				
	840							
15								

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Project: 130.43.003
Data File:TP-206.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/25/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764435.16
Easting: 761677.77
Surface Elevation: 851.86' AMSL
Test Pit Depth: 13.0' below grade
Field Person (s): David Cornell

Test Pit No. TP-207
Client: New York State Electric and Gas
Location: Madison Ave.
Former MGP Site
Elmira, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
0							Sand, Cinders, Brick, Glass, Steel, Concrete. [FILL]	
	850							
							Brown SILT, some fine to coarse subrounded Gravel, little Cobbles.	
5								
	845							
							Saturated at 9.0' bgs.	
							Brown fine to coarse GRAVEL, some Silt and Cobbles, little fine to coarse Sand, saturated.	
10								
	840							
				6.4			Gray staining, little yellow-brown oil, below 12.5' bgs.	
15								

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Remarks: NA = Not Available/Not Applicable. bgs = below ground surface. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:TP-207.dat
Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/25/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764334.46
Easting: 761763.42
Surface Elevation: 849.66' AMSL

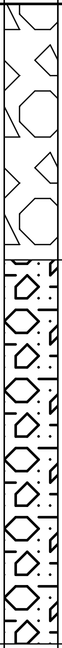
Test Pit Depth: 10.0' below grade

Field Person (s): David Cornell

Test Pit No. TP-208

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York



DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
0	0						Brown COBBLES and rounded medium to coarse GRAVEL, little fine to medium Sand, moist.	
							Brown-gray SILT and fine to coarse subrounded GRAVEL, some Cobbles, little Clay.	
5	-5							
							Saturated at 8.0' bgs. Gray staining, little yellow-brown oil, moderate organic odor, below 8.0' bgs.	Possible former canal bottom.
				14.2				
10	10							
15	15							

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Project: 130.43.003
Data File:TP-208.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/25/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764265.17
Easting: 761576.56
Surface Elevation: 849.56' AMSL

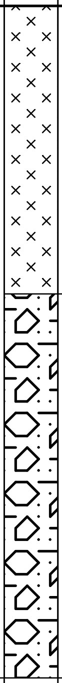
Test Pit Depth: 10.5' below grade

Field Person (s): David Cornell

Test Pit No. TP-209

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York



DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
	850							
0							Cinders, Sand, Gravel, Slag, Cobbles, moist. [FILL]	
5	845						Brown SILT and fine to coarse subrounded to rounded GRAVEL, some Cobbles, little fine Sand, trace Clay, moist. Gray staining and moderate degraded petroleum odor, trace sheen, below 7.0' bgs. Saturated at 8.0' bgs.	
10	840			1.1				
15	835							

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Remarks: NA = Not Available/Not Applicable. bgs = below ground surface. AMSL = Above Mean Sea Level.

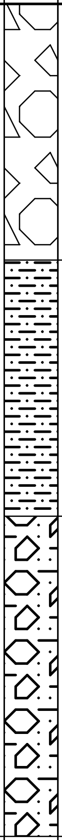
Project: 130.43.003
Data File:TP-209.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/26/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764357.17
Easting: 761825.38
Surface Elevation: 850.28' AMSL
Test Pit Depth: 13.0' below grade
Field Person (s): David Cornell

Test Pit No. TP-210
Client: New York State Electric and Gas
Location: Madison Ave.
Former MGP Site
Elmira, New York



DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
0	850						Brown medium to coarse rounded GRAVEL and COBBLES, little fine to coarse Sand, moist.	
5	845						Brown SILT, some fine to coarse subrounded Gravel, little Clay and fine Sand, moist. Saturated at 8.0' bgs.	During advancement of TP-201 a vertical 1 1/2" PVC pipe was encountered approximately 3' below grade. Maps show no wells in this area, and no curb box was encountered. The PVC pipe was filled with gravel and sand. There were what appeared to be manually cut slots in the lower part of the PVC pipe, which may possibly have been a temporary well. Upon continued advancement of TP-210, the PVC pipe was removed.
10	840			0.8			Brown-gray SILT and fine to coarse subrounded GRAVEL, little Cobbles, Clay, and fine Sand, saturated. Gray staining, little to faint degraded petroleum odor and organic odor, trace sheen, below 8.0' bgs.	
15	835							

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Project: 130.43.003
Data File:TP-210.dat
Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/26/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764434.9
Easting: 761732.39
Surface Elevation: 852.61' AMSL

Test Pit Depth: 10.0' below grade

Field Person (s): David Cornell

Test Pit No. TP-211

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
	855							
0							Bricks, Sand, Concrete, Insulators, Gravel, Cobbles. [FILL]	
	850							
5								
	845						Saturated at 7.5' bgs.	
				4.7			Gray-brown SILT and fine to coarse subrounded GRAVEL, little Cobbles, trace Clay, saturated. Occasional lenses of Silty fine to coarse Sand containing yellow-brown oil.	
10								
	840							
15								

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Remarks: NA = Not Available/Not Applicable. bgs = below ground surface. AMSL = Above Mean Sea Level.

Date Start/Finish: 2/26/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764392.9
Easting: 761499.4
Surface Elevation: 853.18' AMSL

Test Pit Depth: 13.0' below grade

Field Person (s): David Cornell

Test Pit No. TP-212

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
	855							
0							Sand, Brick, Concrete, Gravel, Cobbles, Cinders, Slag, moist. [FILL]	
	850							
5								
							Brown SILT, little Clay, trace fine Sand and fine Gravel, moist. Saturated at 7.5' bgs.	
	845						Brown-gray SILT and fine to coarse subrounded GRAVEL, some Cobbles, little to trace Clay and fine to coarse Sand, moist.	
10								
							Little yellow-brown oil below 11.0' bgs.	
				5.5				
	840							
15								

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Remarks: NA = Not Available/Not Applicable. bgs = below ground surface. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:TP-212.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/26/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764456.26
Easting: 761611.14
Surface Elevation: 853.46' AMSL

Test Pit Depth: 14.0' below grade

Field Person (s): David Cornell

Test Pit No. TP-213

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
	855							
0 5	850					× ×	Sand, Slag, Cinders, Brick, Steel, Insulators, Gravel. [FILL]	
	845					▤	Brown SILT, little Clay, trace fine Sand.	
10	840			0.1		⬡	Brown SILT and fine to coarse GRAVEL, some Cobbles, trace fine to coarse Sand. Saturated at 10.0' bgs. Trace gray Silt at 10.5' bgs.	
15								

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Remarks: NA = Not Available/Not Applicable. bgs = below ground surface. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:TP-213.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/26/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764358.96
Easting: 761283.78
Surface Elevation: 852.01' AMSL

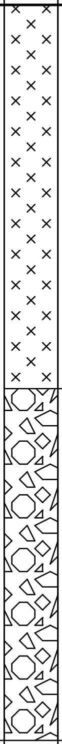
Test Pit Depth: 11.5' below grade

Field Person (s): David Cornell

Test Pit No. TP-214

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York



DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
0							FILL.	
	850							
5								
							Silty fine to coarse subrounded GRAVEL, little Cobbles and fine to coarse Sand, trace Clay.	
	845							
10							Saturated at 9.5' bgs. Yellow-brown oil below 10.0' bgs.	
				20.4				
	840							
15								

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engineers & scientists

Remarks: NA = Not Available/Not Applicable. bgs = below ground surface. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:TP-214.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 2/26/04
Excavating Company: Lyon Drilling
Operator's Name: Jeff Grant
Backhoe: NA

Northing: 764330.14
Easting: 761365.47
Surface Elevation: 851.14' AMSL

Test Pit Depth: 10.5' below grade

Field Person (s): David Cornell

Test Pit No. TP-215

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Engineer's/Geologist's Notes
0	850						FILL.	
5	845						Brown SILT, little Clay, trace fine Sand and fine Gravel, moist.	
10				23.4			Brown Silty fine to coarse subrounded GRAVEL, some Cobbles, little fine to coarse Sand and Clay, wet. Yellow-brown oil below 7.0' bgs. Saturated at 10.0' bgs.	
15	840							

BBL
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Remarks: NA = Not Available/Not Applicable. bgs = below ground surface. AMSL = Above Mean Sea Level.

Project: 130.43.003
Data File:TP-215.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\Testpit2003.ldf
Date: 4/13/04

Date Start/Finish: 3/4/04
Drilling Company: Lyon Drilling
Driller's Name: H. Lyon
Drilling Method: Direct Push
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-45B ATV
Sampling Method: Macrocore

Northing: 764678.18
Easting: 761652.22
Casing Elevation: 849.95' AMSL

Borehole Depth: 25' below grade
Surface Elevation: 849.87' AMSL

Geologist: Dave Cornell

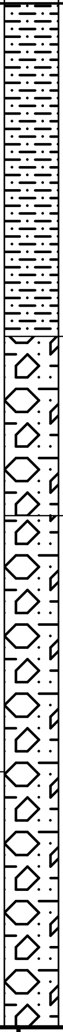
Well/Boring ID: TW-0401S

Client: New York State Electric and Gas

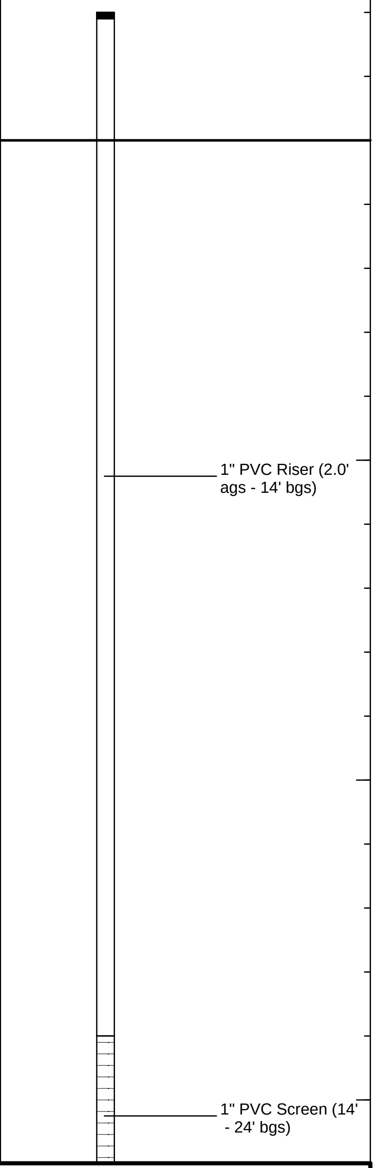
Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
0	*0*								Brown SILT, trace fine Sand and Clay, little Roots and Organics (Topsoil) above 1.0' bgs, non-plastic, moist.
		1	0-4	2.0	NA	NA	ND		
5	*-5*								Gray-brown Silty fine to coarse subrounded to subangular GRAVEL, some to little fine to coarse Sand, little Clay, non-plastic, moist. Moist to wet at 6.0' bgs.
		2	4-8	3.1	NA	NA	ND		
									Gray-brown Silty fine to coarse subrounded GRAVEL, some fine to coarse Sand, non-plastic, saturated.
10	*10*	3	8-12	2.8	NA	NA	ND		
									Little Silt below 12' bgs.
		4	12-15	2.7	NA	NA	ND	X	
15	*15*								
		5	15-19	1.8	NA	NA	ND		

Geologic Column



Well/Boring Construction



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 12' - 16' bgs for Chemox and TOC.

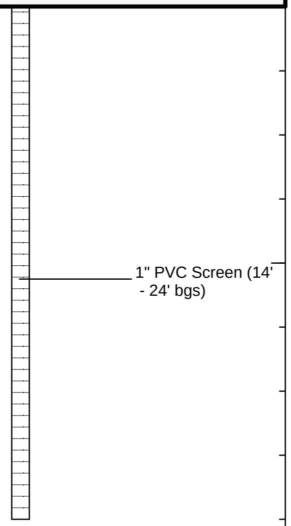
Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: TW-0401S

Borehole Depth: 25' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		5	15-19	1.8	NA	NA	ND			Gray-brown Silty fine to coarse subrounded GRAVEL, some fine to coarse Sand, non-plastic, saturated.	
20	20	6	19-22	2.5	NA	NA	ND				1" PVC Screen (14' - 24' bgs)
		7	22-25	3.0	NA	NA	ND			Brown to gray SILT, trace Clay, trace fine Sand, non-plastic, saturaterd.	
25	25										
30	30										
35	35										



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 12' - 16' bgs for Chemox and TOC.

Date Start/Finish: 3/5/04
Drilling Company: Lyon Drilling
Driller's Name: H. Lyon
Drilling Method: Direct Push
Bit Size: NA
Auger Size: 3-1/4"
Rig Type: CME-45B ATV
Sampling Method: Macrocore

Northing: 764593.65
Easting: 762061.05
Casing Elevation: 850.59' AMSL

Borehole Depth: 20' below grade
Surface Elevation: 850.44' AMSL

Geologist: Dave Cornell

Well/Boring ID: TW-0403S

Client: New York State Electric and Gas

Location: Madison Ave.
Former MGP Site
Elmira, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	850	1	0-4	3.0	NA	NA	ND			Gray-brown SILT, little Organics (Grass and Roots), little Clay, little fine Sand, slightly plastic, wet. Brown SILT, some fine to coarse subrounded to subangular Gravel, trace Clay and fine Sand, non-plastic, moist.	
5	845	2	4-8	2.2	NA	NA	ND			Trace Cobbles below 4.0' bgs.	1" PVC Riser (2.0' ags - 8.5' bgs)
10	840	3	8-12	2.7	NA	NA	ND			Brown Silty fine to coarse subrounded GRAVEL, some fine to coarse Sand, little Cobbles, non-plastic, saturated.	1" PVC Screen (8.5' - 18.5' bgs)
15	835	4	12-16	2.5	NA	NA	ND				

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ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 16' - 17.5' bgs for TOC.

Project: 130.43.003
Data File:TW-0403S.dat

Template: J:\rockware\LogPlot2001\Logfiles\13043\NYSEG_1.ldf
Date:4/13/04

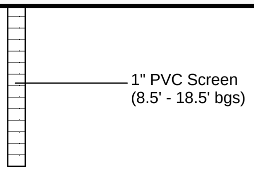
Client: New York State Electric and Gas

Site Location: Madison Ave.
Former MGP Site
Elmira, NY

Well/Boring ID: TW-0403S

Borehole Depth: 20' below grade

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
								╳		Brown Silty fine to coarse subrounded GRAVEL, some fine to coarse Sand, little Cobbles, non-plastic, saturated.	1" PVC Screen (8.5' - 18.5' bgs)
		5	16-20	3.6	NA	NA	ND			Brown SILT, little Clay, slightly plastic, wet with alternating bands of Silty fine SAND, non-plastic, saturated.	
20	830										
25	825										
30	820										
35	815										



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Remarks: bgs = Below ground surface. NA = Not Available/Not Applicable.
ND = Non-Detect. AMSL = Above Mean Sea Level.

Soil sample collected from 16' - 17.5' bgs for TOC.

Appendix B

Summary Report of Cyanide Analysis Results for Soil and Groundwater Samples from Elmira Former MGP Site (prepared by Ish, Inc.)

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an ARCADIS company

Summary Report of Cyanide Analysis Results For Soil and Groundwater Samples from Elmira Former MGP Site

Prepared For:

New York State Electric and Gas Corporation
Binghamton, NY

Prepared by

Ish Inc.
Raleigh, NC

May 30, 2005

Background

Soil cyanide complexes and species have been measured in soil and groundwater samples from former MGP sites throughout the U.S. The predominant forms of cyanide compounds in the MGP residuals are iron-cyanide solids, the most abundant being Prussian Blue or Ferric-Ferrocyanide (FFC) compounds. When FFC solids are dissolved by water, primarily iron cyanide complexes are released as dissolved phase species. However, dissolved phase cyanide complexes and species can exist in different chemical forms ranging from free cyanide (HCN, CN-), weak acid dissociable complexes (copper cyanide, zinc cyanide, nickel cyanide), available cyanide complexes (all of weak acid dissociable complexes and mercury cyanide), to strong-acid dissociable complexes (cobalt cyanide, iron cyanide).

Ghosh, Nakles, Murarka, and Neuhauser (2004) published a paper on detailed characterization of cyanide species in soil and groundwater samples collected from 10 MGP sites in the State of New York. In this New York study, the total cyanide concentrations in groundwater samples ranged from 0.05 mg/L to 19.7 mg/L. Over 95% of the total cyanide in the groundwater samples was present as two different iron cyanide complexes. One of these iron cyanide complexes is the well known ferrocyanide complex and the other species has been tentatively identified as an iron pentacyano complex. Free cyanide, determined by the microdiffusion method, varied from non-detect (<0.01 mg/L) to a maximum value of 0.032 mg/L with most of the groundwater samples showing non-detect values for the free cyanide species. For the soil samples collected and analyzed in this study, the iron cyanide complexes were also found to be dominant cyanide species with small amounts detected for available and free cyanide species.

Introduction

On behalf of NYSEG (New York State Electric and Gas Corp.), Ish Inc. developed and implemented a soil and groundwater sampling and analysis work plan for cyanide compounds, complexes and species as part of the supplemental remedial investigation of the Elmira former MGP site ("the site"). Blasland, Bouck and Lee., Inc. (BBL) was separately retained by NYSEG to carry out the soil borings, the test pitting, and the installation of groundwater monitoring wells at the site. As a result, BBL collected all soil samples during September and October 2003 time period and sent the samples to Ish Inc. subcontractor Chemtech Laboratory to complete the total cyanide analysis for the soil samples using the NY State approved ELAP method (EPA SW-846 method 9012 for total cyanide determination in soils). As part of the analytical work plan, Ish Inc. selected a spectrum of 10 soil samples from the total of 74 soil samples and sent them to Clarkson University for total cyanide analysis by distillation, determination of metal cyanide complexes by IC method, and determination of free cyanide by microdiffusion method. Clarkson University first extracted the soil samples using modified SW-846 method 9013 to prepare the extracts and aliquots of the extracts were then subjected to analysis for free cyanide by microdiffusion, total cyanide by distillation, and metal cyanide complexes by IC method.

This report also contains data from groundwater samples collected and analyzed for total cyanide by Chemtech Laboratory as well as a subset of groundwater samples that were analyzed by the Clarkson University for total cyanide, metal cyanide complexes and free cyanide by microdiffusion method. Because of differences in results of two groundwater samples analyses from the two laboratories, the monitoring wells were re-sampled in September and total cyanide analyses were performed again by Chemtech Laboratory. As a result, the differences in the total cyanide results were resolved and the two laboratories were nearly equal in measuring total cyanide concentrations in groundwater samples from the site.

Results

Soil Samples:

There were 74 surface and subsurface soil samples collected and analyzed for total cyanide by Chemtech Laboratory following the NYS ELAP procedure. A subset of ten of these soil samples were also analyzed by Clarkson University for total cyanide, metal cyanide complexes, and free cyanide species. The soil samples analyzed by Chemtech showed total cyanide concentrations ranging from non-detect at <0.55 mg/Kg to a maximum value of 72 mg/Kg. However, because of significant differences in the sample preparation step for total cyanide analysis, Clarkson University laboratory found the highest total cyanide concentration in soil samples as 2840 mg/Kg. The soil analysis for metal cyanide complexes indicated that iron cyanide complexes were the most abundant component of the total cyanide levels. Two of the soil samples also contained some copper cyanide metal complex in addition to the most abundant iron cyanide complexes. The two highest levels of total cyanide in soils were found to be in samples that were collected from shallow depths extending from about 2.5 to 6 feet.

Tables 1 through 3 provide a summary of all data/results on soil samples reported by Chemtech and Clarkson University Laboratories. Figure 1 shows the scatter plot and a polynomial regression fit to the total cyanide concentrations in soils data from the two laboratories. The data and the correlation indicate that measured total concentrations reported by Chemtech for the soil samples are significantly lower than those reported by Clarkson University. For example, the maximum measured total cyanide concentration was reported as 72 mg CN/Kg by Chemtech Laboratory whereas the Clarkson University analysis, using the alkaline extract for sample preparation step from the split sample, was reported to contain 2840 mg CN/Kg. Conversely, Chemtech analysis reported a value of 8.11 mg CN/Kg for one of the soil samples for which Clarkson University reported a total cyanide concentration below detection level.

Our knowledge of how Chemtech and Clarkson carried out analysis of total cyanide leads to an understanding of the differences observed in the results from the two laboratories.

In accordance with the ELAP method, Chemtech performed direct distillation of the solid samples which generally results in underestimating total cyanide concentrations in a soil/solid waste sample. The alkaline extraction sample preparation step prior to distillation was performed by Clarkson University laboratory. Applying this additional extraction step almost always obtains higher values for total cyanide in a soil/solid waste sample and provides an analytical result that is between 85 to 95% of true total cyanide values in a solid waste sample. This is because the alkaline extraction releases cyanide complexes bound in the soil matrix due to the highest level of solubility for the cyanide compounds. In addition, there is some variability introduced by subsampling and by the non-homogeneous nature of the solid waste samples.

The results presented in Table 2 show that most of the total cyanide in the soil samples is in the form of iron-cyanide complexes. However, some $Cu(CN)_3$ is also present in four of the ten soil samples analyzed. Similarly, four of the ten soil samples also showed small amounts of free cyanide in the soil samples. Figure 2 shows the linear correlation between Total CN and $Fe (CN)_6$ measured in the 10 soil samples with almost a perfect correlation (R^2 = 0.9998) indicated. Figure 3 shows a scatter plot with polynomial regression curve to indicate again a strong correlation (R^2 = 0.9995) between measured $Cu(CN)_3$ and free cyanide in the soil samples from Elmira site. This plot suggests that presence of free CN in the soil samples is most likely influenced by the presence of $Cu(CN)_3$. It is well known that $Cu(CN)_3$ is an easily dissociable cyanide complex and is also highly unstable unless excess amount of Cu ion is present in solution. Therefore, it is conceivable that the presence of free cyanide in soil samples from the Elmira former MGP site is controlled by and related to the presence of $Cu(CN)_3$ in these soil samples.

There is no concentration standard for total cyanide in soil. As noted above, most of the total cyanide measured in the soil samples is in the form of iron-cyanide complexes, which are not known to be a toxicological concern (NGA 2004). Free cyanide comprised only a small portion of the total cyanide. As such, the total cyanide concentrations in soil do not pose a significant concern at the site.

Groundwater Samples:

Altogether, 30 groundwater samples were collected and analyzed for total cyanide by Chemtech Laboratory following the NYS ELAP procedure. Monitoring wells MW-9S and MW-10S were re-sampled in September 2004 to resolve apparent differences in analytical results from Chemtech and Clarkson University in the April samples. The re-sampling results for the two groundwater samples reconciled the differences in the data and matched the measured values reported by Clarkson University for the split samples in April, 2004. It appears that a dilution factor of 10 was not accounted for in the samples originally analyzed by Chemtech. Tables 4 and 5 present data on the groundwater samples collected and analyzed by Chemtech Laboratories and Clarkson University including the re-sampling of the two monitoring wells in September 2004. Figure 5 shows the scatter plot and the linear regression analysis of the total cyanide data for the groundwater samples analyzed by the two laboratories. Only the re-sampling results from Chemtech laboratory have been used in this graph. As shown in this graph, the two laboratories essentially measured the same total cyanide concentrations in all the groundwater samples analyzed.

The measured concentrations for total cyanide in groundwater samples from shallow zone monitoring wells ranged from non-detect (0.01mg/L) to a maximum value of 1.11 mg/L as reported by Chemtech Laboratory. The total cyanide concentrations in samples from the deep groundwater wells ranged from non-detect (0.01mg/L) to a maximum value of 0.067 mg/L. However, the free cyanide concentrations in the shallow and deep groundwater samples ranged from non-detect (<0.0023 mg/L) to a maximum value of 0.0057 mg/L.

The NYSDEC Class GA standard for total cyanide (0.200 mg/L) was exceeded in some cases. However, the two iron-cyanide complexes are the most abundant species in the groundwater samples collected and analyzed at this site. The iron cyanide complexes are not known to be of toxicological concern (NGA, 2004). Free cyanide is the primary chemical species of concern, but comprised little to none of the total cyanide measured in these groundwater samples. As such, cyanide in groundwater is not a human health issue, nor a significant concern at the site.

References

Ghosh, R, D. Nakles, I. Murarka, and E. Neuhaser 2004. Cyanide Speciation in Soil and Groundwater at Manufactured Gas Plant (MGP) Sites. Environmental Engineering Science. 21(6):752-767.

NGA (2004) Investigate Analytical methods, Aqueous Speciation and Toxicology of Cyanide at Manufactured Gas Plant (MGP) Sites in the State of New York, Final Report - Northeast Gas Association, New York, NY.

Table 1: Elmira Soil Analysis Results for Total Cyanide (mg CN/Kg Dry Weight)

Sample ID	Date Collected	Date Received	Date Analyzed	Chemtech Total CN	Clarkson Total CN
SB-215 8-10	9-9-03	9-19-03	9-22-03	<0.598	
SB-217 14-16	9-10-03	9-19-03	9-22-03	<0.536	
SB-217 18-20	9-10-03	9-19-03	9-22-03	<0.543	
SB-211 6-8	9-11-03	9-19-03	9-22-03	2.3	76.2
SB-211 20-22	9-11-03	9-19-03	9-22-03	<0.557	
SB-215 4-6	9-9-03	9-19-03	9-22-03	<0.603	
SB-216 34-.364	9-16-03	9-19-03	9-22-03	<0.536	
SB-210 28.5-29.3	9-17-03	9-19-03	9-22-03	<0.559	
SB-210 38.0-39.5	9-17-03	9-19-03	9-22-03	<0.547	<0.06
SB-208 10-11	9-18-03	9-19-03	9-22-03	<0.596	
SB-208 14.0-14.5	9-18-03	9-22-03	9-30-03	<0.575	
SB-209 2.7-3.5	9-19-03	9-22-03	9-30-03	72	2840
SB-209 6-7	9-19-03	9-22-03	9-30-03	4.6	92.3
SB-209 22.0-23.4	9-19-03	9-22-03	9-30-03	<0.554	
SB-207 30-32	9-22-03	9-27-03	10-3-03	<0.613	
SB-206 4-6	9-23-03	9-27-03	10-3-03	2.18	3.22
SB-206 40-42	9-23-03	9-27-03	10-3-03	<0.654	
SB-206 24-26	9-23-03	9-27-03	10-3-03	8.11	<0.06
SB-206 14-16	9-23-03	9-27-03	10-3-03	<0.55	
SB-203 8-10	9-24-03	9-27-03	10-3-03	24	660
SB-203 24-26	9-24-03	9-27-03	10-3-03	<0.545	
SB-202 22-24	9-26-03	9-27-03	10-3-03	1.24	<0.06
SB-218 22-24	10-1-03	10-4-03	10-10-03	<0.56	
SB-205 16-18	9-30-03	10-4-03	10-10-03	<0.543	<0.06
SB-201 16-18	9-30-03	10-4-03	10-10-03	<0.544	
SB-205 6-8	9-30-03	10-4-03	10-10-03	<0.598	
SB-221 16-18	10-2-03	10-4-03	10-10-03	<0.549	
SB-204 26-28	9-29-03	10-4-03	10-10-03	<0.535	
SB-222 4-6	10-2-03	10-4-03	10-10-03	24	1110
SB-222 8-10	10-2-03	10-4-03	10-10-03	<0.595	
SB-204 12-14	9-29-03	10-4-03	10-10-03	<0.579	
SB-214 6-8	10-6-03	10-10-03	10-17-03	<0.645	
SB-214 10-12	10-6-03	10-10-03	10-17-03	<0.645	
DUP-1	10-6-03	10-10-03	10-17-03	<0.621	
MW-0304D2-4	10-8-03	10-10-03	10-17-03	<0.610	
SS-201	4-6-04	4-7-04	4-8-04	<0.66	
SS-202	4-6-04	4-7-04	4-8-04	<0.58	

Table 1: (continued) Elmira Soil Analysis Results for Total Cyanide (mg CN/Kg Dry Weight)

Sample ID	Date Collected	Date Received	Date Analyzed	Chemtech Total CN	Clarkson Total CN
SS-203	4-6-04	4-7-04	4-8-04	<0.67	
SS-204	4-6-04	4-7-04	4-8-04	<<0.66	
SS-205	4-6-04	4-7-04	4-8-04	0.83	
SS-206	4-6-04	4-7-04	4-8-04	<0.54	
SS-207	4-6-04	4-7-04	4-8-04	2.07	
SS-208	4-6-04	4-7-04	4-8-04	<0.57	
SS-209	4-6-04	4-7-04	4-8-04	<0.53	
SS-210	4-6-04	4-7-04	4-8-04	<0.54	
SS-211	4-6-04	4-7-04	4-8-04	<0.55	
Dup-103	4-6-04	4-7-04	4-8-04	<0.55	
SB-230 (24.0-27.1)	3-3-04	3-6-04	3-12-04	1.08	
SB-235 (12.0-14.9)	3-4-04	3-6-04	3-12-04	3.42	
SB-234 (12.0-15.4)	3-5-04	3-6-04	3-12-04	3.06	
Pipe	2-27-04	3-6-04	3-12-04	21	
Dup-100-2-16-04	2-16-04	2-19-04	2-26-04	<0.55	
SB-213 (26.0-26.8	2-16-04	2-19-04	2-26-04	<0.56	
SB-213 (30.0-31.3)	2-16-04	2-19-04	2-26-04	<0.552	
SB-212 (32.0-33.2)	2-17-04	2-19-04	2-26-04	<0.535	
SB-212 (42.0-45.2)	2-17-04	2-19-04	2-26-04	<0.542	
SB-228 (36.0-36.9)	2-19-04	2-23-04	2-26-04	<0.662	
SB-228 (12.0-13.3)	2-18-04	2-23-04	2-26-04	2.66	
SB-227 (8.0-10.5)	2-19-04	2-23-04	2-26-04	<0.68	
SB-227 (34.0-35.2)	2-19-04	2-23-04	2-26-04	<0.62	
SB-227 (2.0-2.3)	2-19-04	2-23-04	2-26-04	<0.66	
SB-226 (48.0-49.5)	3-8-04	7-15-04	3-17-04	<0.571	
SB-226 (52.0-54.4)	3-8-04	3-15-04	3-17-04	<0.583	
SB-225 (20.0-21.2)	3-9-04	3-15-04	3-17-04	<0.536	
SB-224 (28.0-28.8)	3-11-04	3-15-04	3-17-04	<0.557	
SB-224 (40.0-41.0)	3-12-04	3-15-04	3-17-04	<0.548	
SB-237 (84.0-86.1)	3-30-04	4-3-04	4-7-04	<0.625	
SB-237 (38.0-39.1)	3-25-04	4-3-04	4-7-04	<0.588	
Dup-103	3-30-04	4-3-04	4-7-04	<0.639	
SB-239 (66.0-68.6)	4-1-04	4-3-04	4-7-04	<0.555	
SB-223 (36.0-38.6)	3-16-04	3-23-04	3-16-04	<0.543	
SB-223 (20.0-21.3)	3-15-04	3-23-04	3-26-04	<0.538	
SB-236 (18.0-19.8)	3-17-04	3-23-04	3-26-04	<0.550	

Table 2: Elmira Soil Analysis Results for Total, Metal, and Free Cyanide

				Concentration (mg CN/Kg Dry Weight)				
Sample ID	**Date Collected**	**Date Received**	**Date Analyzed**	**Total CN**	**Free CN**	**$Cu(CN)_3$**	**$Fe(CN)_6$**	**Unknown Iron complex**
SB211 6-8’	9-11-03	11-20-03	12-23-03	76.2	<0.06	<0.7	77.8	<2
SB210 38-39.5’	9-17-03	11-20-03	12-23-03	<0.06	0.08	<0.6	<0.8	<2
SB209 2.7-3.5’	9-19-03	11-20-03	12-23-03	2840	32.5	29.8	2640	44
SB209 6-7’	9-19-03	11-20-03	12-23-03	92.3	0.66	<0.8	96.7	2.7
SB206 4-6’	9-23-03	11-20-03	12-23-03	3.22	<0.05	0.56	2	<2
SB206 24-26’	9-23-03	11-20-03	12-23-03	<0.06	<0.05	<0.6	<0.9	<2
SB203 8-10’	9-24-03	11-20-03	12-23-03	660	3.8	9.9	609	17.4
SB202 22-24’	9-26-03	11-20-03	12-23-03	<0.06	<0.05	<0.6	<0.8	<2
SB205 16-18’	9-30-03	11-20-03	12-23-03	<0.06	<0.05	<0.6	<0.9	<2
SB222 4-6’	10-2-03	11-20-03	12-23-03	1110	<0.06	0.78	1070	3.4

Table 3: Elmira Soil Analysis Duplicates and Spike Recoveries

		Concentration (mg CN/Kg Dry Weight)				
Sample ID		**Total CN**	**Free CN**	**$Cu(CN)_3$**	**$Fe(CN)_6$**	**Unknown Complex**
SB211 6-8’		68.9	<0.05	<0.7	69.1	<2
SB211 6-8’		83.4	<0.06	<0.6	86.6	<2
SB203 8-10’		629	3.5	8.8	577	17.1
SB203 8-10’		692	4.1	10.9	641	17.7
Spike Recovery		95.4%	96.9%	95.6%	102.3%	--

Table 4: Elmira Groundwater Analysis Results for Total Cyanide

Sample ID	Date Collected	Date Received	Date Analyzed	Chemtech Total CN (mg/L)	Clarkson Total CN (mg/L)
NMW-0401S	4-28-04	4-29-04	5-5-04	0.029	
MW-0402S	4-28-04	4-29-04	5-5-04	<0.010	
MW-0403S	4-28-04	4-29-04	5-5-04	0.030	0.057
MW-0304D	4-28-04	4-29-04	5-5-04	<0.010	
MW-9S	4-27-04	4-29-04	5-5-04	0.022	0.226
MW-9S (resample)	9-3-04	9-8-04	9-10-04	0.241	
MW-0403S	4-29-04	4-30-04	5-5-04	0.406	
MS-11S	4-29-04	4-30-04	5-5-04	<0.010	
MW-0404S	4-29-04	4-30-04	5-5-04	<0.010	
MW-0405S	4-29-04	4-30-04	5-5-04	<0.010	
MW-0404D	4-29-04	4-30-04	5-5-04	0.067	
NMW-0402	4-29-04	4-30-04	5-5-04	0.052	
MW-0301S	4-29-04	4-30-04	5-5-04	0.019	
TMW-01	4-26-04	4-28-04	5-3-04	0.078	
TMW-02	4-26-04	4-28-04	5-3-04	<0.010	
MW-10S	4-26-04	4-28-04	5-3-04	0.110	1.220
MW-10S (resample)	9-3-04	9-8-04	9-10-04	1.110	
MW-0401S	4-26-04	4-28-04	5-3-04	0.090	
MW-01S	4-27-04	4-28-04	5-3-04	<0.010	
MW-01D	4-27-04	4-28-04	5-3-04	<0.010	
MW-8D	4-23-04	4-26-04	4-29-04	<0.010	
MW-9D	4-23-04	4-26-04	4-29-04	<0.010	
MW-02S	4-21-04	4-23-04	4-29-04	0.081	
MW-02D	4-21-04	4-23-04	4-29-04	<0.010	<0.003
MW-12D	4-21-04	4-23-04	4-29-04	<0.010	
MW-12S	4-21-04	4-23-04	4-29-04	<0.010	
MW-3S	4-21-04	4-23-04	4-29-04	0.169	0.186
MW-6S	4-22-04	4-23-04	4-29-04	0.647	0.787
MW-4S	4-22-04	4-23-04	4-29-04	0.017	
MW-7	4-22-04	4-23-04	4-29-04	0.286	0.321
MW-8S	4-22-04	4-23-04	4-29-04	0.057	
Dup-1	4-22-04	4-23-04	4-29-04	0.308	0.334

Table 5: Elmira Groundwater Analysis Results for Total Metal and Free Cyanide

Sample ID	Date Collected	Date Received	Date Analyzed	Total CN	Free CN	Fe $(CN)_x$	Unknown Iron Complex
				← mg/L →			
MW-2D	4-21-04	4-23-04	5-6-04	<0.003	<0.0023	ND	<0.005
MW-3S	4-21-04	4-23-04	5-6-04	0.186	0.0029	0.086	0.090
MW-6S	4-22-04	4-23-04	5-6-04	0.787	0.0031	0.037	0.738
MW-7	4-22-04	4-23-04	5-6-04	0.321	0.0044	0.182	0.048
MW -7 (Dup-1)	4-22—04	4-23-04	5-6-04	0.334	0.0057	0.181	0.051
MW-9S	4-27-04	4-28-04	5-6-04	0.226	<0.0023	0.070	0.134
MW-10S	4-27-04	4-28-04	5-6-04	1.220	<0.0023	1.080	0.017
MW-0403S	4-28-04	4-28-04	5-6-04	0.057	<0.0023	0.048	0.008
Reagent Blank	N/A	N/A	5-6-04	<0.003	<0.0023	ND	<0.005

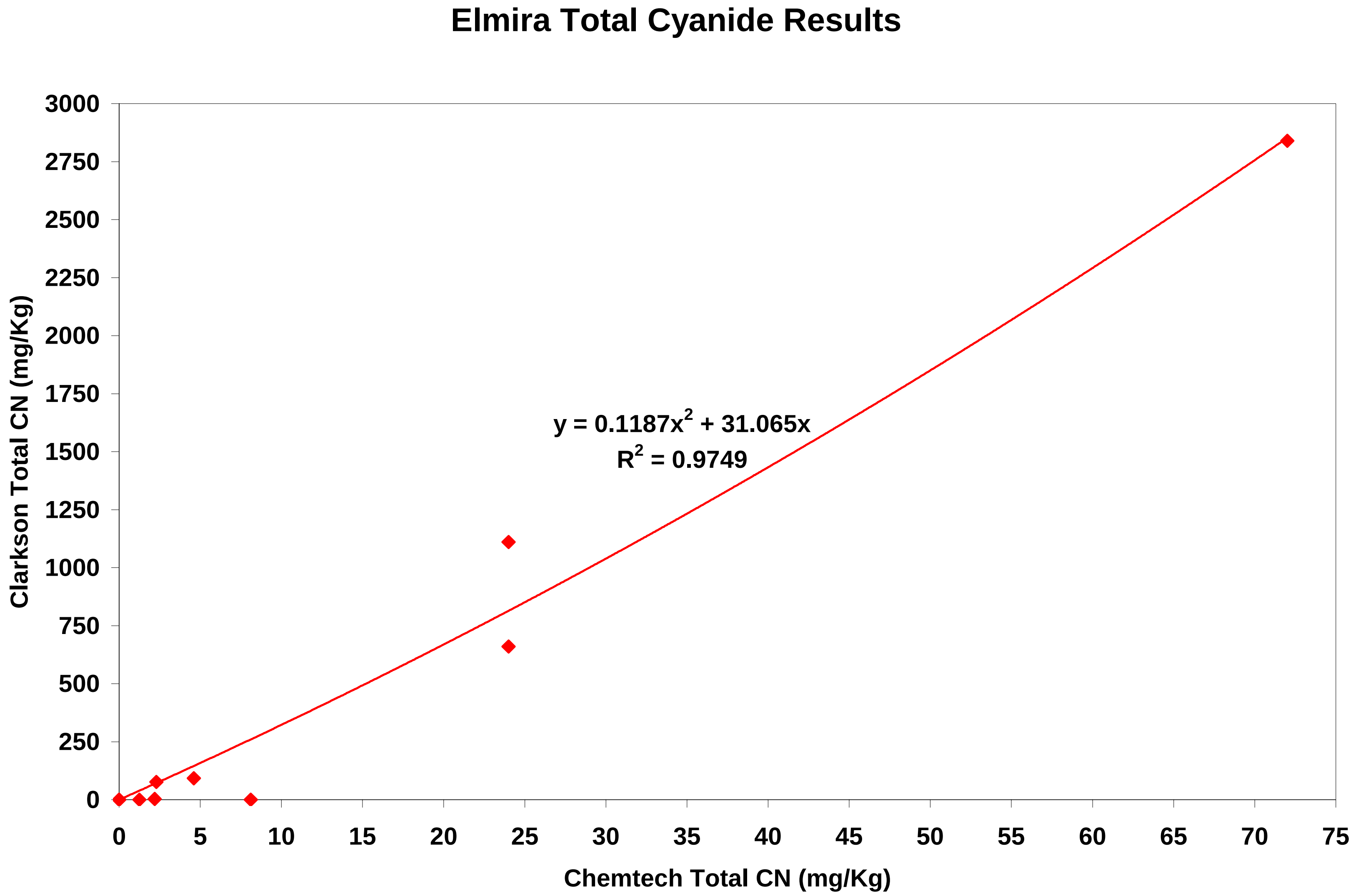


Figure 1 Scatter plot and Regression Curve Showing Correlation between Chemtech and Clarkson Measured Total Cyanide Concentrations in Soils

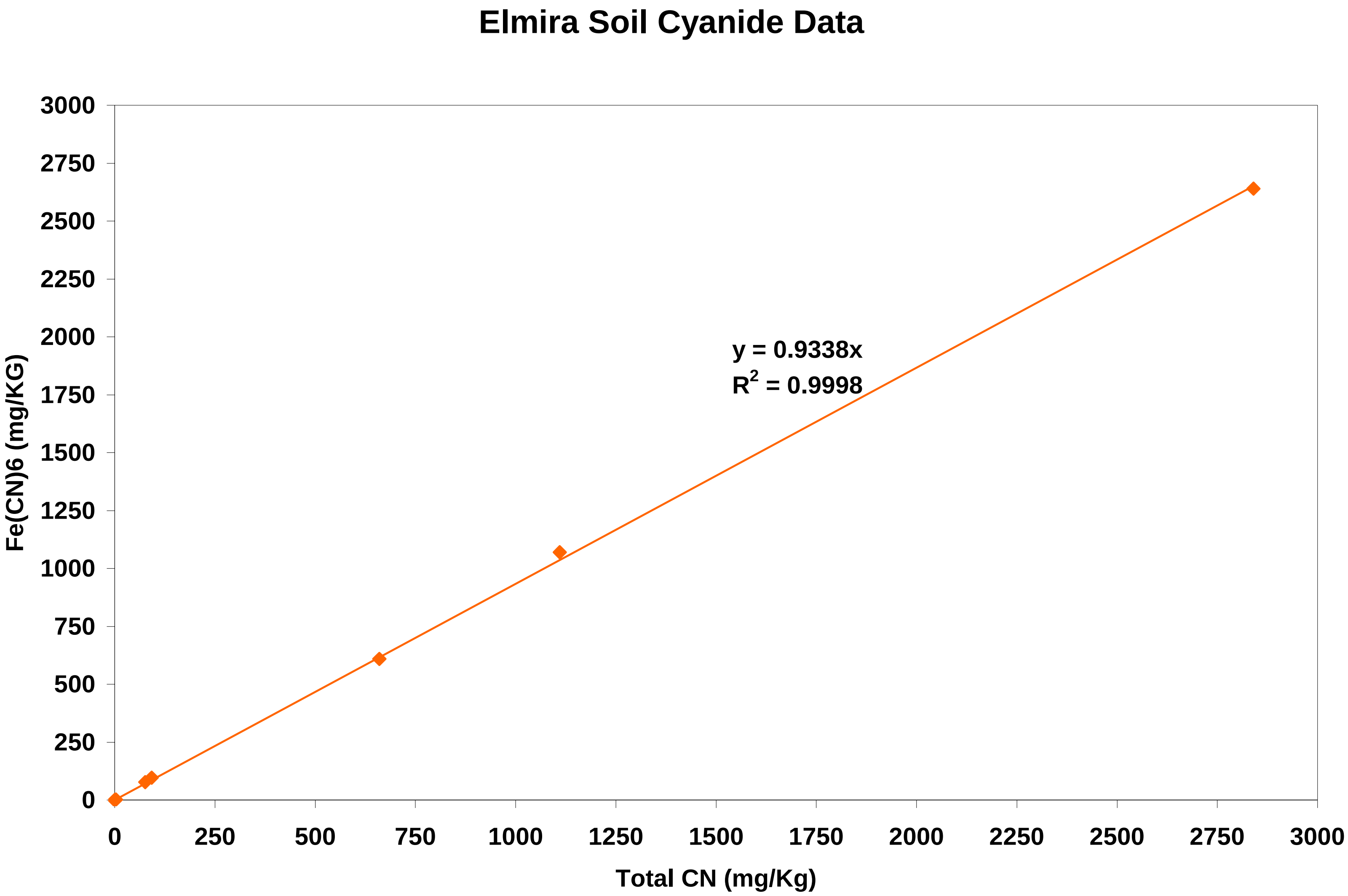


Figure 2 Scatter Plot and Regression Line Showing Correlation between Total Cyanide and Iron Cyanide Complex in Soils

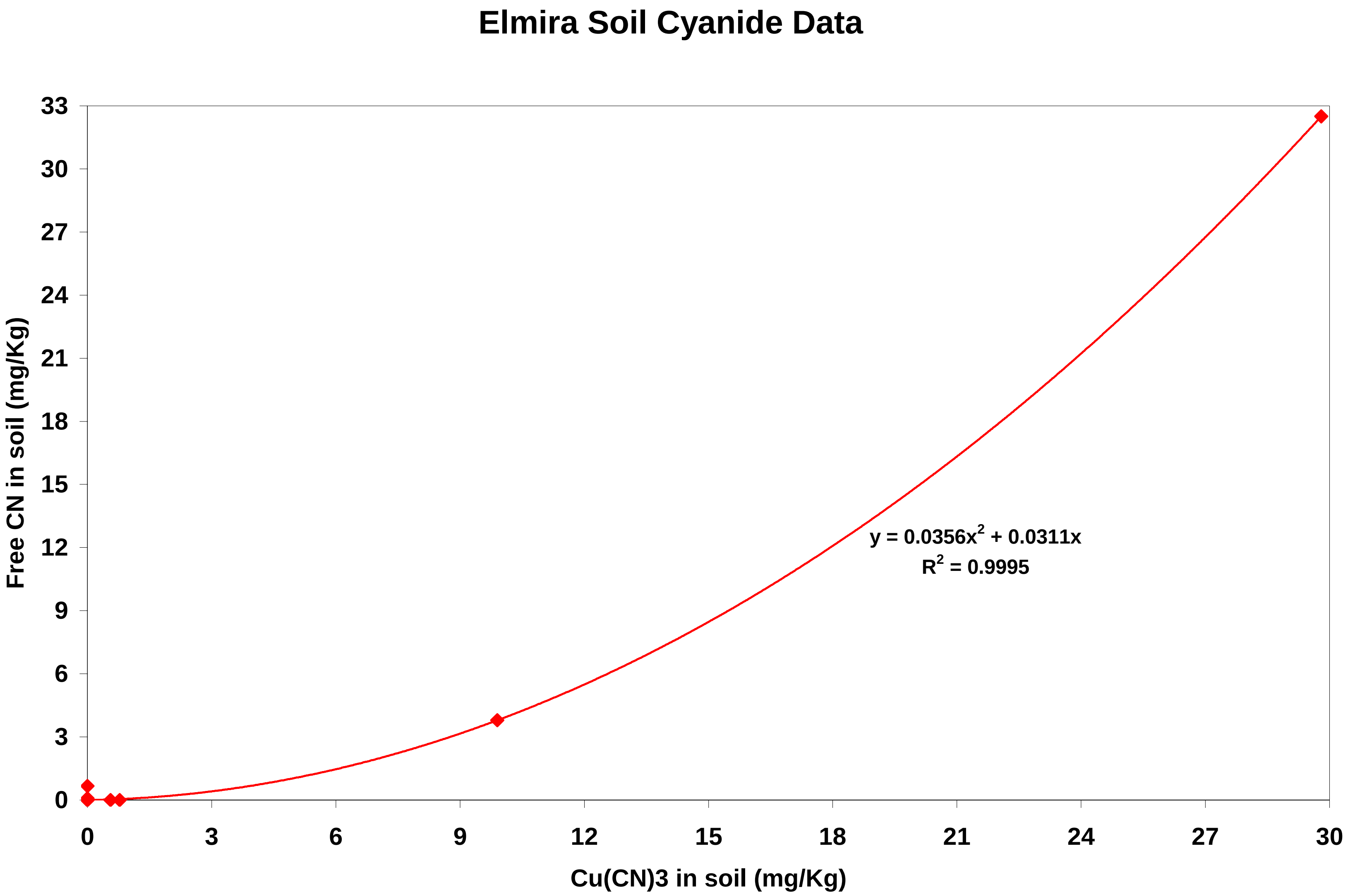


Figure 3 Scatter Plot and Correlation Between Copper Cyanide Complex and Free Cyanide in Soil Samples.

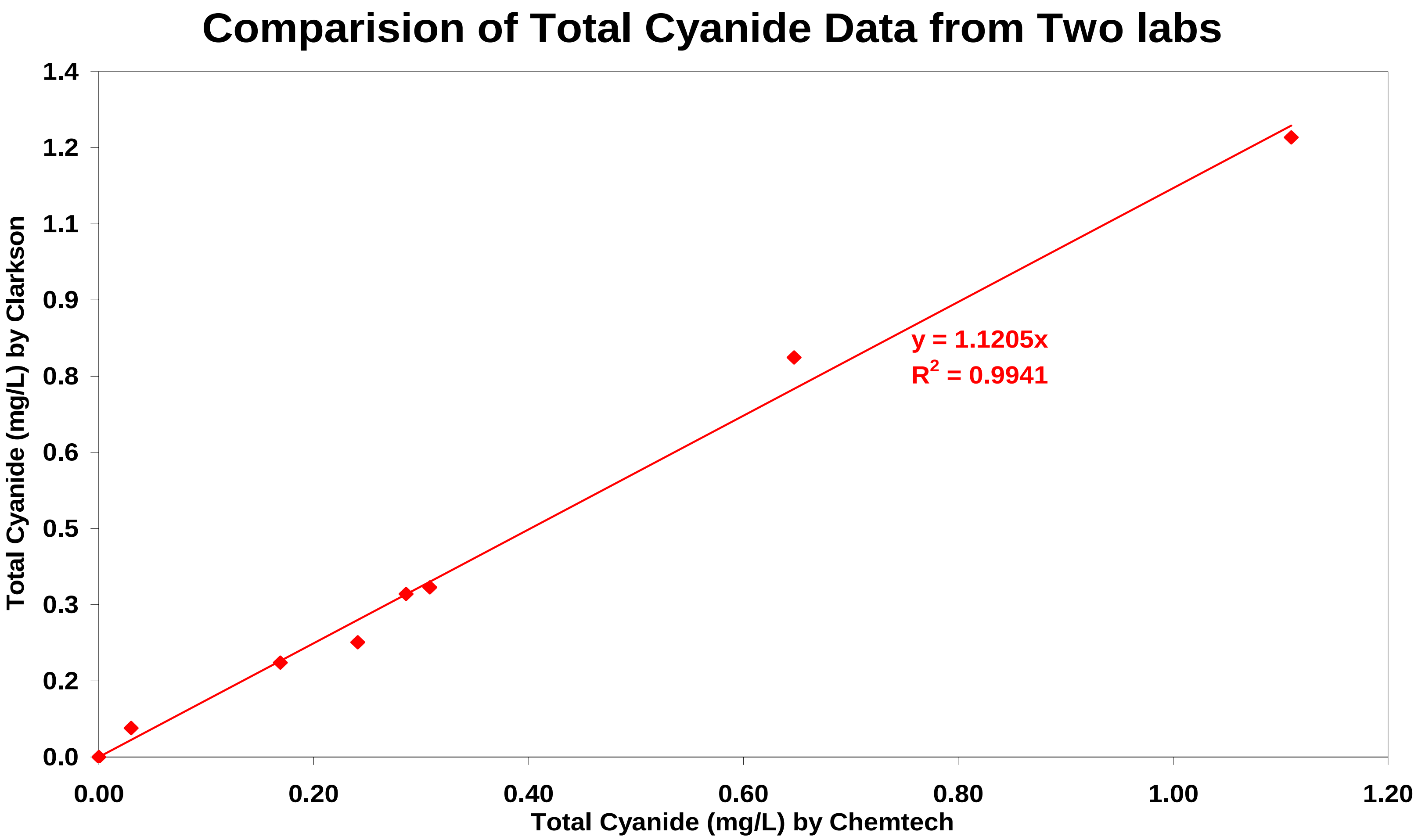


Figure 4 Scatter plot and correlation between total cyanide measured in groundwater samples by Clarkson and Chemtech

Appendix C

PAH Source Evaluation

BBL®
an ARCADIS company

Forensic Evaluation of Hydrocarbon Sources in Soils at the New York State Electric and Gas Corporation (NYSEG) Elmira (Madison Avenue) Former MGP Site in Elmira, New York

Ted Sauer and Helder Costa

INTRODUCTION

The findings of the source evaluation are intended to support the development of an accurate site model. By understanding which sources have impacted soil and groundwater in various portions of the site, significant sources and associated migration pathways can be more reliably identified and controlled.

An evaluation of hydrocarbon results (priority pollutant PAHs and TPH gas chromatograms) of approximately 70 soils samples indicated that the sample results would be best characterized by dividing the sample locations into 9 geographical areas at the Elmira site. These areas starting at the eastern most part of the site and moving west across the site correspond to former and present physical landmarks designated on the accompanying map (Figure 1).

Site Areas
Eastern Area (A)
Area Between Eastern Area and Distribution Holder Area (B)
Distribution Holder Area (C)
Oil Tank & Concrete Dike Area (D)
Area Between Distribution Holder and Oil/Tar Separator (E)
Oil/Tar Separator and Gas Holder Area (F)
Storage Yard Area (G)
Canal Area
Offsite Area

There were two samples in the dataset that were designated as potential Site Sources, the Pipe and Manhole samples. However, the evaluation concluded that these two samples, while similar to each other, are not significant sources of PAHs in NAPL and residues throughout the site. The specific Site Areas above in which the samples are located are provided in the data table (Table 1, top row) and shown in Figure 1.

In addition to other target analytes, all samples listed in Table 1 were analyzed for the 17 priority pollutant PAHs. Selected samples were also analyzed for TPH (total petroleum hydrocarbons) which included both a TPH concentration (Table 1) and gas chromatogram (i.e., GC fingerprint) from the analysis (Appendix A). The following samples were selected for TPH analysis based on field observations indicating the potential presence of petroleum:

Eastern Area (A): SB-204 (12-14’) – 3080 ppm, SB-204 (24-26’) – 10.8 ppm,
TP-204 (12’) – 5100 ppm, TP-206 (11.5’) – 3300 ppm,
TP-207 (13’) – 2000 ppm
Area Between Eastern and Distrib Holder Areas (B):
MW-0403 (12-15’) – 2520 ppm,
TP-212 (12.5’) – 1000 ppm,
Distribution Holder Area (C):
None

Oil Tank & Concrete Dike Area (D):	TP-214 (11’) – 3200 ppm, TP-215 (8’) – 2300 ppm
Area Between Distrib Holder and Oil/Tar Sep (E):	None
Oil/Tar Sep and Gas Holder Area (F):	None
Storage Yard Area (G):	SB-233 (12-13’) – 1500 ppm
Canal Area:	SB-205 (6-8’) – 4110 ppm, TP-208 (9.5’) – 3600 ppm TP-209 (10.5’) – 2900 ppm, TP-210 (9.0’) – 500 ppm
Offsite Area:	SB-242 (8.0-10.7’) – 1.6 ppm, SB-243 – 21.2 ppm

SUMMARY OF FINDINGS

There appear to be at least three distinct source types found at the site:

- Lower-temperature-process coal tar, likely from carbureted water gas (CWG) or similar process, also rich in priority pollutant PAHs; best represented by SB-210 within the Distribution Holder area;
- High-temperature-process coal tar, likely from coal carbonization (CC) or similar process(es), rich in priority pollutant PAHs; found in the **Pipe** and **Manhole** samples; and
- Petroleum, likely from product(s) stored/used on site for various purposes, mostly middle-distillate-range petroleum, low in priority pollutant PAHs but rich in alkylated, non-target PAHs and other hydrocarbons, was found in numerous locations throughout site.

Most of the soil samples at the site that showed elevated concentrations of TPH (> 100 ppm) and TPAH (>10 ppm) contained both petroleum and coal tar hydrocarbons. Except for the few samples in the small area between the Distribution Holder and Oil/Tar Separator (Area E), the type of tar in soils throughout the site was a CWG type, typical of the product found in SB-210 underneath the former Distribution Holder (**Scott, we assume that the Dist Holder has been removed? And we took a boring in the soil underneath?)** There were areas at the site where petroleum was not present although there was tar.

Based on the limited TPH analyses performed on site samples, the type of petroleum at the site was predominantly middle-distillate oil that is similar to a No. 6 type fuel oil with No. 2 fuel (e.g., diesel). No samples from Areas C, E, and F were analyzed for TPH; however, the total ion chromatograms from the GC/MS analysis (Method 8270) analysis were evaluated to determine presence of petroleum in samples from these areas. Subsurface soils in Area A, B, and D contained middle-distillate oil, from a likely common source, mixed with coal tar. There was no evidence of petroleum in soils in Areas C, E, and F. Soils in the Canal Area contained multiple types of petroleum, probably from different sources than that found in Areas A, B, and D.

DATA ANALYSIS

With the PAH data, diagnostic ratios (e.g., Fluoranthene/Pyrene [Fl/Py]), commonly used to identify sources of PAHs in environmental samples (Yunker et al., 2002, Costa et al., 2004, Costa and Sauer, 2004), were explored using simple scatter plots. These scatter plots of diagnostic PAH ratios help to identify PAH source signatures in site samples with the highest PAH concentrations (Figure 2) and differentiate PAH signatures associated with other sources.

From the TPH analysis of selected samples, the gas chromatographic “fingerprints” of selected samples were evaluated to determine the presence and type of petroleum (e.g., diesel, motor oil) or non-petroleum hydrocarbon product (e.g., coal tar) in the samples.

Although a number of PAH diagnostic ratios were calculated, two ratios were found to be most useful in evaluating sources of hydrocarbons at the site. These were

1) Fluoranthene/Pyrene (Fl/Py)
2) Benzo(a)anthracene/Chrysene (BAA/C)

These ratios were used in generating scatter plots of all the PAH data shown in Figures 3A and 3B. Except for a few samples, samples with TPAH concentrations less than 1 ppm were removed from the plots because typical urban background TPAH concentrations are greater than 1 ppm. Figure 3B plots the same ratios as Figure 3A, but with low-PAH concentration samples filtered to facilitate visual evaluation. The groupings of samples in these plots indicate a common source of PAHs for the majority of site soils.

The GC fingerprints from the TPH analysis of selected samples were used to verify the presence of petroleum in the samples, and if petroleum was present, the type of oil in the samples. For this site study, both the PAH diagnostic ratios and GC fingerprints were essential in evaluating potential sources of hydrocarbons and PAHs at the site.

PAH Diagnostic Ratios and Total PAH Results

As illustrated in Figures 3A and 3B, none of the site soils cluster around the **Pipe** and **Manhole** samples. The diagnostic ratios and high PAH concentration of the Pipe and Manhole samples are characteristic of coal tar/creosote from a CC process, rather than a CWG process tar. Except for a scattered set of samples with Fl/Py > 1 (e.g., TP-210 [Canal Area]), only the samples from Area E, the area between the Distribution Holder and the Oil/Tar Separator, show a characteristic that would be considered influenced principally from a CC-type tar, and may be influenced by the same source evident in the **Pipe** and **Manhole** samples. With the PAH results alone, the presence of petroleum in Area E samples is not known.

Most all samples throughout the site have a hydrocarbon characteristic represented by the ellipse in Figure 3. The samples that fall outside the ellipse are mostly those from the Canal Area (non-solid diamond in figure) where petroleum of different types and potential sources was observed. In Figure 3, the Fl/Py ratio suggests that the most of the samples have PAHs from a CWG and possibly petroleum source whereas the BAA/C ratio indicates that the samples have PAHs from a combustion/pyrogenic (e.g., coal tar) source. This slight contradiction in source signatures (petroleum and coal tar) is probably due to a mixture of petroleum and coal tar in the samples. In most cases, the high concentrations of priority pollutant PAHs in coal tar-type products relative petroleum generally overwhelms any representation of petroleum PAH signature in the sample using either of these ratios.

The Fl/Py ratios of the samples within the ellipse in Figure 3 fall within two areas of source designation: ‘petroleum’ signature and ‘CWG tar’ signature. From Figure 2 which shows the Fl/Py ratios relative to total PAH concentrations, most of the samples in the ellipse in Figure 3 have sufficiently high PAH concentrations to suggest that the major source of PAHs is from coal tar. PAHs from petroleum products or used petroleum products would only contribute on the order of 1 to 10 ppm of total priority pollutant PAHs to the soils. Concentrations much greater than 10 ppm would suggest a pyrogenic (coal tar-type) source. As for the type of tar in these samples, because the Fl/Py ratios are considerably less than 1.0, CWG process tar is most likely. CWG tars have typical Fl/Py ratios between 0.66 and 1.0 whereas CC tars and creosote typically have ratios in the 1.1 to 1.5 range. The presence of petroleum in samples could lower the Fl/Py ratio of the CWG tar. Thus, it appears that except for the on-site Area E samples, the tar present in soils at the site is from the CWG process.

As discussed above, samples were selected for TPH analysis based on observations of the soil boring logs and to determine the presence of petroleum in samples representative of the site. No samples from Areas C, E, and F (Figure 1) were selected. In almost every sample selected for TPH analysis, petroleum of many types, principally diesel, was evident.

TPH Analysis Results

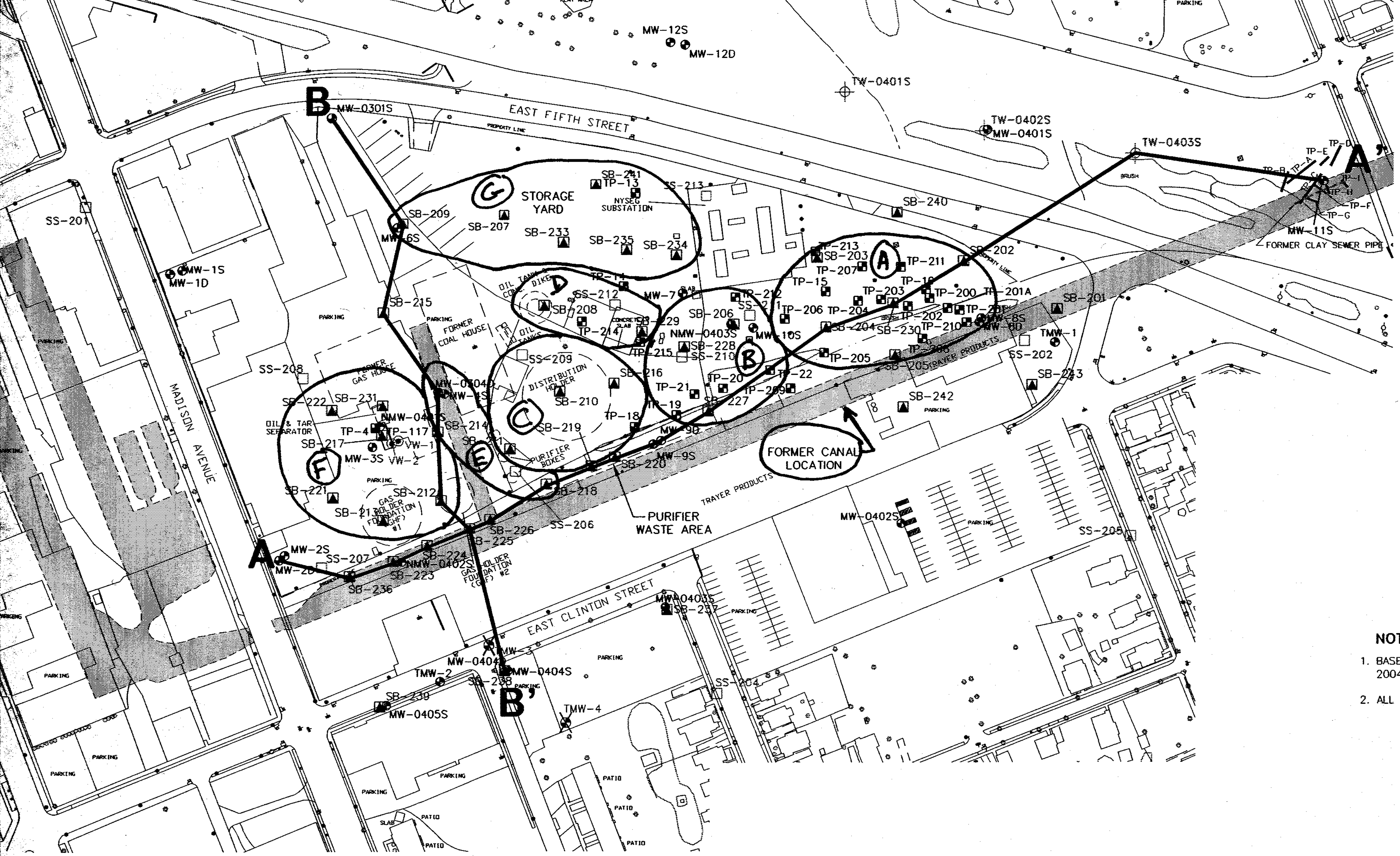
In all the samples selected for TPH analysis, except offsite sample SB-242 (8.0-10.7'), there was evidence from the GC fingerprints of some type of petroleum product, principally middle distillate-type oil, similar to No. 6 fuel oil with No. 2 oil (e.g., diesel). There was also motor oil-type oil in some of the samples. In addition to petroleum, most of the samples contained a coal tar product which was characterized by relatively high total PAH concentrations (> 50 ppm) and large peaks in the GC fingerprint. Samples from C, E, and F were not analyzed for TPH; however, the total ion chromatograms of the GC/MS analysis (Method 8270) of representative samples in these areas were evaluated to determine the presence of petroleum.

The GC fingerprints of samples TP-204, TP-206, TP-207, and TP-211 in Area A were very similar to each other and very similar to those of TP-212 in Area B, and TP-214 and TP-215 in Area D, suggesting a common source of petroleum in subsurface soils of Areas A, B, and D. The petroleum in these samples looked to be middle-distillate oil (MD1 in figures) mixed with a coal tar product. SB-204, which was also in Area A, had heavy-distillate oil also, probably motor (crankcase) oil, with diesel and coal tar. SB-233 in Area G had a middle distillate oil fingerprint with evidence of some coal tar, but not similar to others above.

The sample from MW-0403 in Area B contained middle-distillate oil according to the GC fingerprint (no PAH analysis was performed on this sample). However, although this sample was located in almost the same position as SB-206 in Area B, the SB-206 samples did not contain the petroleum (or any petroleum) that the MW sample contained. Only coal tar was present.

The samples in the Canal Area (SB-205, TP-208, TP-209, and TP-210) contained different types of oils than those in the other areas (Areas A, B, and D), and no evidence of coal tar in the GC fingerprints in conjunction with low levels of total PAHs (<10 ppm). Some Canal samples contained coal tar but were not analyzed for TPH. SB-205 contained only heavy-distillate oil (e.g., motor oil) with no evidence of tar. TP-208 and TP-209 had very similar middle-distillate oils (common source) with no tar, but were different than those TP samples in Areas A, B, and D. TP-210 had middle-distillate oil with possibly low levels of coal tar. The Offsite samples (SB-242 and SB-243) contained low levels of a middle distillate oil.

The representative samples from Area C, E, and F, which included SB-210 and SB-211 from Area C, SB-214 from Area E, and SB-212, SB-213, SB-217, and SB-222 from Area F, showed no or negligible evidence of petroleum in the TICs from the Method 8270 analysis. For those samples above background PAH concentrations, only coal tar was present in the samples.



LEGEND:

●	MONITORING WELL; SHALLOW (S), DEE TRAYER WELL (TMW)
▲	SOIL BORING
▪	TEST PIT
⊕	ABANDONED TEMPORARY MONITORING
☐	SURFACE SOIL SAMPLING LOCATION
✕	ABANDONED MONITORING WELL
◉	MGP VAULTED WELL
▪	RECHARGE PIT
•	POWER POLE
-○-	UTILITY POLE W/GUY
○	LIGHT POLE
○-○	POST, SIGN
▫	CATCH BASIN
○	TRAFFIC LIGHT
▾	MANHOLE
A—A'	CROSS SECTION LOCATION

NOTES:

1. BASE MAP SUPPLIED BY NYSEG, LATEST REVISION DATE 2004, AT A SCALE OF 1"= 60'.
2. ALL LOCATIONS ARE APPROXIMATE.

0 80' 160'
GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP S
SUPPLEMENTAL REMEDIAL INVESTI

FIGURE 1 - SITE MAP

Figure 2. TPAH Signature Screening For Area Soils at the Elmira Site (Petroleum interpreted from GC fingerprints)

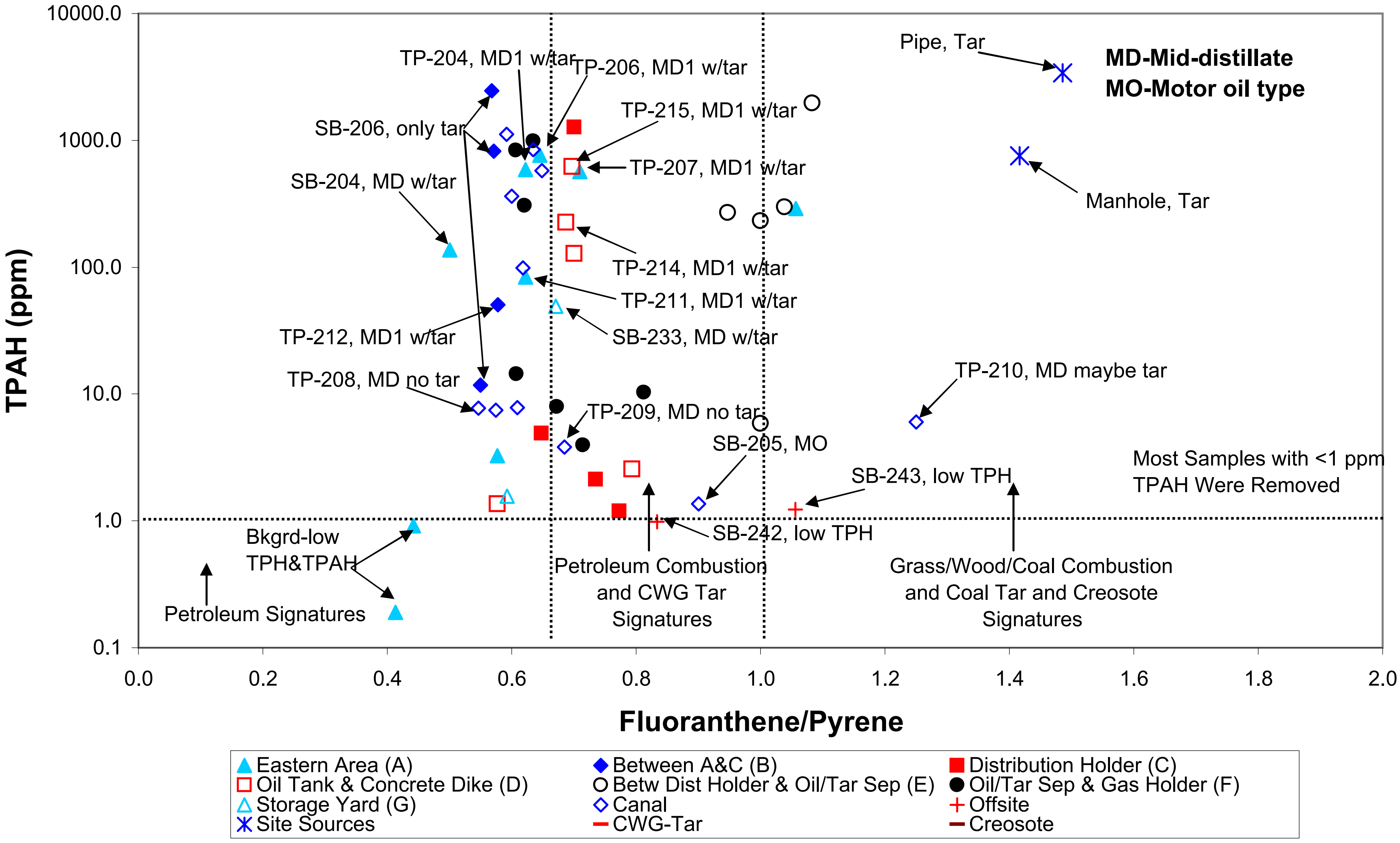


Figure 3A. BAA/C vs Fl/Py of All Samples in Area Soils at the Elmira Site (<1 ppm TPAH removed) - Yunker et al. (2002)

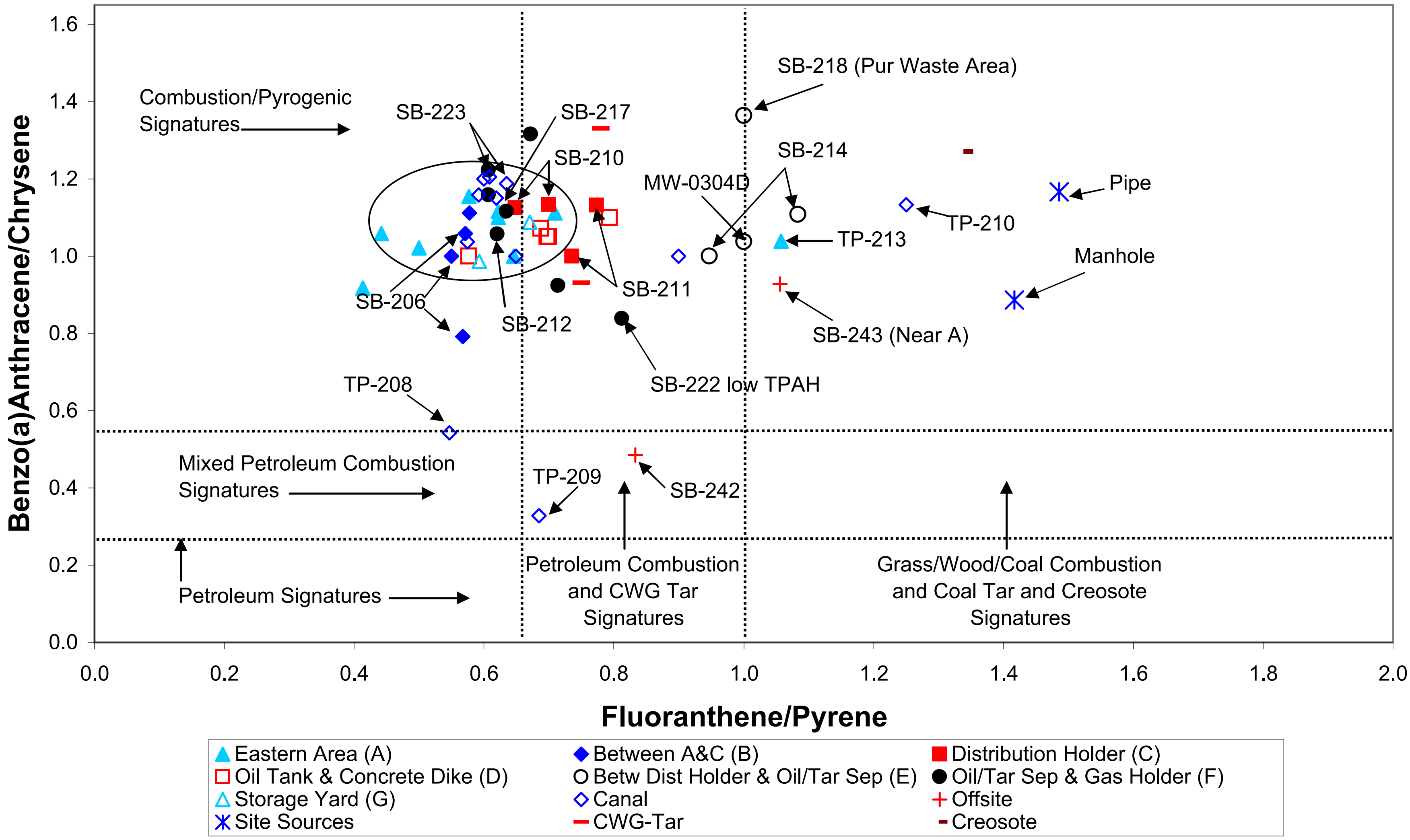
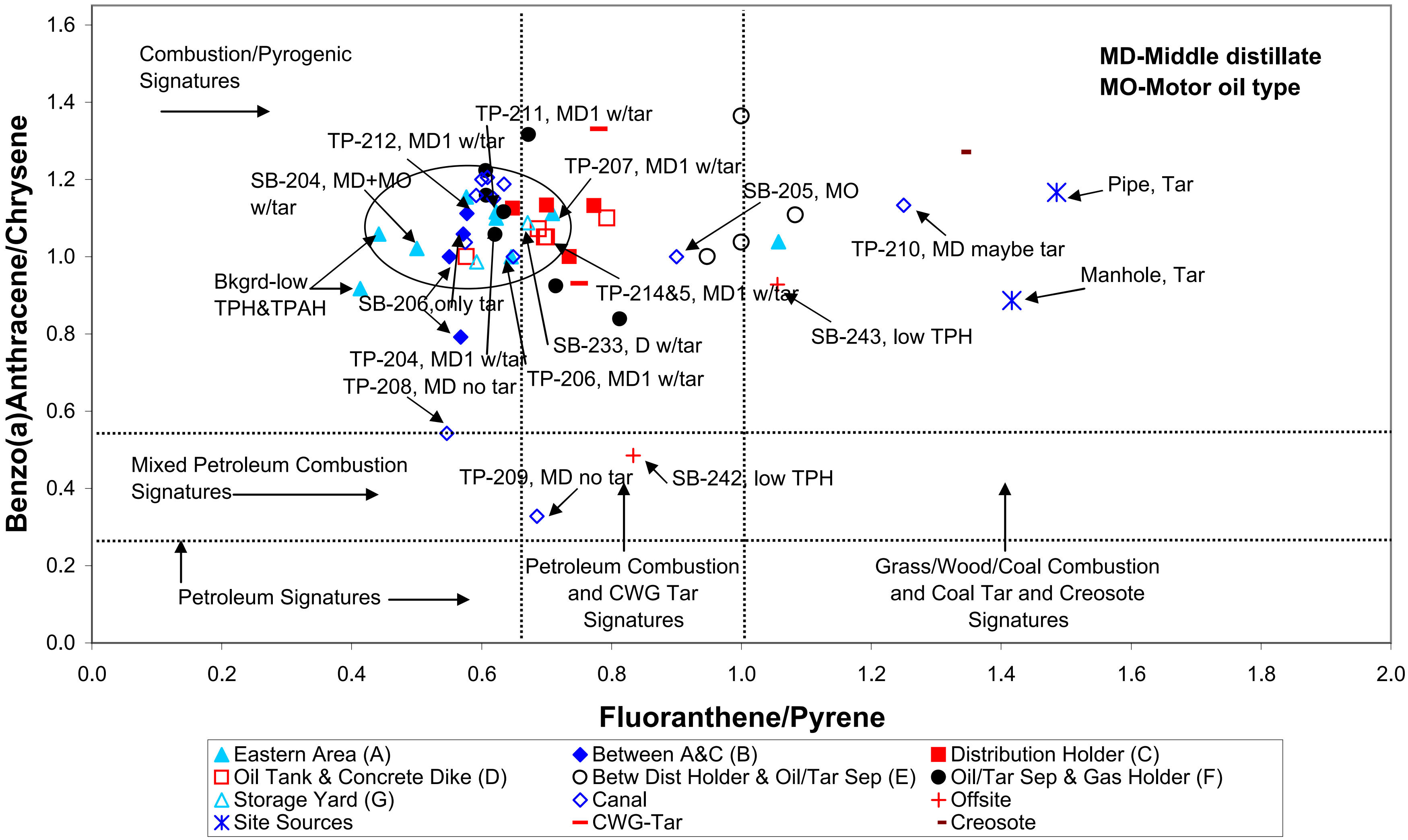


Figure 3B. BAA/C vs Fl/Py of All Samples in Area Soils at the Elmira Site (Petroleum interpreted from GC fingerprints)



DRAFT

TABLE 1

NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION

SUBSURFACE SOIL ANALYTICAL RESULTS

General Areas of site	A	A	A	A	A	A	A	A	A	A	A	B	B	B
Sample ID	**SB-202**	**SB-203**	**SB-204**	**SB-204**	**SB-230**	**TP-204**	**TP-204**	**TP-206**	**TP-207**	**TP-211**	**TP-213**	**SB-206**	**SB-206**	**SB-206**
Sample Depth	**(22 - 24')**	**(24 - 26')**	**(12 - 14')**	**(26 - 28')**	**(24.0 - 27.1')**	**(12.0')**	**(12.0')**	**(11.5')**	**(13.0')**	**(9.5')**	**(10.5')**	**(4 - 6')**	**(14 - 16')**	**(24 - 26')**
Sample Date	**9/26/2003**	**9/24/2003**	**9/29/2003**	**9/29/2003**	**3/3/2004**	**2/24/2004**	**2/24/2004**	**2/25/2004**	**2/25/2004**	**2/26/2004**	**2/26/2004**	**9/23/2003**	**9/23/2003**	**9/23/2003**
Sample Type	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**DUP**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
VOCs (ppm)												SB-206 is same loc as MW-0403S		
Benzene	**0.0032**	**0.003**	0	**0.001**	0	--	--	--	--	--	--	**1.1**	**0.1**	**0.0045**
Ethylbenzene	**0**	**0.0007**	**0.17**	0	0	--	--	--	--	--	--	**10**	**6.5**	**0.012**
Toluene	**0.0072**	**0.0065**	0	**0.0028**	**0.0033**	--	--	--	--	--	--	**0.79**	**0.088**	**0.012**
Xylenes, Total	**0.0054**	**0.0062**	**0.097**	**0.0025**	0	--	--	--	--	--	--	**7.7**	**3.9**	**0.02**
Total BTEX	**0.0158**	**0.0164**	**0.267**	**0.0063**	**0.0033**	--	--	--	--	--	--	**19.59**	**10.588**	**0.0485**
SVOCs (ppm)														
2-Methylnaphthalene	0	0	0	0	**0.097**	**4.7**	**6.2**	**14**	**47**	**2.9**	**0.71**	**120**	**100**	**0.48**
Acenaphthene	0	**0.0087**	**19**	**0.098**	**0.24**	**74**	**83**	**82**	**67**	**12**	**3.5**	**85**	**60**	**0.61**
Acenaphthylene	0	**0.0087**	**1.5**	**0.013**	**0.077**	**8.5**	**10**	**14**	**10**	**1.4**	**2.6**	**71**	**22**	**0.26**
Anthracene	0	**0.0083**	**7.4**	**0.056**	**0.24**	**38**	**42**	**47**	**34**	**6.3**	**7.4**	**78**	**36**	**0.63**
Benzo(a)anthracene	0	**0.011**	**4.9**	**0.036**	**0.15**	**22**	**24**	**26**	**20**	**2.9**	**27**	**76**	**18**	**0.56**
Benzo(a)pyrene	0	**0.011**	**6**	**0.047**	**0.13**	**25**	**28**	**32**	**21**	**2.9**	**37**	**100**	**16**	**0.63**
Benzo(b)fluoranthene	0	**0.0077**	**2.7**	**0.017**	**0.055**	**11**	**12**	**13**	**8.5**	**1.5**	**31**	**50**	**5.6**	**0.3**
Benzo(g,h,i)perylene	0	**0.0086**	**3.1**	0	**0.059**	**14**	**13**	**19**	**8.8**	**1.1**	**8.4**	**88**	**8.4**	**0.35**
Benzo(k)fluoranthene	0	**0.0098**	**3.9**	**0.024**	**0.08**	**15**	**19**	**20**	**13**	**1.8**	**35**	**66**	**9.8**	**0.42**
Chrysene	0	**0.012**	**4.8**	**0.034**	**0.13**	**20**	**24**	**26**	**18**	**2.6**	**26**	**96**	**17**	**0.56**
Dibenz(a,h)anthracene	0	0	**0.62**	0	0	**2.5**	**2.6**	**3.5**	**2.1**	**0.31**	**3.6**	**13**	**2**	**0.022**
Fluoranthene	0	**0.019**	**12**	**0.084**	**0.3**	**56**	**64**	**71**	**39**	**5.6**	**37**	**210**	**36**	**1.1**
Fluorene	0	0	**6.8**	**0.041**	**0.17**	**29**	**32**	**37**	**32**	**5.2**	**1.6**	**71**	**34**	**0.46**
Indeno(1,2,3-cd)pyrene	0	0	**2.2**	0	**0.038**	**10**	**9.6**	**13**	**6.4**	**0.91**	**12**	**54**	**5.7**	**0.24**
Naphthalene	0	0	**0.28**	**0.01**	**0.11**	**18**	**24**	**38**	**76**	**11**	**2.8**	**250**	**250**	**0.66**
Phenanthrene	0	**0.039**	**38**	**0.26**	**0.86**	**150**	**170**	**200**	**110**	**16**	**19**	**660**	**140**	**2.5**
Pyrene	0	**0.046**	**24**	**0.19**	**0.52**	**90**	**100**	**110**	**55**	**9**	**35**	**370**	**63**	**2**
Total PAHs	0	**0.1898**	**137.2**	**0.91**	**3.256**	**587.7**	**663.4**	**765.5**	**567.8**	**83.42**	**289.61**	**2,458**	**823.5**	**11.782**
Misc. Parameters														
Total Diesel Range Organics	--	--	**3,080**	**10.8**	--	**5,100**	**4,800**	**3,300**	**2,000**	--	--	--	--	--
			GC-No2&6	GC-nothing		GC-D		GC-D	GC-D	GC				
TPAH/DRO	#VALUE!	#VALUE!	0.04	0.08	#VALUE!	0.12	0.14	0.23	0.28	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	< 1 ppm						DUP							
Fl/Py		0.41	0.50	0.44	0.58	0.62		0.65	0.71	0.62	1.06	0.57	0.57	0.55
BAA/C		0.92	1.02	1.06	1.15	1.10		1.00	1.11	1.12	1.04	0.79	1.06	1.00
BAA/BaP		1.00	0.82	0.77	1.15	0.88		0.81	0.95	1.00	0.73	0.76	1.13	0.89
INDP/BGHI		0.00	0.71		0.64	0.71		0.68	0.73	0.83	1.43	0.61	0.68	0.69
A/P		0.21	0.19	0.22	0.28	0.25		0.24	0.31	0.39	0.39	0.12	0.26	0.25

See Notes on Page 7.

TABLE 1

NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION

SUBSURFACE SOIL ANALYTICAL RESULTS

General Areas of site	B	B	B	B	B	B	B	D	D	D	D	D	Canal	Canal
Sample ID	**SB-206**	**NMW-0403S**	**SB-227**	**SB-227**	**SB-228**	**SB-228**	**TP-212**	**TP-214**	**TP-215**	**SB-208**	**SB-208**	**SB-229**	**SB-201**	**SB-205**
Sample Depth	**(40 - 42')**	**(12 - 15')**	**(8 - 10.5')**	**(34 - 35.2')**	**(12 - 13.3')**	**(36 - 39')**	**(12.5')**	**(11.0')**	**(8.0')**	**(10 - 11')**	**(14 - 14.5')**	**(30.0 - 31.6')**	**(16 - 18')**	**(6 - 8')**
Sample Date	**9/23/2003**	**3/22/2004**	**2/19/2004**	**2/19/2004**	**2/18/2004**	**2/19/2004**	**2/26/2004**	**2/26/2004**	**2/26/2004**	**9/18/2003**	**9/18/2003**	**3/1/2004**	**9/30/2003**	**9/30/2003**
Sample Type	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
VOCs (ppm)														
Benzene	0	**0**	0	0	**0.0015**	**0.0007**	--	--	--	0	**0.0038**	**0.0005**	**0.0012**	**0**
Ethylbenzene	0	0	0	0	**0.0006**	0	--	--	--	0	**0.0012**	**0.0073**	0	0
Toluene	0	0	0	**0.013**	**0.0062**	**0.0029**	--	--	--	0	**0.0096**	**0.023**	**0.0028**	**0**
Xylenes, Total	R	0	**0.0013**	**0.0014**	**0.0061**	**0.0013**	--	--	--	0	**0.01**	**0.012**	**0.0017**	**0**
Total BTEX	0	0	**0.0013**	**0.0144**	**0.0144**	**0.0049**	--	--	--	0	**0.0246**	**0.0428**	**0.0057**	**0**
SVOCs (ppm)		0												
2-Methylnaphthalene	0	0	**0.014**	0	0	0	**3.9**	**1.5**	**12**	0	0	**0.19**	0	0
Acenaphthene	**0.032**	0	**0.0084**	0	0	0	**1.4**	**30**	**67**	**16**	**0.15**	**0.1**	**0.013**	**0**
Acenaphthylene	**0.014**	0	**0.022**	0	0	0	**3.5**	**3.7**	**13**	**1.7**	**0.02**	**0.075**	0	0
Anthracene	**0.026**	0	**0.017**	0	0	0	**3.2**	**16**	**45**	**11**	**0.1**	**0.16**	**0.034**	**0**
Benzo(a)anthracene	**0.024**	0	**0.067**	0	0	0	**2**	**9**	**21**	**6.3**	**0.067**	**0.11**	**0.063**	**0**
Benzo(a)pyrene	**0.025**	0	**0.046**	0	0	0	**2.6**	**11**	**22**	**6.8**	**0.086**	**0.1**	**0.054**	**0**
Benzo(b)fluoranthene	**0.014**	0	**0.039**	0	0	0	**1.4**	**4.2**	**8.3**	**2.6**	**0.034**	**0.042**	**0.038**	**0**
Benzo(g,h,i)perylene	**0.017**	0	0	0	0	0	**0.33**	**5**	**8**	**3.9**	**0.048**	**0.055**	**0.026**	**0**
Benzo(k)fluoranthene	**0.02**	0	**0.058**	0	0	0	**1.9**	**6.5**	**13**	**4.8**	**0.057**	**0.071**	**0.052**	**0**
Chrysene	**0.03**	0	**0.082**	0	0	0	**1.8**	**8.4**	**20**	**6**	**0.067**	**0.1**	**0.061**	**0**
Dibenz(a,h)anthracene	0	0	0	0	0	0	**0.12**	**0.9**	**2.1**	**0.25**	0	0	0	0
Fluoranthene	**0.044**	0	**0.088**	0	0	0	**4.1**	**22**	**46**	**14**	**0.15**	**0.23**	**0.14**	**0.27**
Fluorene	**0.028**	0	0	0	0	0	**2.3**	**11**	**37**	**6.7**	**0.062**	**0.14**	**0.014**	**0.18**
Indeno(1,2,3-cd)pyrene	**0.012**	0	**0.018**	0	0	0	**0.38**	**3.6**	**6.2**	**2.8**	**0.033**	**0.041**	**0.026**	**0**
Naphthalene	**0.087**	0	**0.021**	0	0	0	**4.5**	**8.1**	**95**	**0.19**	0	**0.31**	0	0
Phenanthrene	**0.12**	0	**0.055**	**0.026**	0	0	**10**	**52**	**140**	**25**	**0.23**	**0.54**	**0.07**	**0.61**
Pyrene	**0.084**	0	**0.098**	**0.014**	0	0	**7.1**	**32**	**66**	**20**	**0.26**	**0.29**	**0.11**	**0.3**
Total PAHs	**0.577**	0	**0.6334**	**0.04**	0	0	**50.53**	**224.9**	**621.6**	**128.04**	**1.364**	**2.554**	**0.701**	**1.36**
Misc. Parameters														
Total Diesel Range Organics	--	2520	--	--	--	--	**1,000**	**3,200**	**2,300**	--	--	--	0	4110
		GC-D					GC-D	GC=TP-212	GC=TP-212					GC-MO
TPAH/DRO	#VALUE!	0.00	#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.05	0.07	0.27	#VALUE!	#VALUE!	#VALUE!	#DIV/0!	0.00
	< 1 ppm		< 1 ppm										< 1 ppm	
Fl/Py							0.58	0.69	0.70	0.70	0.58	0.79		0.90
BAA/C							1.11	1.07	1.05	1.05	1.00	1.10		1.00
BAA/BaP							0.77	0.82	0.95	0.93	0.78	1.10		
INDP/BGHI							1.15	0.72	0.78	0.72	0.69	0.75		
A/P							0.32	0.31	0.32	0.44	0.43	0.30		0.00

See Notes on Page 7.

TABLE 1

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NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION

SUBSURFACE SOIL ANALYTICAL RESULTS

General Areas of site	Canal	Canal	Canal	Canal	Canal	Canal	Canal	Canal	Canal	Canal	Canal	Canal	Offsite	Offsite
Sample ID	**SB-205**	**SB-223**	**SB-223**	**SB-224**	**SB-224**	**SB-225**	**SB-226**	**SB-226**	**SB-236**	**TP-208**	**TP-209**	**TP-210**	**SB-237**	**SB-237**
Sample Depth	**(16 - 18')**	**(20 - 21.3')**	**(36 - 38.6')**	**(28 - 28.8')**	**(40 - 41')**	**(20 - 21.2')**	**(48 - 49.5')**	**(52 - 54.4')**	**(18 - 19.8')**	**(9.5')**	**(10.5')**	**(9.0')**	**(38 - 39.1')**	**(84 - 86.1')**
Sample Date	**9/30/2003**	**3/15/2004**	**3/16/2004**	**3/11/2004**	**3/12/2004**	**3/9/2004**	**3/8/2004**	**3/8/2004**	**3/17/2004**	**2/25/2004**	**2/25/2004**	**2/26/2004**	**3/25/2004**	**3/30/2004**
Sample Type	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
VOCs (ppm)														
Benzene	**0.0012**	**0.11**	**0.026**	**0.23**	**0.17**	**0.27**	**3.9**	**0.0035**	**0.0005**	--	--	--	0	0
Ethylbenzene	0	**5.9**	**0.14**	**5.2**	**5.6**	**2.7**	**44**	**0.011**	0	--	--	--	0	**0.0008**
Toluene	**0.0028**	**1.4**	**0.037**	**0.39**	**1.1**	**0.17**	**18**	**0.011**	**0.0017**	--	--	--	**0.0012**	**0.03**
Xylenes, Total	**0.0025**	**4.8**	**0.067**	**4.5**	**5.5**	**2.2**	**36**	**0.012**	**0.001**	--	--	--	0	**0.0013**
Total BTEX	**0.0065**	**12.21**	**0.27**	**10.32**	**12.37**	**5.34**	**101.9**	**0.0375**	**0.0032**	--	--	--	**0.0012**	**0.0321**
SVOCs (ppm)														
2-Methylnaphthalene	0	**140**	**0.99**	**93**	**62**	**13**	**180**	**0.45**	**0.014**	**0.17**	**0.054**	0	0	0
Acenaphthene	0	**83**	**0.68**	**60**	**26**	**9.2**	**44**	**0.53**	**0.015**	**0.3**	**0.13**	**0.13**	0	0
Acenaphthylene	0	**19**	**0.96**	**10**	**14**	**1.3**	**66**	**0.39**	0	**0.24**	0	**0.094**	0	0
Anthracene	**0.0091**	**35**	**0.14**	**25**	**13**	**3.8**	**35**	**0.43**	**0.051**	**0.47**	**0.18**	**0.48**	0	0
Benzo(a)anthracene	0	**19**	**0.094**	**15**	**7.2**	**2.3**	**22**	**0.28**	**0.048**	**0.32**	**0.22**	**0.34**	0	0
Benzo(a)pyrene	0	**16**	**0.067**	**12**	**6.7**	**2.7**	**24**	**0.3**	**0.039**	**0.24**	**0.17**	**0.27**	0	0
Benzo(b)fluoranthene	0	**6.2**	**0.025**	**5**	**2.5**	**1.1**	**9.8**	**0.11**	**0.032**	**0.18**	**0.2**	**0.19**	0	0
Benzo(g,h,i)perylene	0	**5.8**	**0.02**	**4.8**	**2.6**	**1.4**	**12**	**0.17**	**0.026**	**0.11**	0	**0.13**	0	0
Benzo(k)fluoranthene	0	**9.6**	**0.044**	**8.2**	**4.4**	**1.7**	**14**	**0.19**	**0.036**	**0.23**	**0.2**	**0.26**	0	0
Chrysene	0	**16**	**0.078**	**15**	**6**	**2**	**19**	**0.27**	**0.055**	**0.59**	**0.67**	**0.3**	0	0
Dibenz(a,h)anthracene	0	**1.8**	0	**1.3**	**0.78**	**0.26**	**2.5**	**0.031**	0	0	0	**0.046**	0	0
Fluoranthene	**0.016**	**33**	**0.14**	**24**	**12**	**4.7**	**42**	**0.5**	**0.2**	**0.82**	**0.5**	**1**	0	0
Fluorene	0	**41**	**0.25**	**28**	**14**	**3.5**	**38**	**0.32**	**0.018**	**0.47**	**0.11**	**0.43**	0	0
Indeno(1,2,3-cd)pyrene	0	**4.5**	0	**3.7**	**2.1**	**1**	**8.3**	**0.12**	**0.02**	**0.098**	0	**0.12**	0	0
Naphthalene	**0.015**	**250**	**3.6**	**160**	**120**	**28**	**390**	**0.87**	**0.025**	**0.42**	**0.14**	**0.016**	0	0
Phenanthrene	0	**110**	**0.51**	**77**	**48**	**15**	**140**	**1.6**	**0.16**	**1.6**	**0.53**	**1.4**	0	**0.016**
Pyrene	**0.026**	**52**	**0.23**	**37**	**20**	**7.6**	**71**	**0.87**	**0.11**	**1.5**	**0.73**	**0.8**	0	**0.0084**
Total PAHs	**0.0661**	**841.9**	**7.828**	**579**	**361.28**	**98.56**	**1,117.6**	**7.431**	**0.849**	**7.758**	**3.834**	**6.006**	0	**0.0244**
Misc. Parameters														
Total Diesel Range Organics	--	--	--	--	--	--	--	--	--	**3,600**	**2,900**	**500**	--	--
										GC-No2	GC=TP-208	GC=TP-208		
TPAH/DRO	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.00	0.00	0.01	#VALUE!	#VALUE!
									< 1 ppm					
Fl/Py		0.63	0.61	0.65	0.60	0.62	0.59	0.57		0.55	0.68	1.25		
BAA/C		1.19	1.21	1.00	1.20	1.15	1.16	1.04		0.54	0.33	1.13		
BAA/BaP		1.19	1.40	1.25	1.07	0.85	0.92	0.93		1.33	1.29	1.26		
INDP/BGHI		0.78	0.00	0.77	0.81	0.71	0.69	0.71		0.89		0.92		
A/P		0.32	0.27	0.32	0.27	0.25	0.25	0.27		0.29	0.34	0.34		

See Notes on Page 7.

TABLE 1

NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION

SUBSURFACE SOIL ANALYTICAL RESULTS

General Areas of site	Offsite	Offsite	Offsite	Offsite	Offsite	G	G	G	G	G	C	C	C	C
Sample ID	**SB-239**	**SB-240**	**SB-240**	**SB-242**	**SB-243**	**SB-207**	**SB-209**	**SB-233**	**SB-234**	**SB-235**	**SB-210**	**SB-210**	**SB-211**	**SB-211**
Sample Depth	**(66 - 68.6')**	**(22 - 25.7')**	**(22 - 25.7')**	**(8 - 10.7')**	**(13.3 - 15')**	**(30 - 32')**	**(22 - 23.4')**	**(12.0 - 13.0')**	**(12.0 - 15.4')**	**(12.0 - 14.9')**	**(28.5 - 29.3')**	**(38 - 39.5')**	**(6 - 8')**	**(20 - 22')**
Sample Date	**4/1/2004**	**4/1/2004**	**4/1/2004**	**4/2/2004**	**4/5/2004**	**9/22/2003**	**9/19/2003**	**3/5/2004**	**3/5/2004**	**3/4/2004**	**9/17/2003**	**9/17/2003**	**9/11/2003**	**9/11/2003**
Sample Type	**FS**	**FS**	**DUP**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
VOCs (ppm)														
Benzene	0	--	--	--	--	0.0011	0.0027	--	0	0	0.06	0.0017	0.0072	0.0008
Ethylbenzene	0	--	--	--	--	0	0	--	0	0	14	0.0024	0.0008	0
Toluene	0.0068	--	--	--	--	0.0015	0.004	--	0.0037	0.0039	0.34	0.0039	0	0
Xylenes, Total	0	--	--	--	--	0	0.0017	--	0	0	11	0.0058	0.0031	0
Total BTEX	0.0068	--	--	--	--	0.0026	0.0084	--	0.0037	0.0039	25.4	0.0138	0.0111	0.0008
SVOCs (ppm)														
2-Methylnaphthalene	0	0	0	0.025	0.014	0	0	0	0	0	180	0.53	0.063	0.019
Acenaphthene	0	0	0	0	0.031	0	0	8.5	0	0.074	130	0.38	0.024	0.49
Acenaphthylene	0	0	0	0	0	0	0	0.86	0.023	0.1	20	0.095	0.046	0.12
Anthracene	0	0	0	0	0.043	0	0	3.8	0	0.1	81	0.34	0.061	0.02
Benzo(a)anthracene	0	0	0	0.063	0.077	0	0.021	2.5	0.031	0.072	34	0.18	0.12	0.043
Benzo(a)pyrene	0	0	0	0.051	0.076	0	0.045	2	0.038	0.084	26	0.18	0.17	0.054
Benzo(b)fluoranthene	0	0	0	0.045	0.064	0	0	1.1	0.025	0.044	9.6	0.074	0.12	0.044
Benzo(g,h,i)perylene	0	0	0	0	0.054	0	0.037	0.84	0	0.12	10	0.062	0.094	0
Benzo(k)fluoranthene	0	0	0	0.05	0.073	0	0	1.5	0.032	0.055	18	0.12	0.16	0.05
Chrysene	0	0	0	0.13	0.083	0	0.02	2.3	0.037	0.073	30	0.16	0.12	0.038
Dibenz(a,h)anthracene	0	0	0	0	0.018	0	0	0.18	0	0	2.6	0.022	0.021	0
Fluoranthene	0	0.013	0	0.2	0.19	0	0.021	5.5	0.06	0.16	77	0.35	0.25	0.075
Fluorene	0	0	0	0	0.026	0	0	3.4	0	0.064	75	0.24	0.034	0.021
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.044	0	0.029	0.67	0	0.076	7.6	0.053	0.092	0
Naphthalene	0	0	0	0.019	0.028	0	0	0	0	0	220	0.58	0.25	0.085
Phenanthrene	0	0.022	0	0.16	0.23	0	0	7.9	0.025	0.28	240	1	0.17	0.044
Pyrene	0	0.014	0	0.24	0.18	0	0.023	8.2	0.057	0.27	110	0.54	0.34	0.097
Total PAHs	0	0.049	0	0.983	1.231	0	0.196	49.25	0.328	1.572	1,270.8	4.906	2.135	1.2
Misc. Parameters														
Total Diesel Range Organics	--	--	--	1.6	21.2	--	--	1,500	--	--	--	--	--	--
				GC-wea D	GC-wea D			GC-wea D						
TPAH/DRO	#VALUE!	#VALUE!	#VALUE!	0.61	0.06	#VALUE!	#VALUE!	0.03	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
		< 1 ppm		< 1 ppm			< 1 ppm		< 1 ppm					
Fl/Py				0.83	1.06			0.67		0.59	0.70	0.65	0.74	0.77
BAA/C				0.48	0.93			1.09		0.99	1.13	1.13	1.00	1.13
BAA/BaP				1.24	1.01			1.25		0.86	1.31	1.00	0.71	0.80
INDP/BGHI					0.81			0.80		0.63	0.76	0.85	0.98	
A/P				0.00	0.19			0.48		0.36	0.34	0.34	0.36	0.45

See Notes on Page 7.

DRAFT

TABLE 1

NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION

SUBSURFACE SOIL ANALYTICAL RESULTS

General Areas of site	E	E	E	E	E	E	F	F	F	F	F	F	F	F
Sample ID	**MW-0304D**	**SB-214**	**SB-214**	**SB-214**	**SB-218**	**SB-218**	**SB-212**	**SB-212**	**SB-213**	**SB-213**	**SB-213**	**SB-215**	**SB-216**	**SB-217**
Sample Depth	**(2 - 4')**	**(6 - 8')**	**(6 - 8')**	**(10 - 12')**	**(22 - 24')**	**(32 - 34')**	**(32 - 33.2')**	**(42 - 45.2')**	**(26 - 26.8')**	**(26 - 26.8')**	**(30 - 31.3')**	**(8 - 10')**	**(34 - 36.4')**	**(14 - 16')**
Sample Date	**10/8/2003**	**10/6/2003**	**10/6/2003**	**10/6/2003**	**10/1/2003**	**10/1/2003**	**2/17/2004**	**2/17/2004**	**2/16/2004**	**2/16/2004**	**2/16/2004**	**9/9/2003**	**9/16/2003**	**9/10/2003**
Sample Type	**FS**	**FS**	**DUP**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**DUP**	**FS**	**FS**	**FS**	**FS**
VOCs (ppm)														
Benzene	0	0.7	0.36	0.0003	0	0.0012	0.061	0.003	0	0	0.0013	0	0.001	0.41
Ethylbenzene	0	12	4	0.0002	0.41	0	1	0.0054	4.1	4	0.0018	0	0	5.3
Toluene	0.0009	6.5	1.4	0.0008	0	0.0045	0	0.0044	0.22	0.2	0.0084	0	0.0024	1.8
Xylenes, Total	0	43	6.7	0.0009	0.72	0.0038	0.56	0.0047	4.8	4.5	0.0034	0	0.0016	7.6
Total BTEX	0.0009	62.2	12.46	0.0022	1.13	0.0095	1.621	0.0175	9.12	8.7	0.0149	0	0.005	15.11
SVOCs (ppm)														
2-Methylnaphthalene	0.27	110	18	23	1.9	0	31	1.6	130	100	1.1	0	0	77
Acenaphthene	0.18	49	10	3	4.3	0	36	1.7	40	29	0.62	0	0	74
Acenaphthylene	0.11	23	3.9	4.9	10	0	5	0.39	68	61	0.5	0	0	18
Anthracene	0.24	65	14	10	15	0	16	0.75	40	34	0.41	0	0	46
Benzo(a)anthracene	0.28	62	13	9.1	15	0	9.2	0.44	22	21	0.25	0	0	29
Benzo(a)pyrene	0.45	56	12	8.7	13	0	9.4	0.42	18	14	0.18	0.021	0	30
Benzo(b)fluoranthene	0.28	38	9.5	5.9	9.1	0	3.5	0.15	7.7	5.7	0.075	0.015	0	14
Benzo(g,h,i)perylene	0.35	29	7.2	4.6	4.6	0.0045	4.7	0.2	7.7	5.9	0.071	0	0	11
Benzo(k)fluoranthene	0.41	47	10	7.3	13	0	6.2	0.27	11	9.4	0.11	0.014	0	23
Chrysene	0.27	56	13	9.1	11	0	8.7	0.38	18	16	0.19	0	0	26
Dibenz(a,h)anthracene	0.12	8.4	2.5	1.8	1.8	0	0.92	0.053	1.8	0.68	0.016	0	0	0
Fluoranthene	0.32	130	27	18	29	0	18	0.85	37	30	0.41	0	0	59
Fluorene	0.71	58	13	7.8	16	0	15	0.73	42	38	0.45	0	0	40
Indeno(1,2,3-cd)pyrene	0.34	28	6.7	4	5.2	0	3.6	0.13	5.8	4.5	0.057	0	0	10
Naphthalene	0.24	880	72	100	12	0	56	2.2	200	200	1.5	0	0	270
Phenanthrene	0.99	210	41	34	43	0.0089	55	2.7	130	110	1.4	0	0	170
Pyrene	0.32	120	26	19	29	0	29	1.4	61	47	0.61	0.02	0	93
Total PAHs	5.88	1969.4	298.8	270.2	232.9	0.0134	307.22	14.363	840	726.18	7.949	0.07	0	990
Misc. Parameters														
Total Diesel Range Organics	--	--	--	--	--	--	--	--	--	--	--	--	--	--

TPAH/DRO	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
			DUP							DUP				
Fl/Py	1.00	1.08	1.04	0.95	1.00		0.62	0.61	0.61		0.67			0.63
BAA/C	1.04	1.11		1.00	1.36		1.06	1.16	1.22		1.32			1.12
BAA/BaP	0.62	1.11		1.05	1.15		0.98	1.05	1.22		1.39			0.97
INDP/BGHI	0.97	0.97		0.87	1.13	0.00	0.77	0.65	0.75		0.80			0.91
A/P	0.24	0.31		0.29	0.35	0.00	0.29	0.28	0.31		0.29			0.27

See Notes on Page 7.

TABLE 1

NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION

SUBSURFACE SOIL ANALYTICAL RESULTS

General Areas of site	F	F	F	F	S	S					
Sample ID	**SB-217**	**SB-221**	**SB-222**	**SB-222**	**PIPE**	**MANHOLE**					
Sample Depth	**(18 - 20')**	**(16 - 18')**	**(4 - 6')**	**(8 - 10')**							
Sample Date	**9/10/2003**	**10/2/2003**	**10/2/2003**	**10/2/2003**	**2/27/2004**	**4/28/2004**					
Sample Type	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**					
VOCs (ppm)											
Benzene	**0.15**	**0.0016**	0	0	0	**0.0026**					
Ethylbenzene	**0.0043**	0	0	0	**0.56**	**0.0011**					
Toluene	**0.0078**	**0.0039**	0	0	0	**0.0074**					
Xylenes, Total	**0.0084**	**0.0035**	0	0	**8**	**0.0056**					
Total BTEX	**0.1705**	**0.009**	0	0	**8.56**	**0.0167**					
SVOCs (ppm)											
2-Methylnaphthalene	**0.24**	0	0	0	**71**	**0.83**					
Acenaphthene	**0.19**	0	**0.3**	0	**88**	**16**					
Acenaphthylene	**0.068**	0	**0.13**	0	**100**	**6.4**					
Anthracene	**0.16**	**0.0088**	**0.65**	0	**270**	**51**					
Benzo(a)anthracene	**0.073**	0	**0.57**	**0.07**	**210**	**39**					
Benzo(a)pyrene	**0.071**	0	**1**	**0.19**	**170**	**33**					
Benzo(b)fluoranthene	**0.033**	0	**0.65**	**0.13**	**120**	**26**					
Benzo(g,h,i)perylene	**0.035**	0	**0.73**	**0.14**	**41**	**12**					
Benzo(k)fluoranthene	**0.055**	0	**1.1**	**0.2**	**180**	**38**					
Chrysene	**0.079**	0	**0.68**	**0.079**	**180**	**44**					
Dibenz(a,h)anthracene	0	0	**0.068**	0	**21**	**4.4**					
Fluoranthene	**0.2**	**0.017**	**1.3**	**0.05**	**520**	**170**					
Fluorene	**0.15**	0	**0.7**	0	**190**	**21**	**EPRI**	**EPRI**	**EPRI**	**EPRI**	
Indeno(1,2,3-cd)pyrene	**0.028**	0	**0.66**	**0.12**	**55**	**11**	**CWG**	**CWG**	**CC**	**CR**	
Naphthalene	**1.7**	0	**0.093**	0	**210**	**1.1**					
Phenanthrene	**0.59**	**0.023**	**0.11**	0	**620**	**160**					
Pyrene	**0.28**	**0.012**	**1.6**	**0.057**	**350**	**120**					
Total PAHs	**3.952**	**0.0608**	**10.341**	**1.036**	**3,396**	**753.73**					
Misc. Parameters											
Total Diesel Range Organics	--	--	--	--	--	--					

TPAH/DRO	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!					#DIV/0!
		< 1 ppm		< 1 ppm							
Fl/Py	0.71		0.81		1.49	1.42	0.75	0.78	0.98	1.34	#DIV/0!
BAA/C	0.92		0.84		1.17	0.89	0.93	1.33	1.14	1.27	#DIV/0!
BAA/BaP	1.03		0.57		1.24	1.18	1.31	1.22	1.18	1.27	#DIV/0!
INDP/BGHI	0.80		0.90		1.34	0.92					#DIV/0!
A/P	0.27		5.91		0.44	0.32					#DIV/0!

See Notes on Page 7.

TABLE 1

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NEW YORK STATE ELECTRIC AND GAS CORPORATION
ELMIRA (MADISON AVENUE) FORMER MGP SITE
ELMIRA, NEW YORK

SUPPLEMENTAL REMEDIAL INVESTIGATION

SUBSURFACE SOIL ANALYTICAL RESULTS

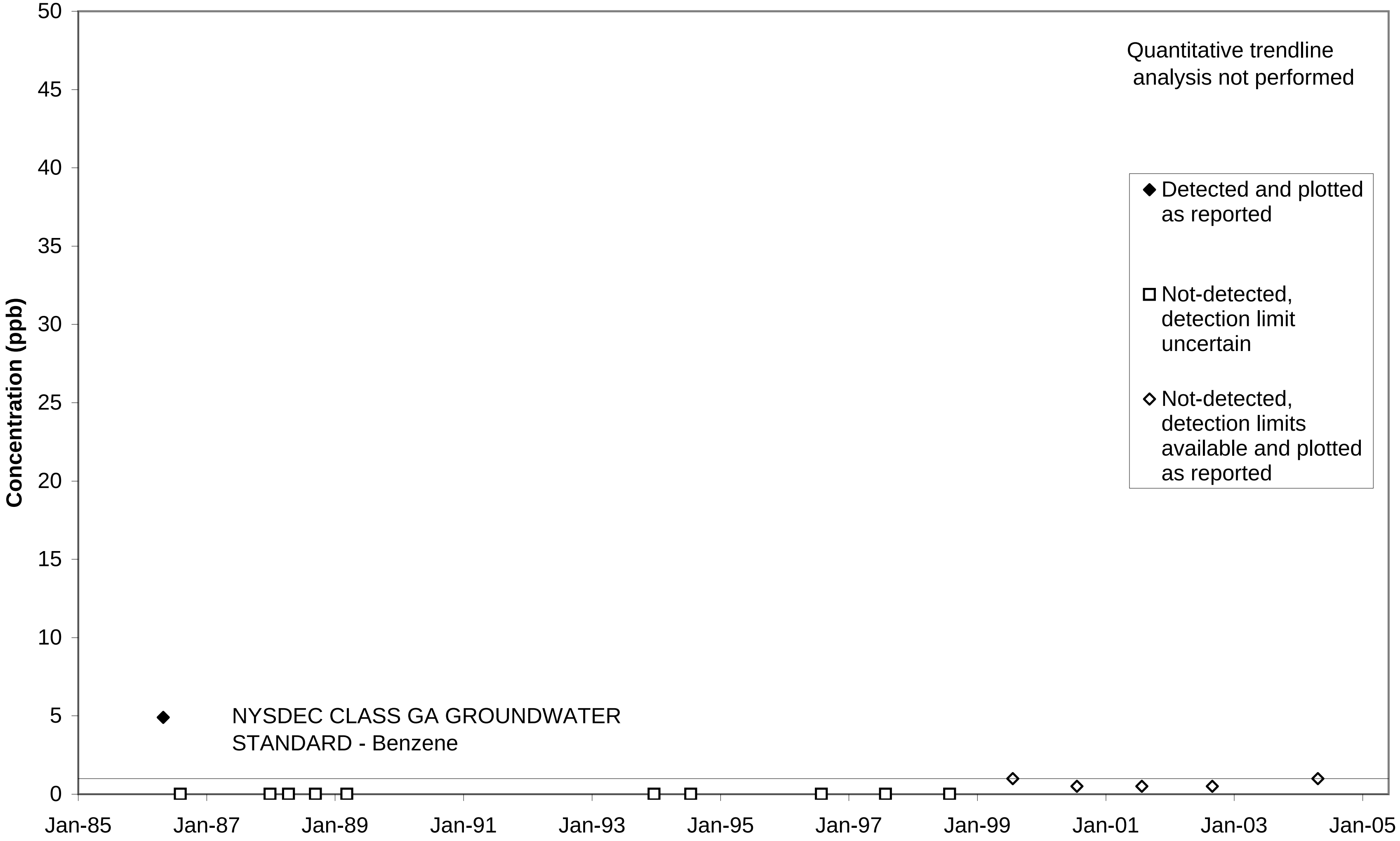
Notes:
All concentrations in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm), unless otherwise noted.
-- = Not analyzed.
NA = No criteria listed
DUP = Duplicate field sample.
FS = Field sample.
Bolded values indicate the constituent was detected.

Data Qualifiers:
J = The compound/constituent was positively identified; however, the associated numerical value is an estimated concentration only.
ND = Non detect.
R = The sample results are rejected.
U = The compound/constituent was analyzed for but not detected. The associated value is the compound/constituent quantitation limit.

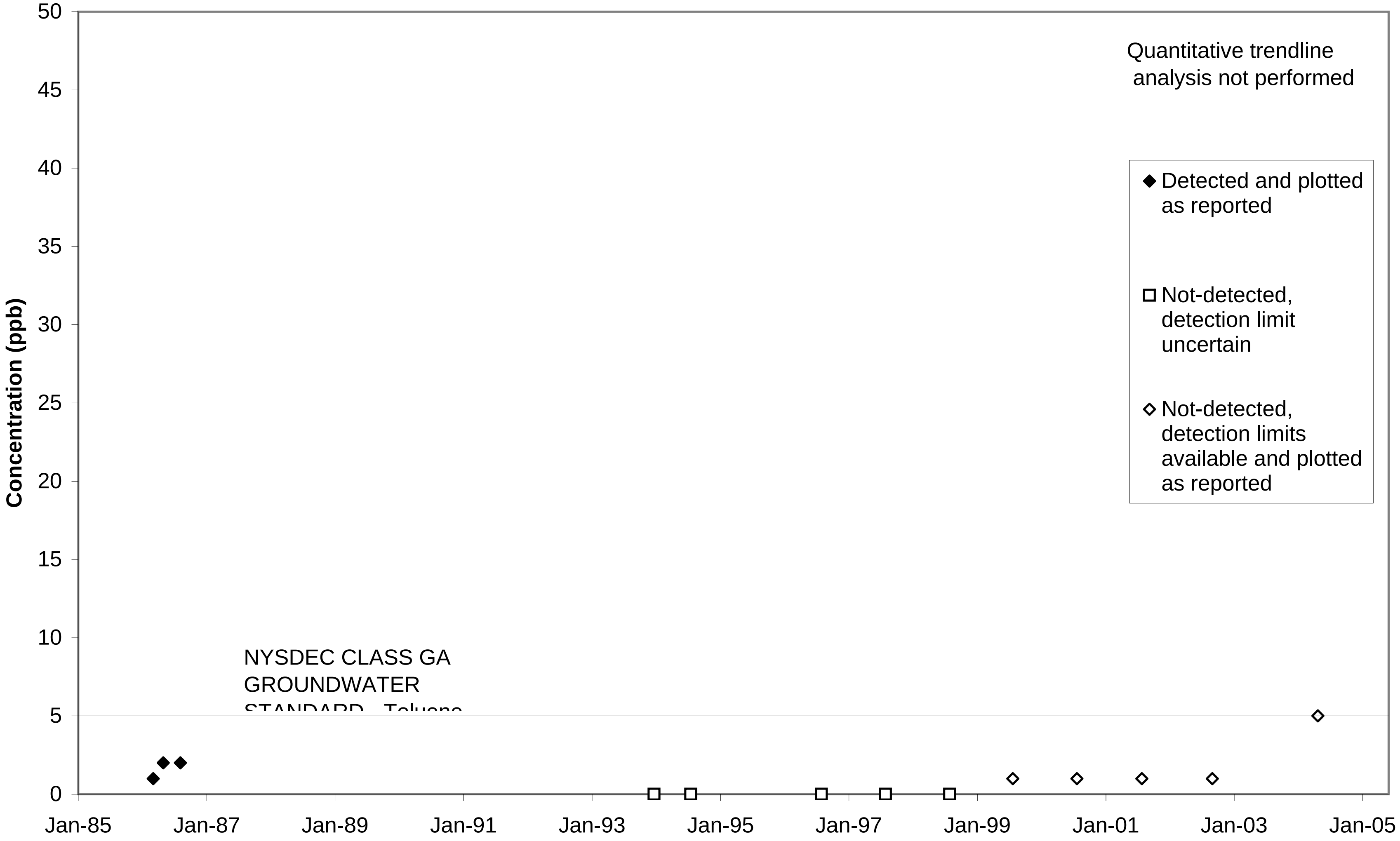
Appendix D

Groundwater Concentration Trend Analysis Plots (1984-2004)

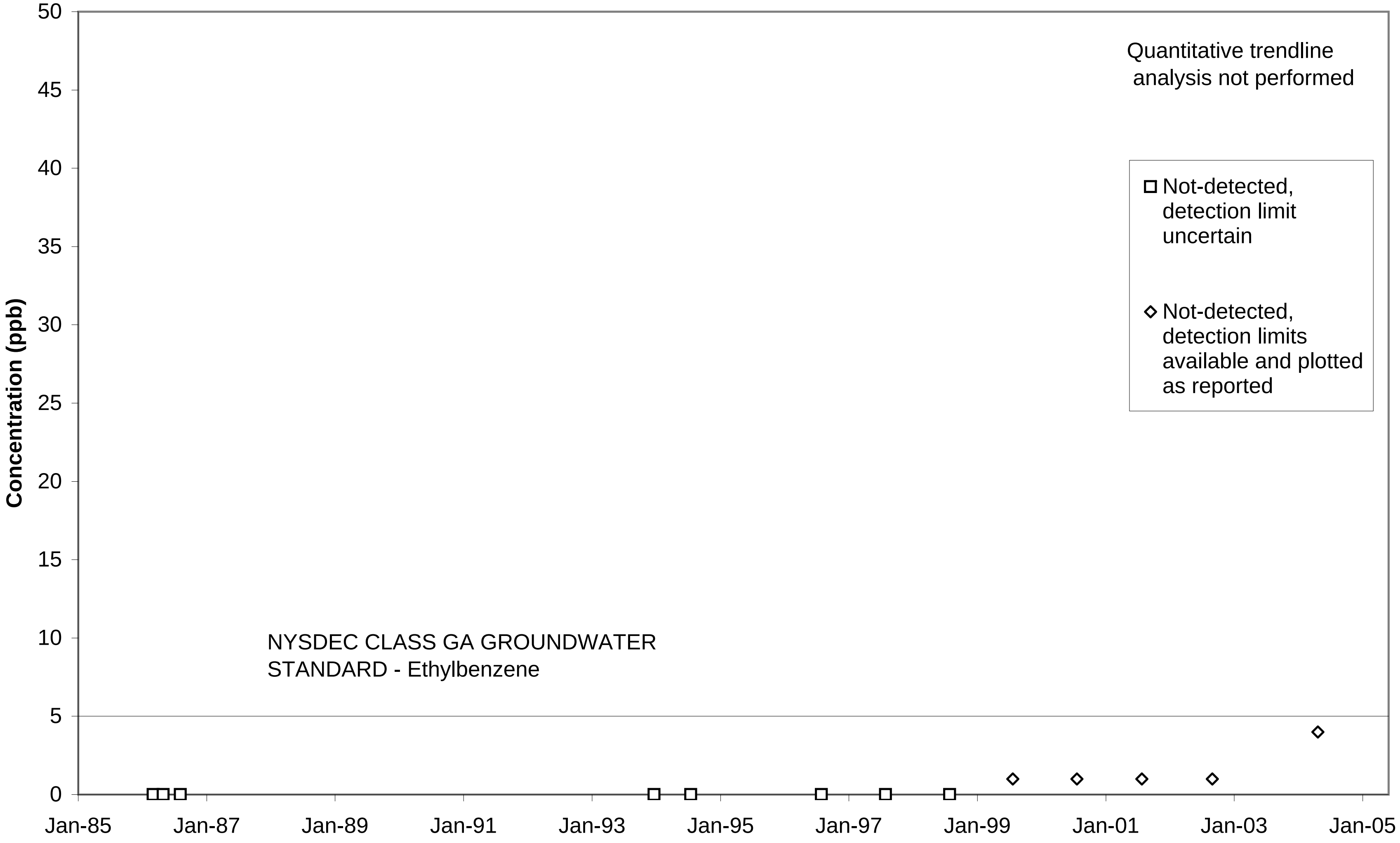
Benzene Concentration Trends
Monitoring Well MW-2S



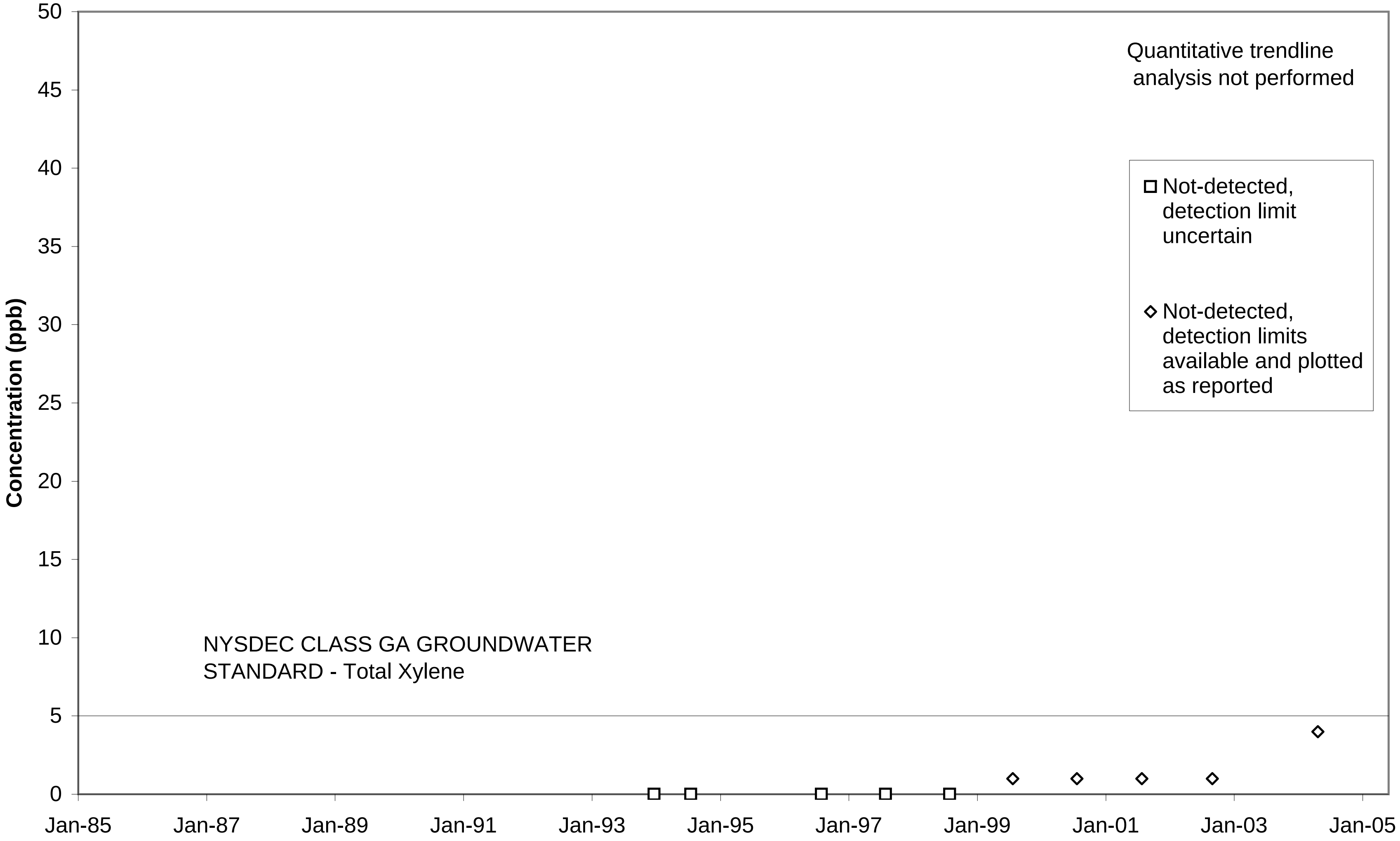
Toluene Concentration Trends
Monitoring Well MW-2S



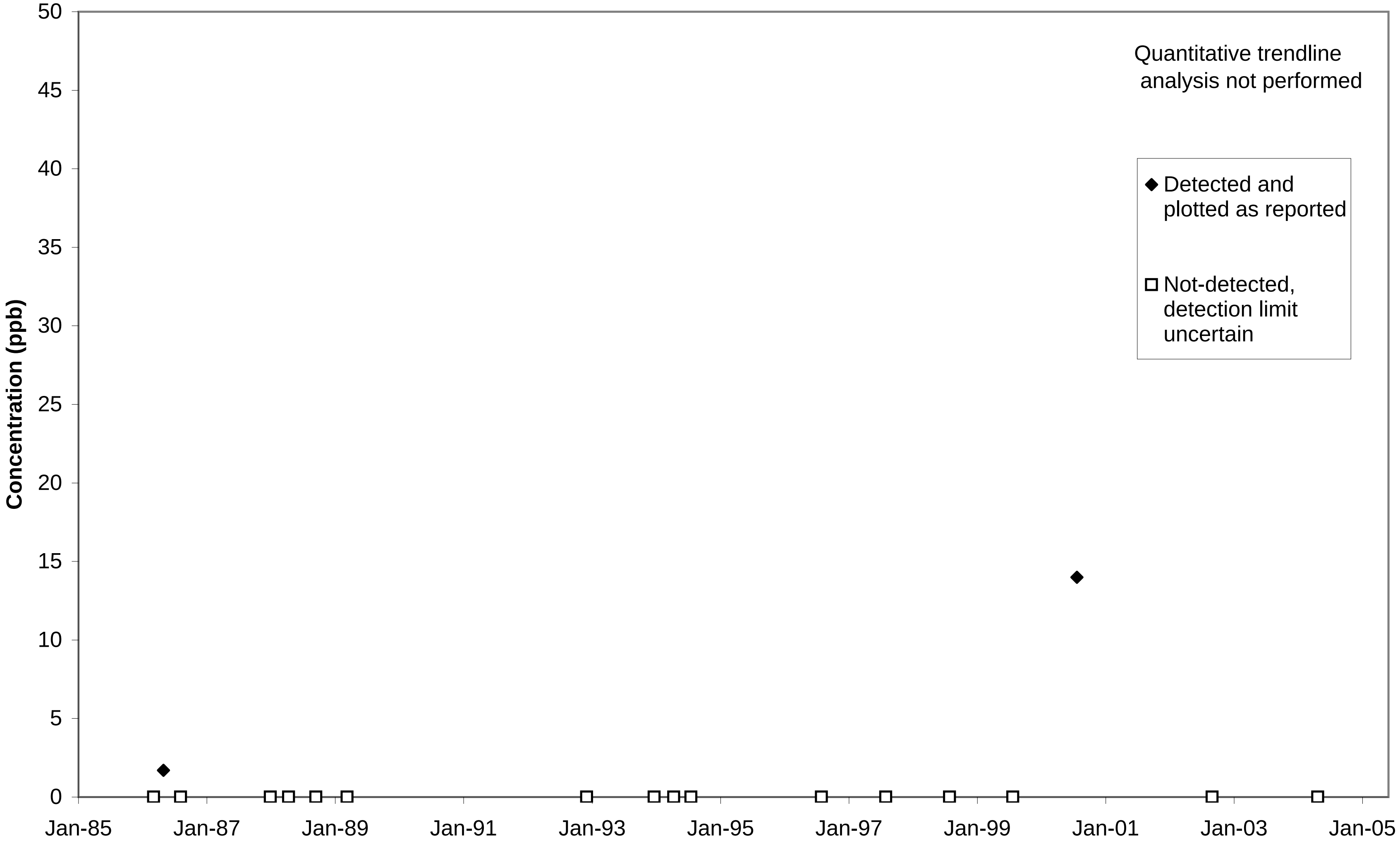
Ethylbenzene Concentration Trends
Monitoring Well MW-2S



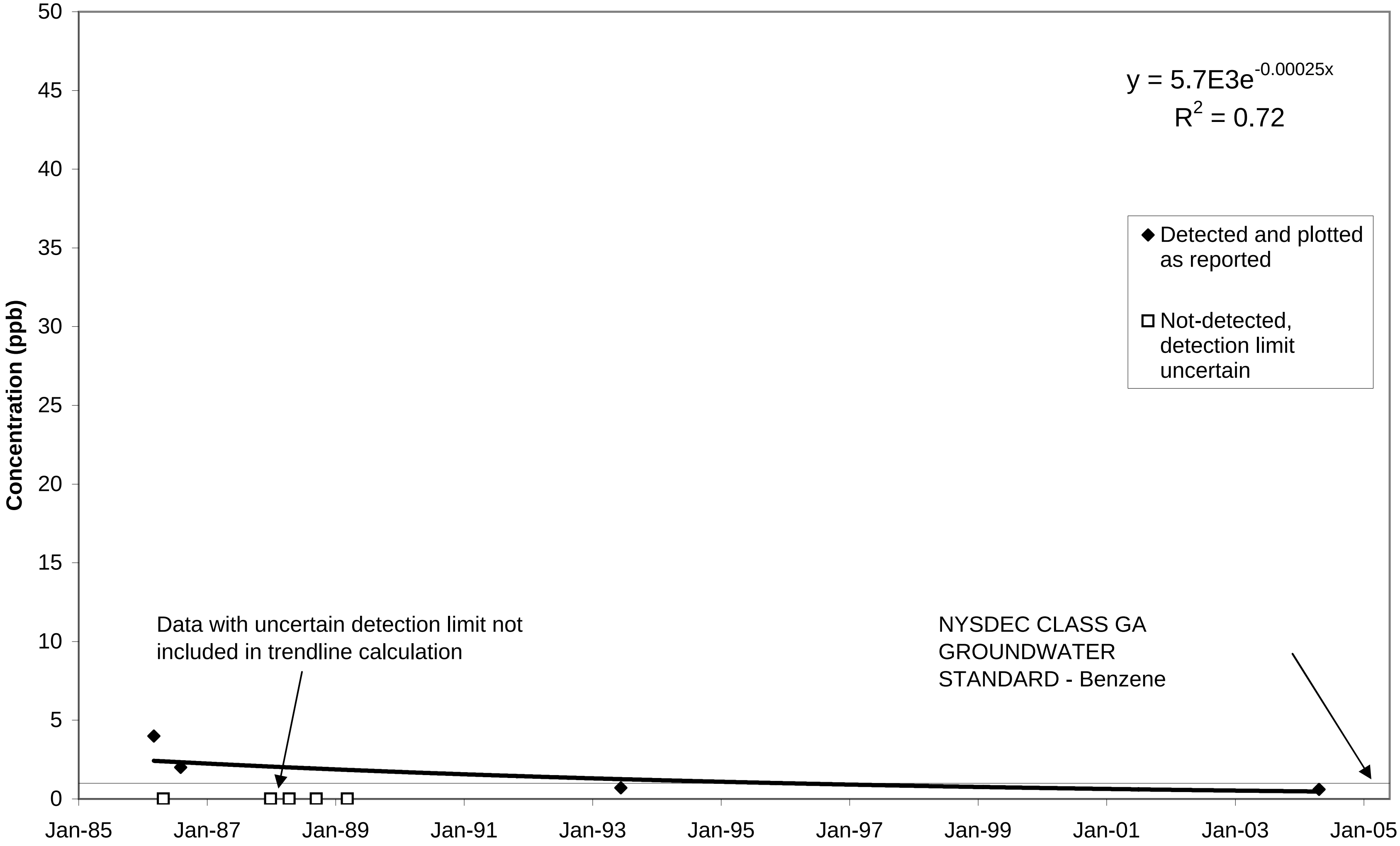
Total Xylene Concentration Trends
Monitoring Well MW-2S



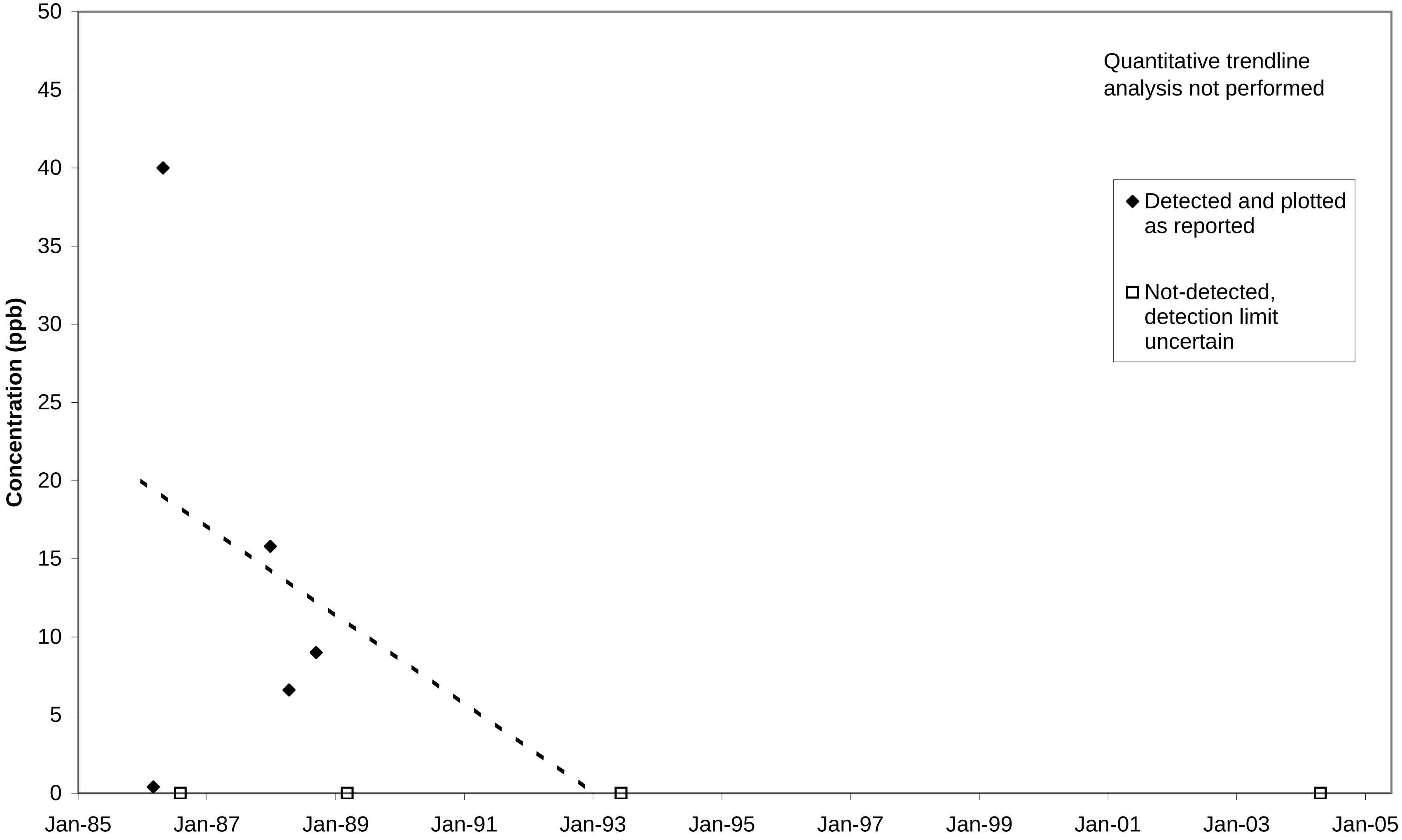
Total PAH Concentration Trends
Monitoring Well MW-2S



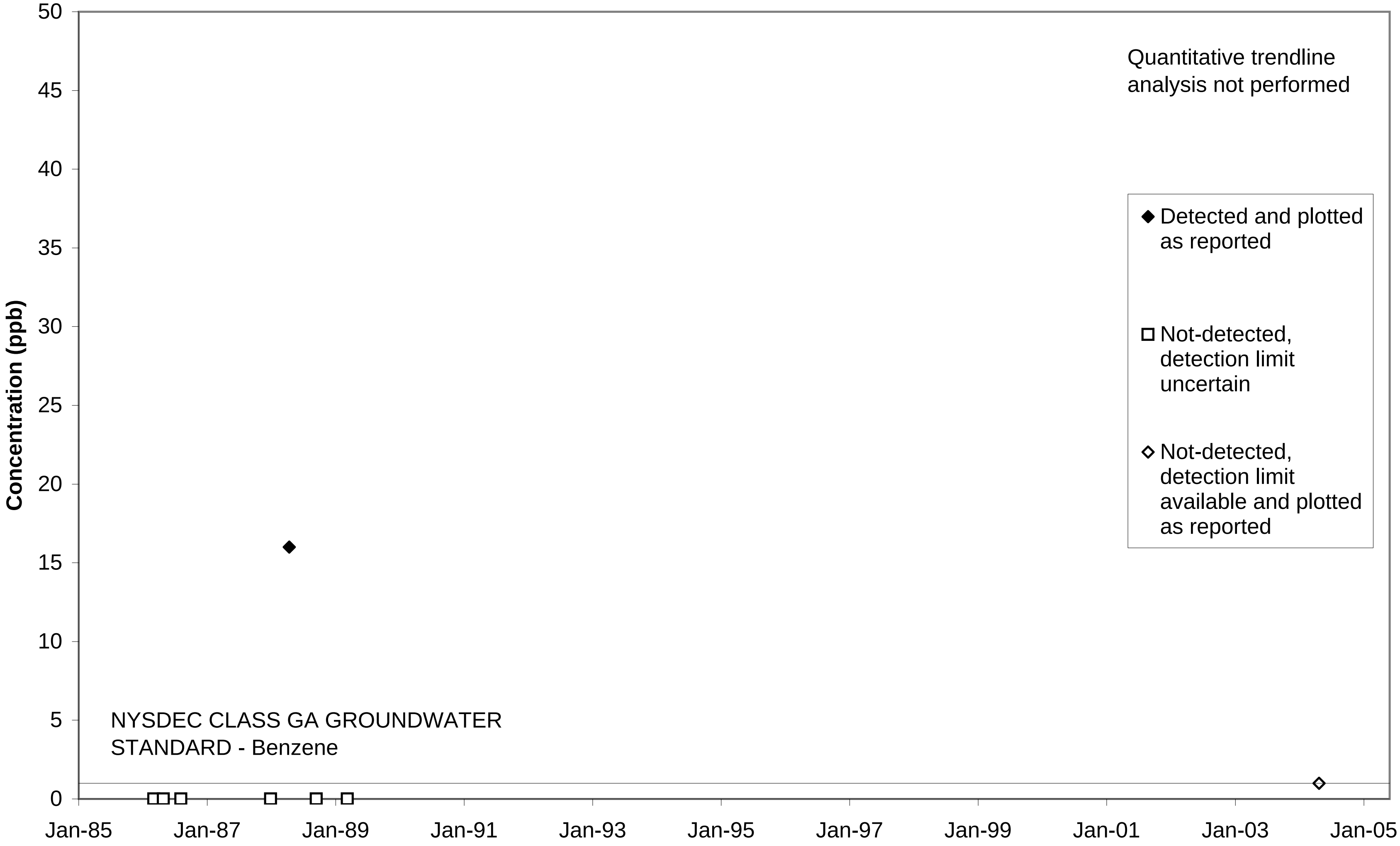
Benzene Concentration Trends
Monitoring Well MW-3S



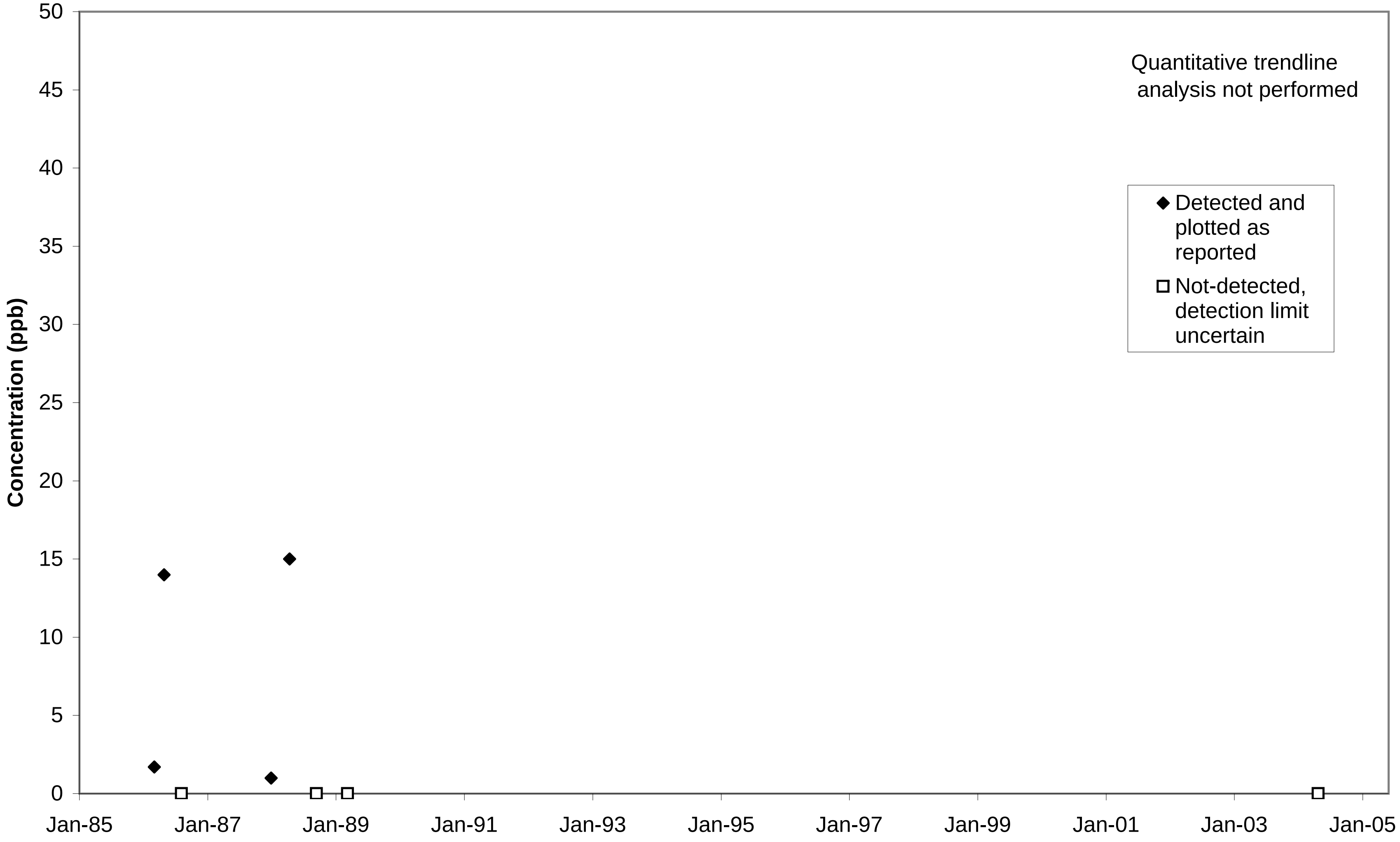
Total PAH Concentration Trends
Monitoring Well MW-3S

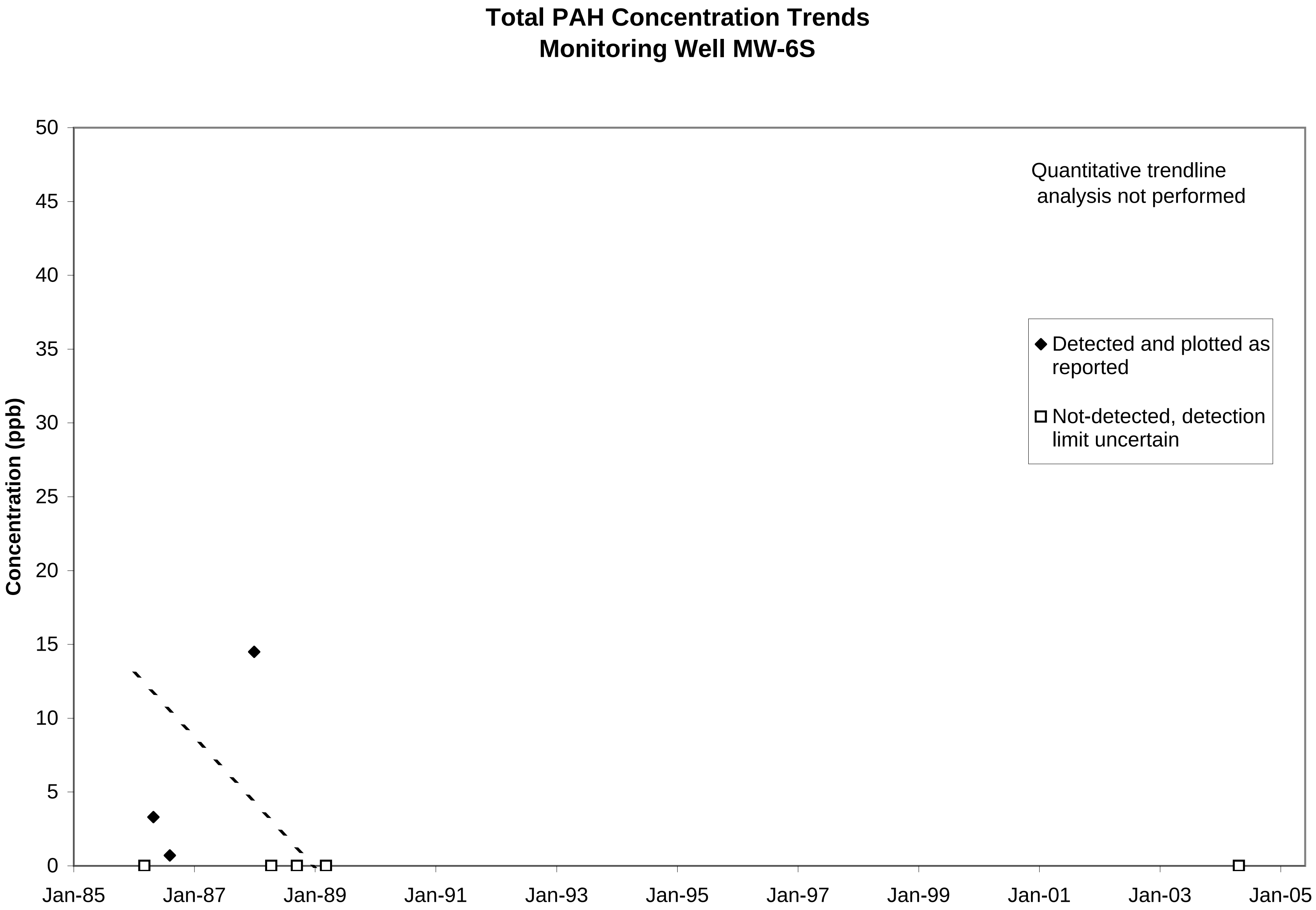


Benzene Concentration Trends
Monitoring Well MW-4S

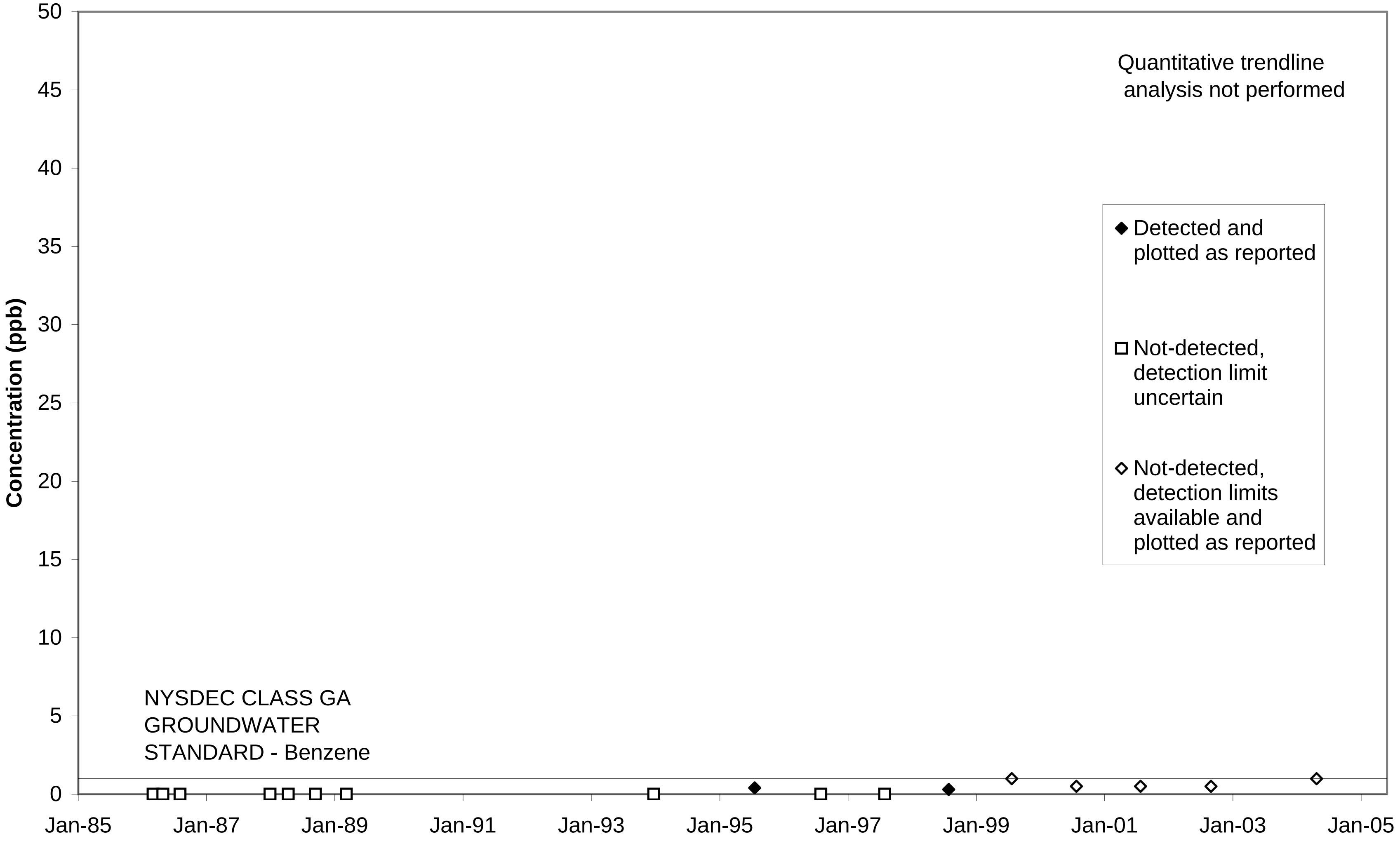


Total PAH Concentration Trends
Monitoring Well MW-4S

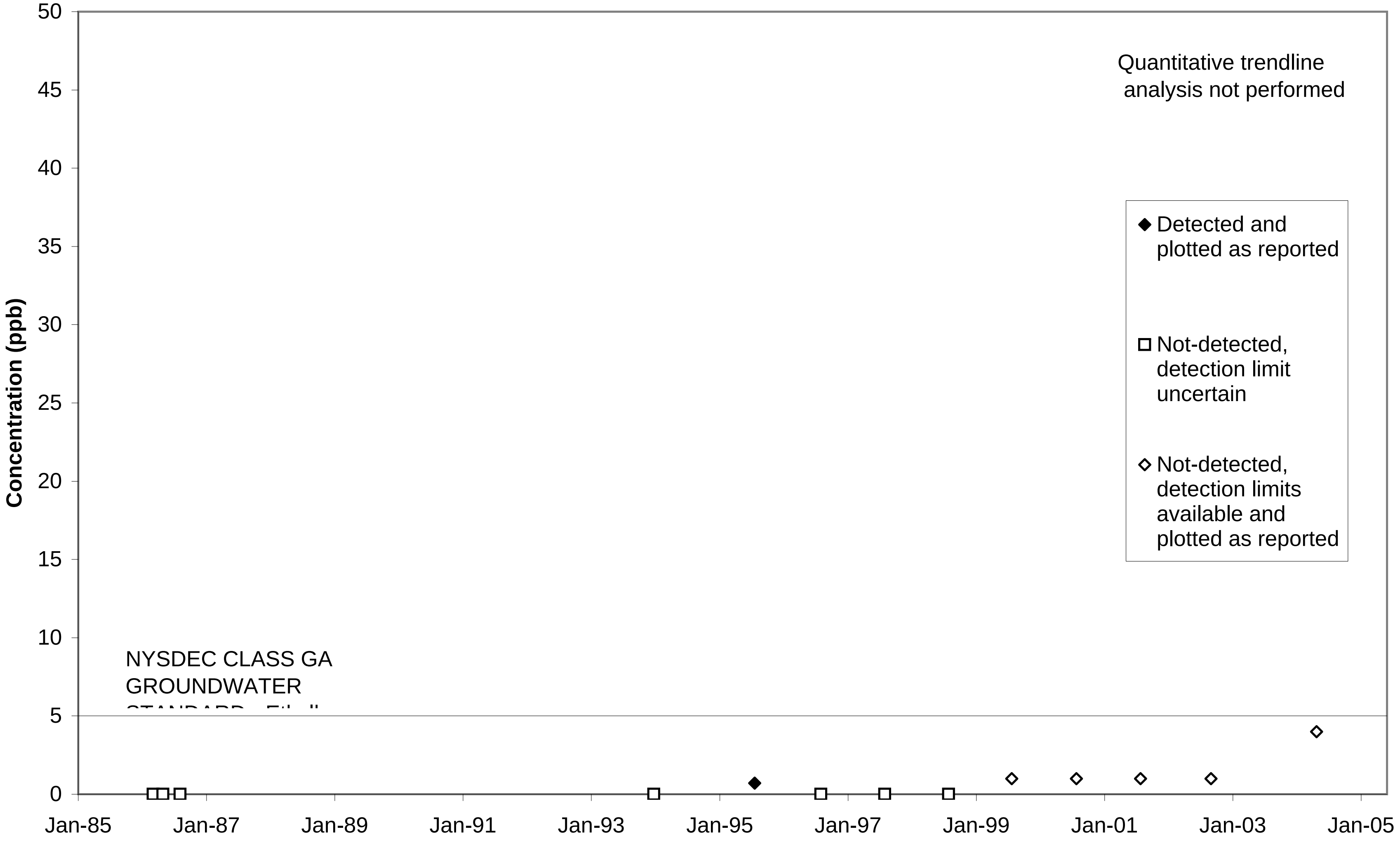



Total PAH Concentration Trends
Monitoring Well MW-6S
Concentration (ppb)
50
45
40
35
30
25
20
15
10
5
0
Jan-85
Jan-87
Jan-89
Jan-91
Jan-93
Jan-95
Jan-97
Jan-99
Jan-01
Jan-03
Jan-05
Quantitative trendline analysis not performed
◆ Detected and plotted as reported
☐ Not-detected, detection limit uncertain

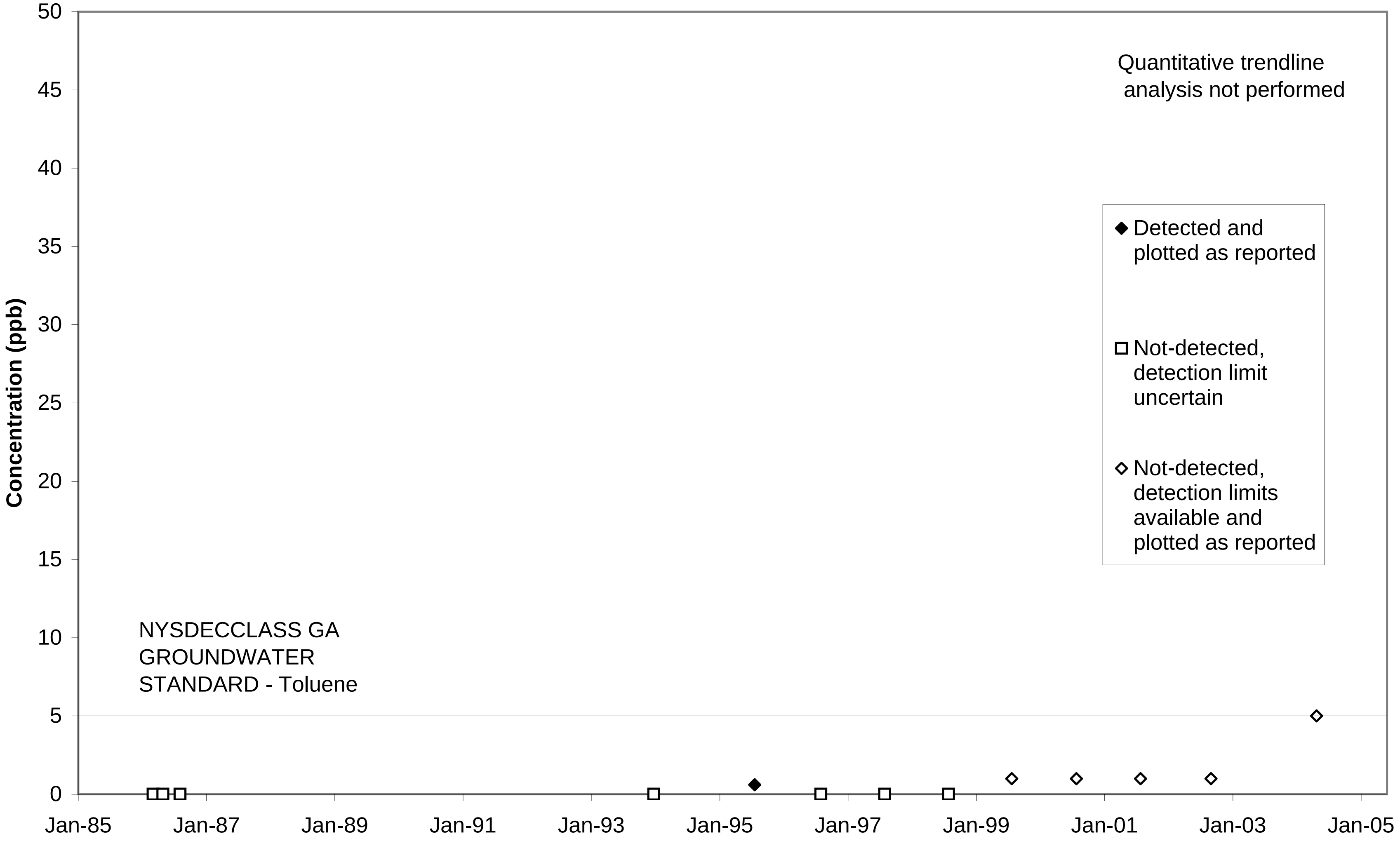
Benzene Concentration Trends
Monitoring Well MW-7S



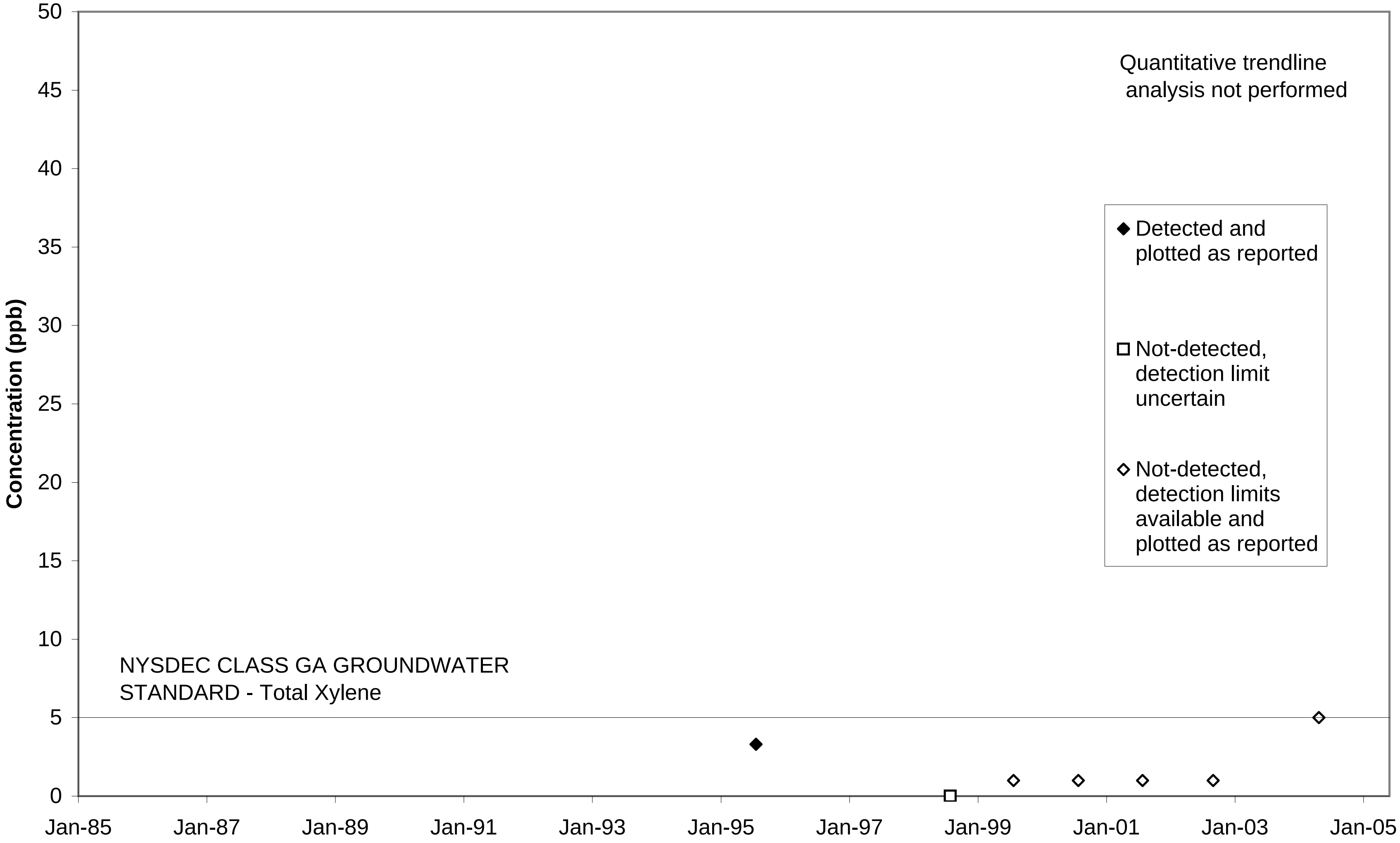
Ethylebenzene Concentration Trends
Monitoring Well MW-7S

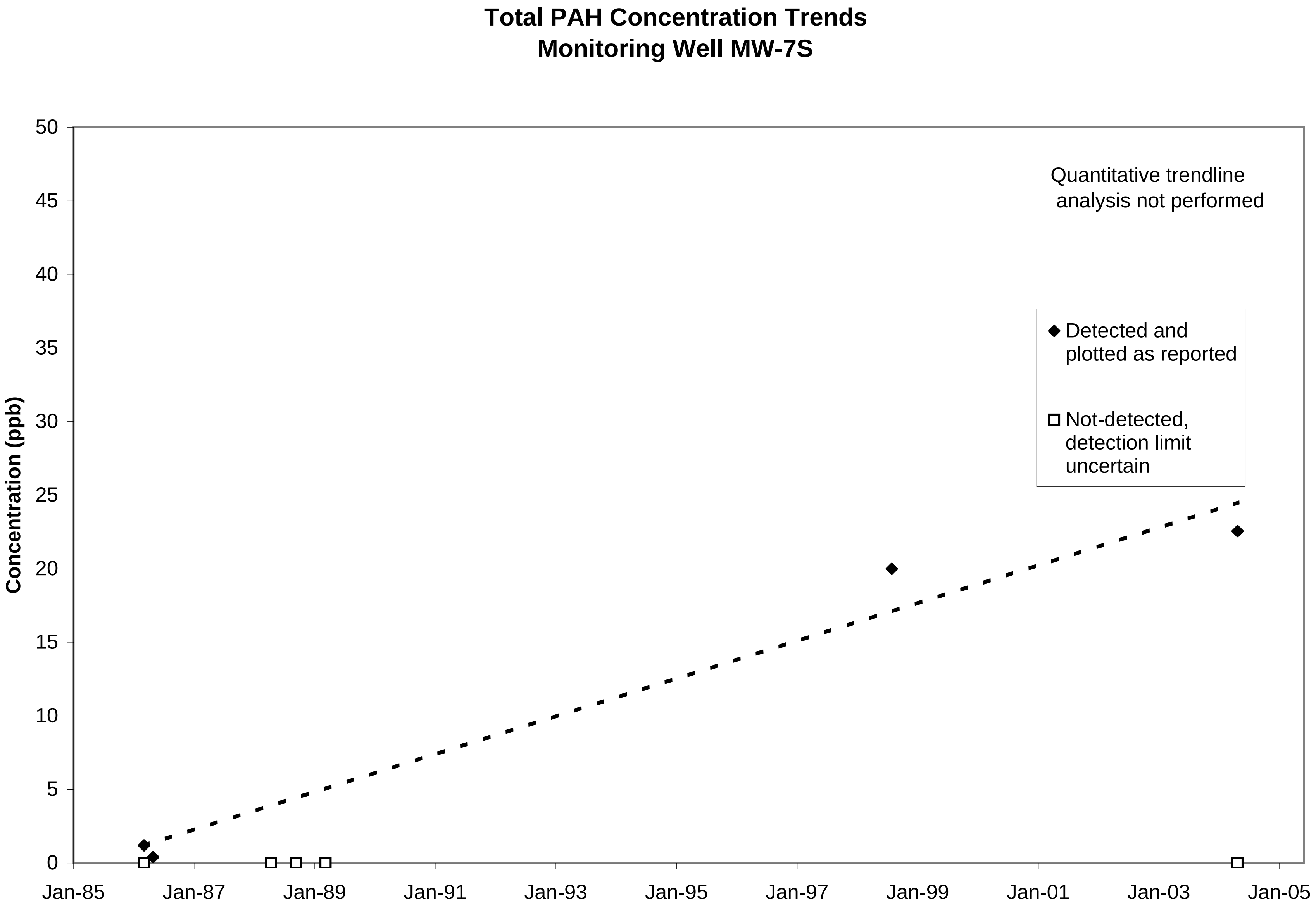


Toluene Concentration Trends
Monitoring Well MW-7S

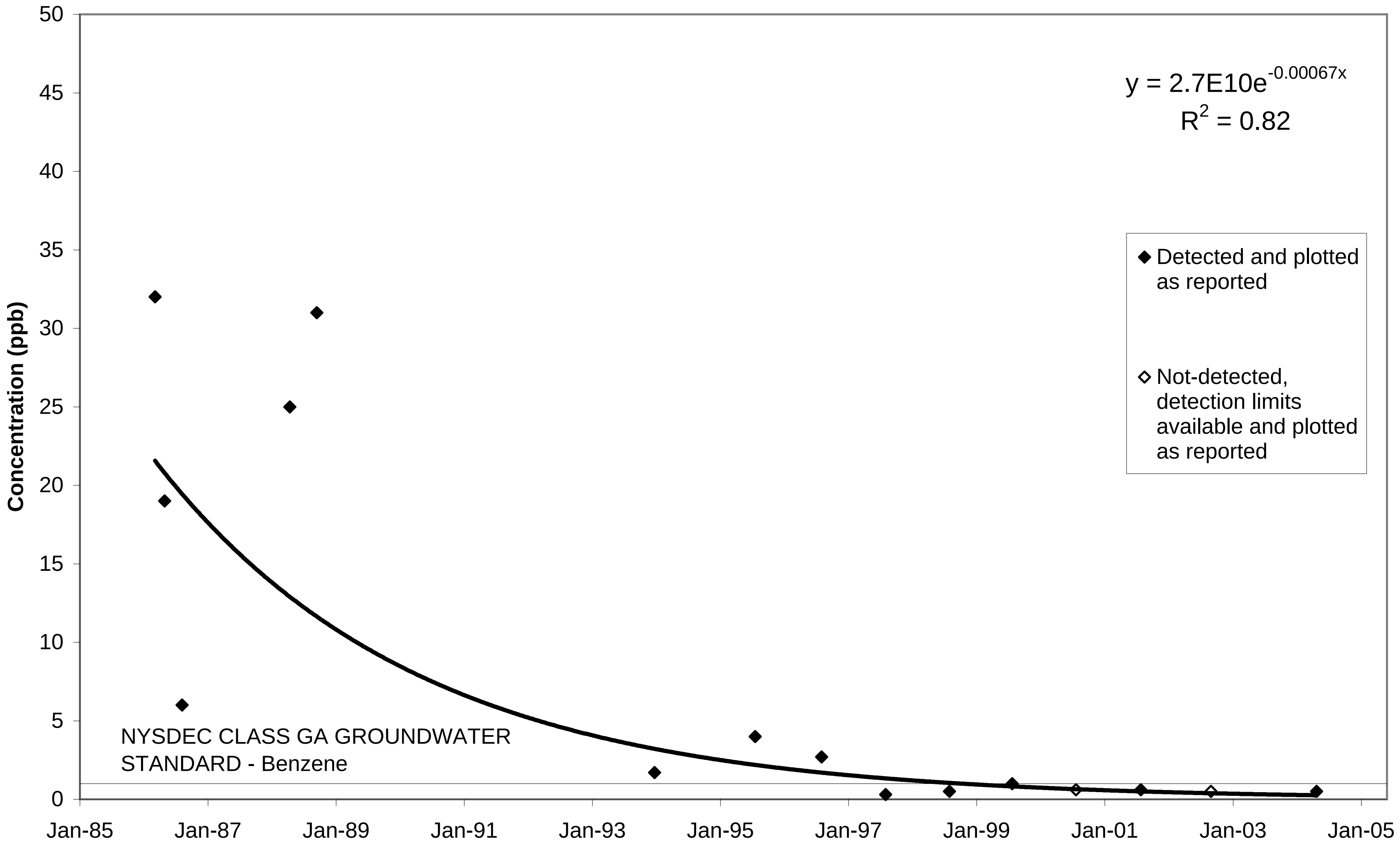


Total Xylene Concentration Trends
Monitoring Well MW-7S

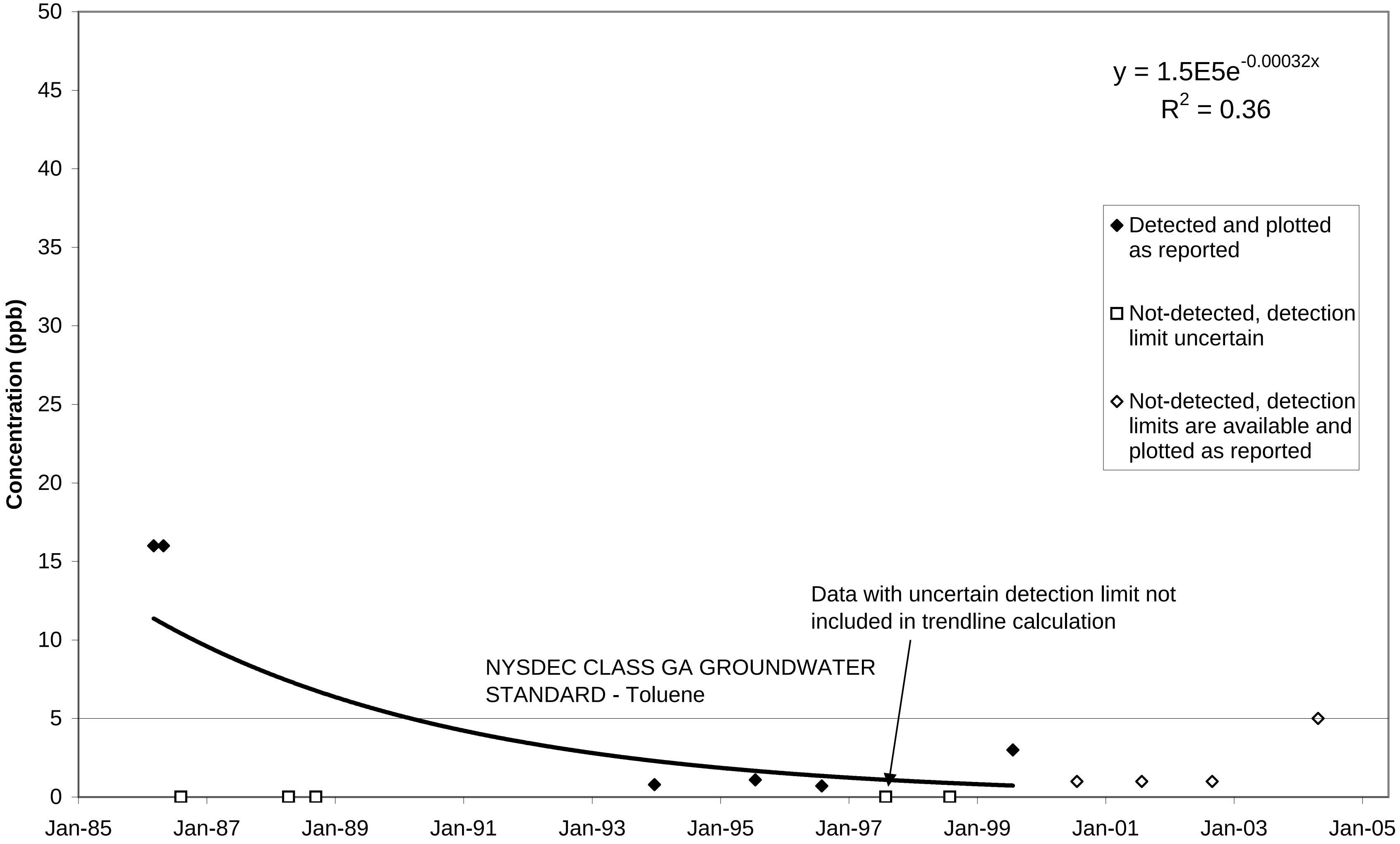




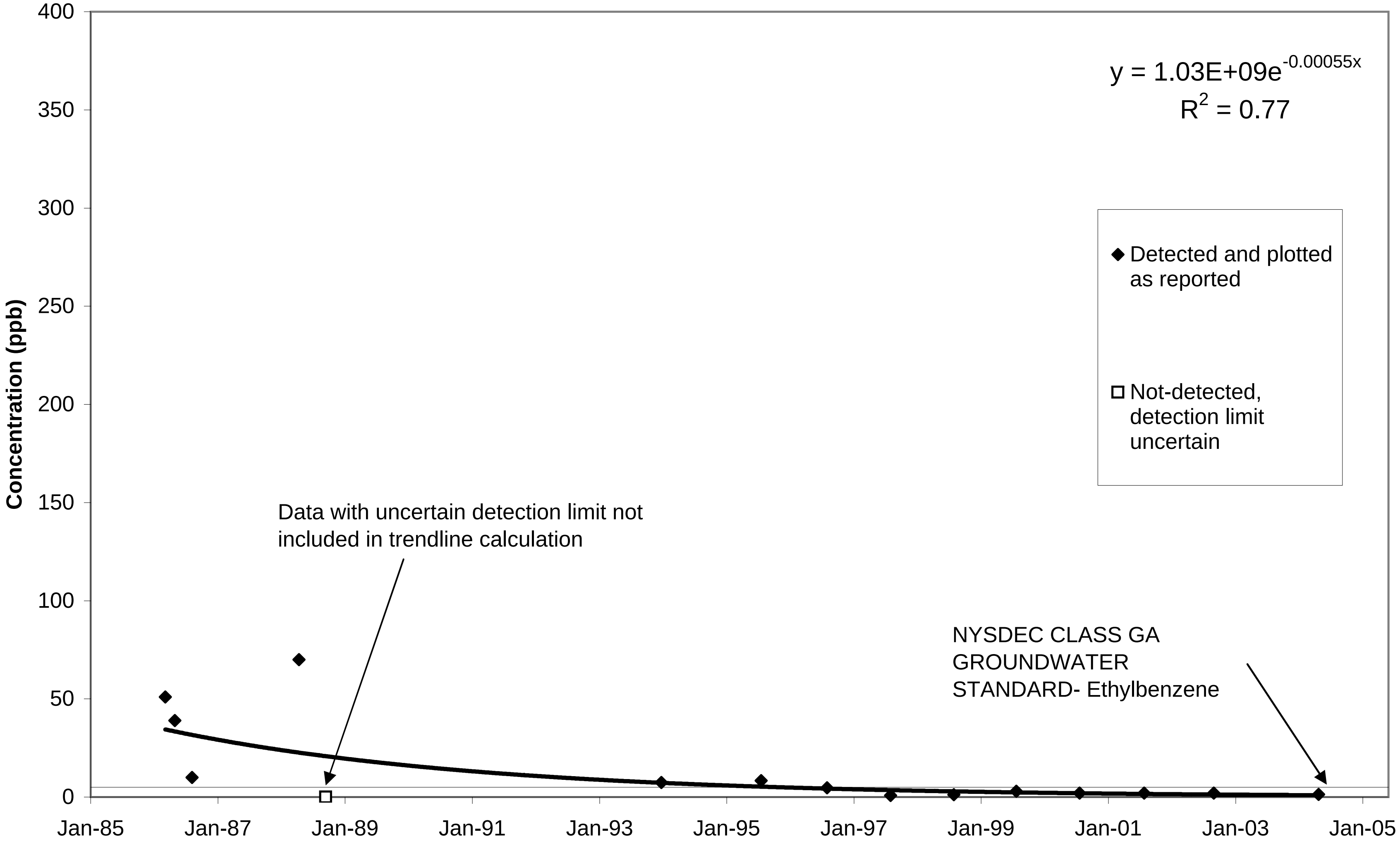
Benzene Concentration Trends
Monitoring Well MW-8S



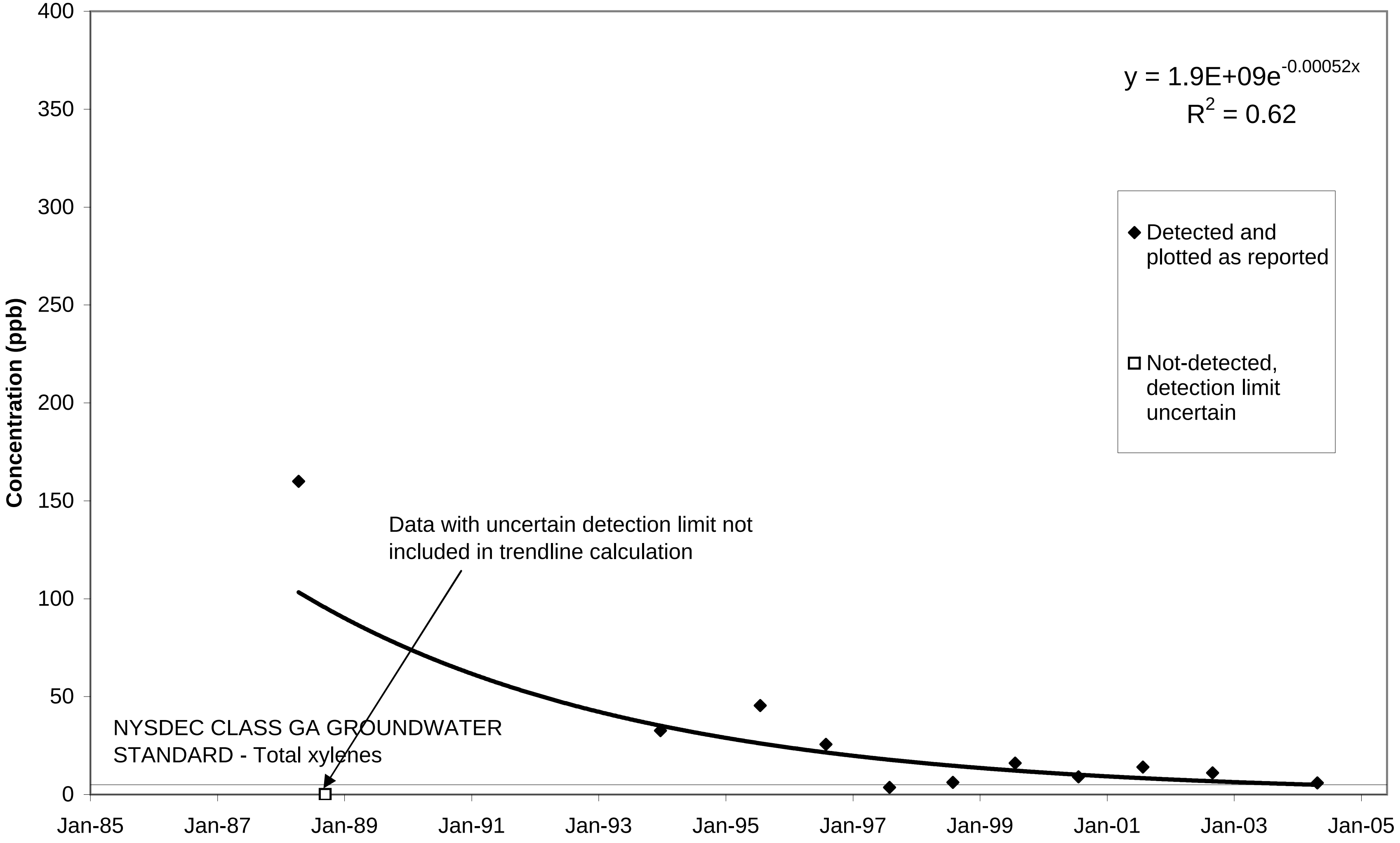
Toluene Concentration Trends
Monitoring Well MW-8S



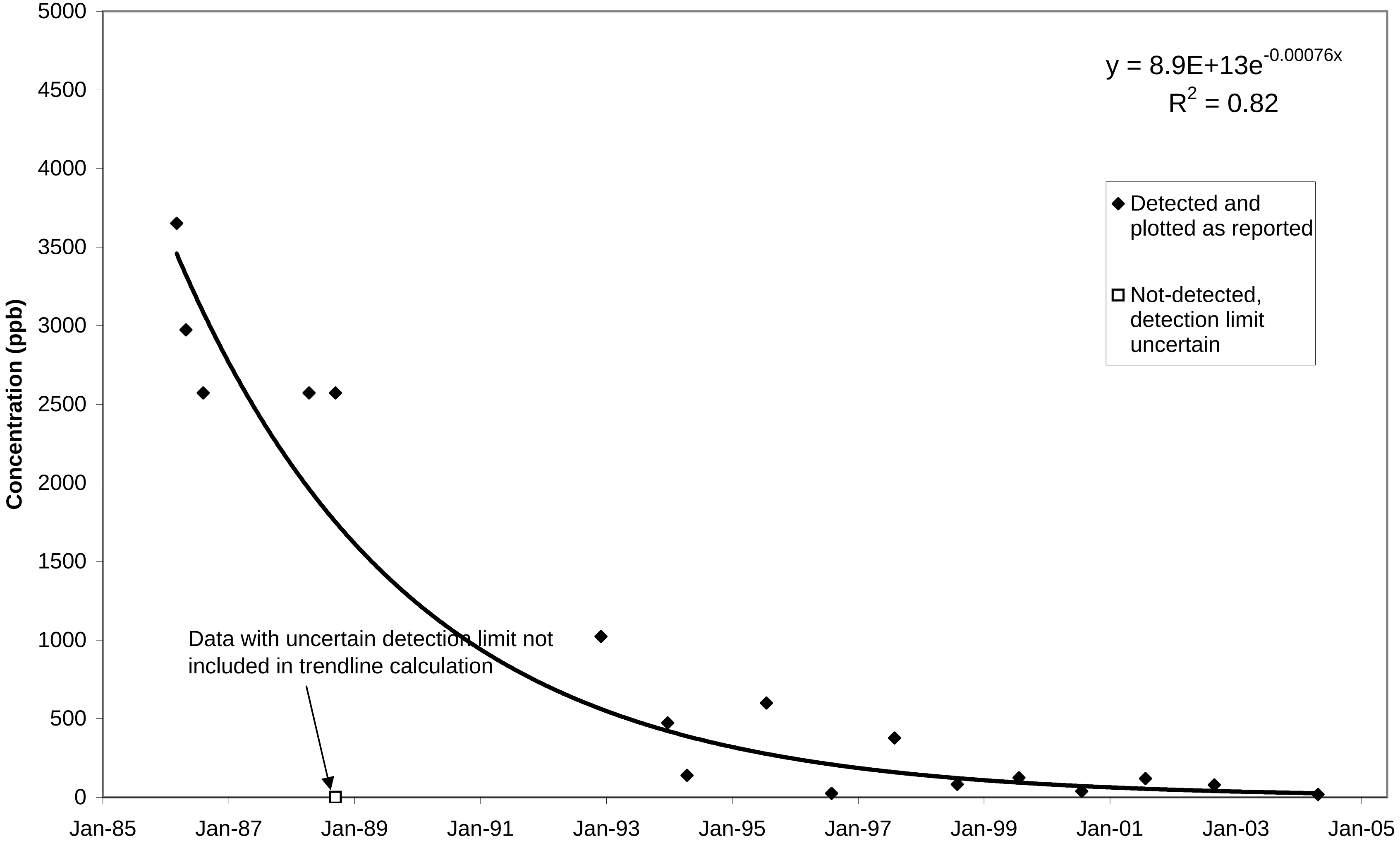
Ethylbenzene Concentration Trends
Monitoring Well MW-8S



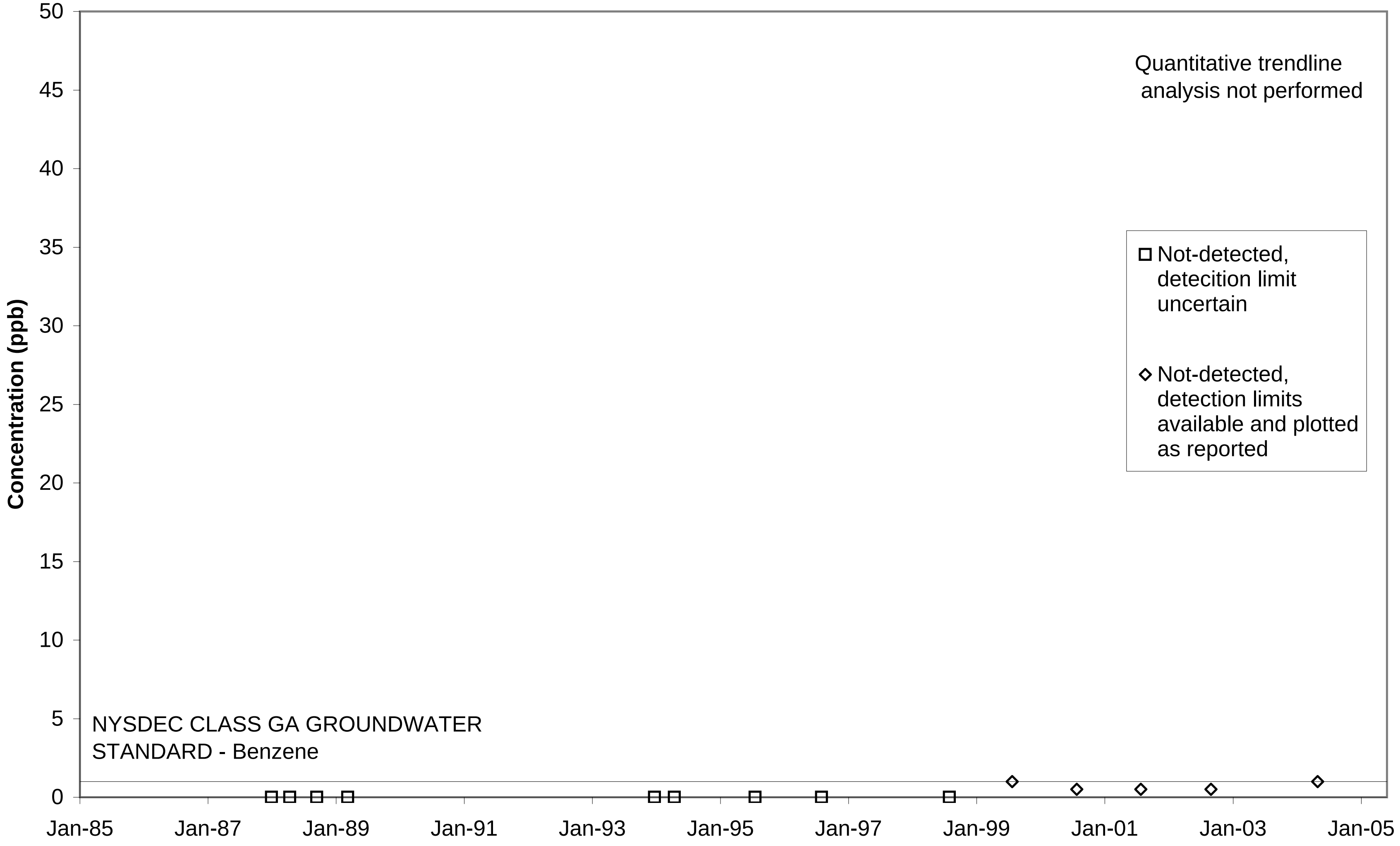
Total Xylenes Concentration Trends
Monitoring Well MW-8S



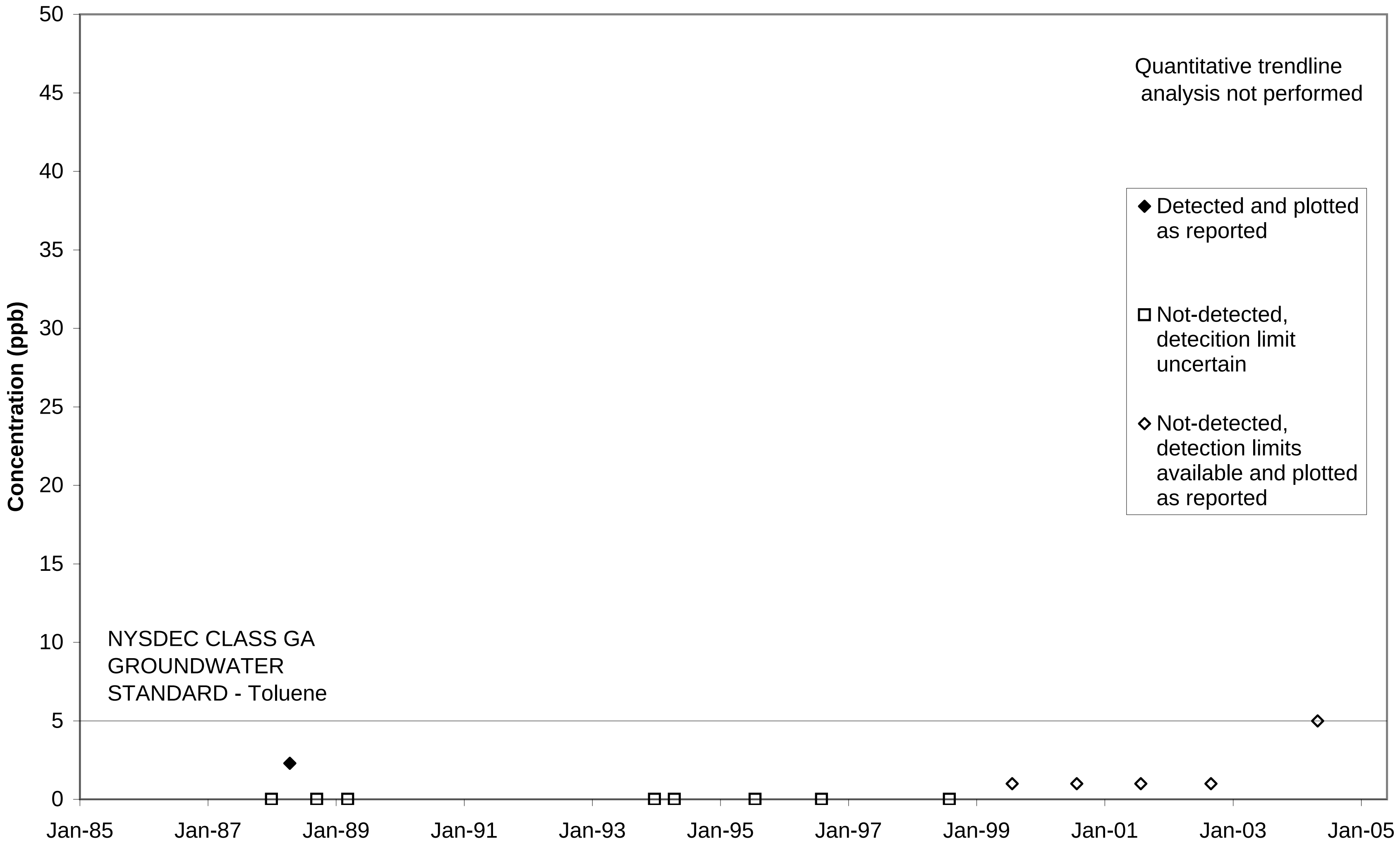
Total PAH Concentration Trends
Monitoring Well MW-8S



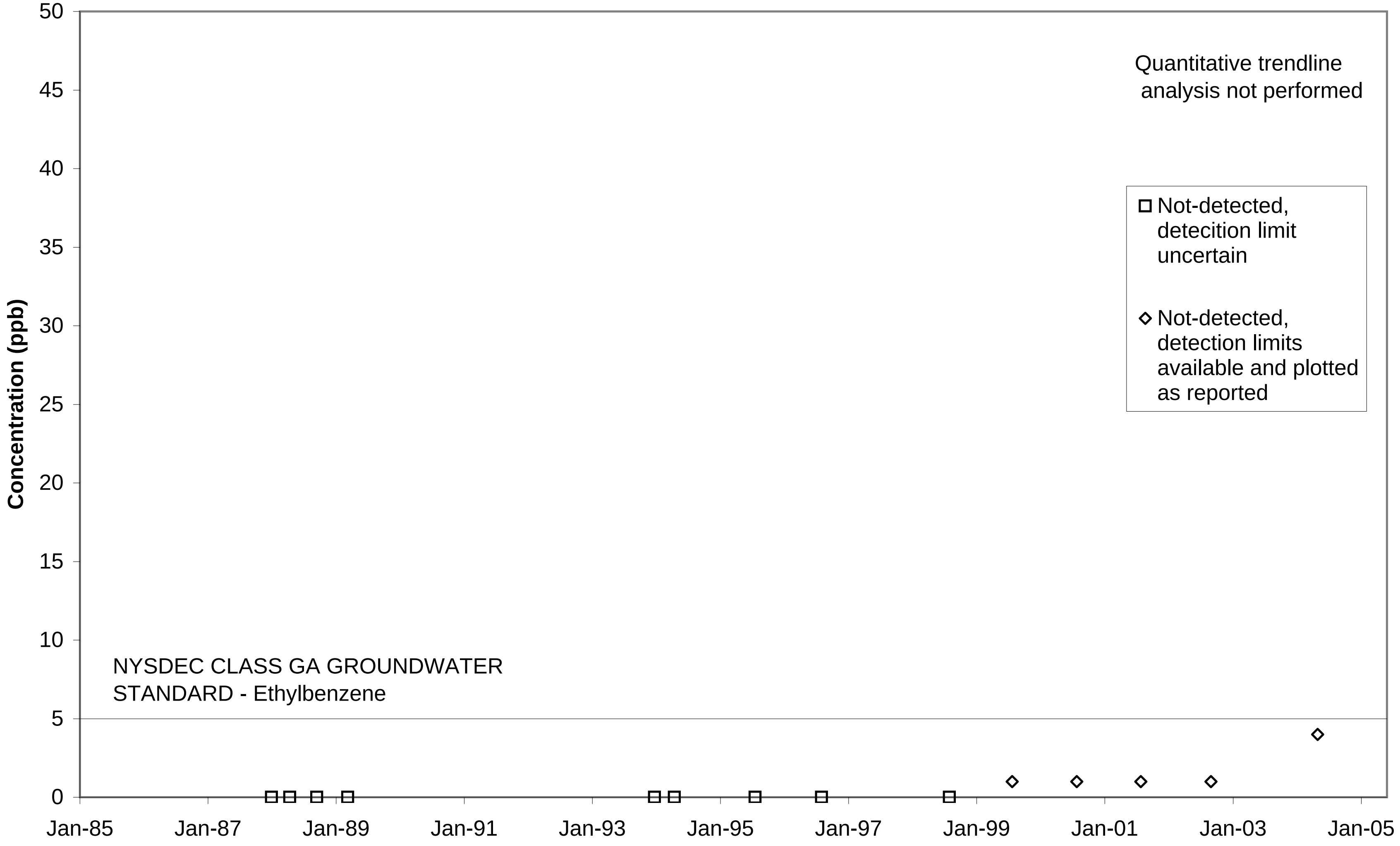
Benzene Concentration Trends
Monitoring Well MW-9S



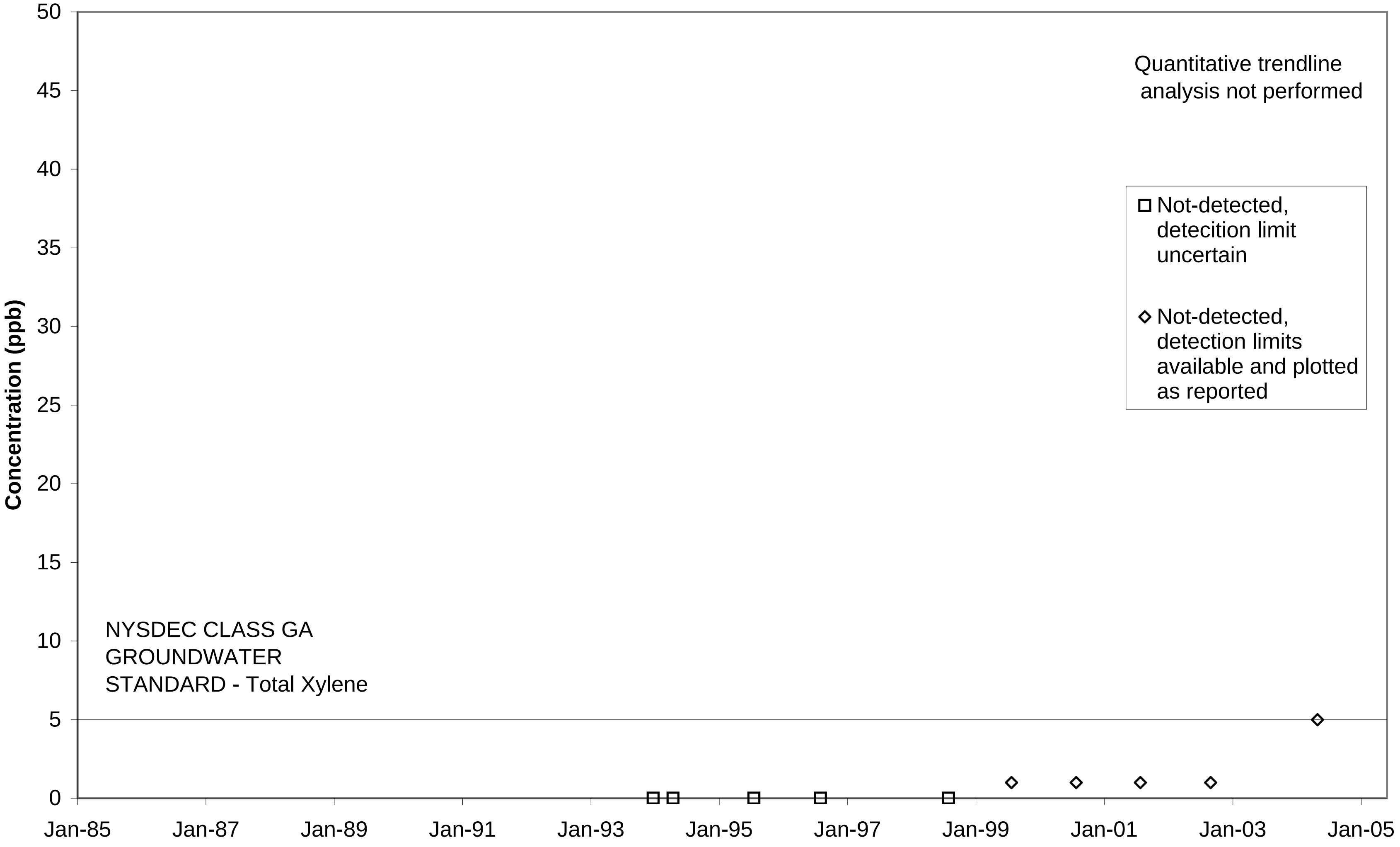
Toluene Concentration Trends
Monitoring Well MW-9S

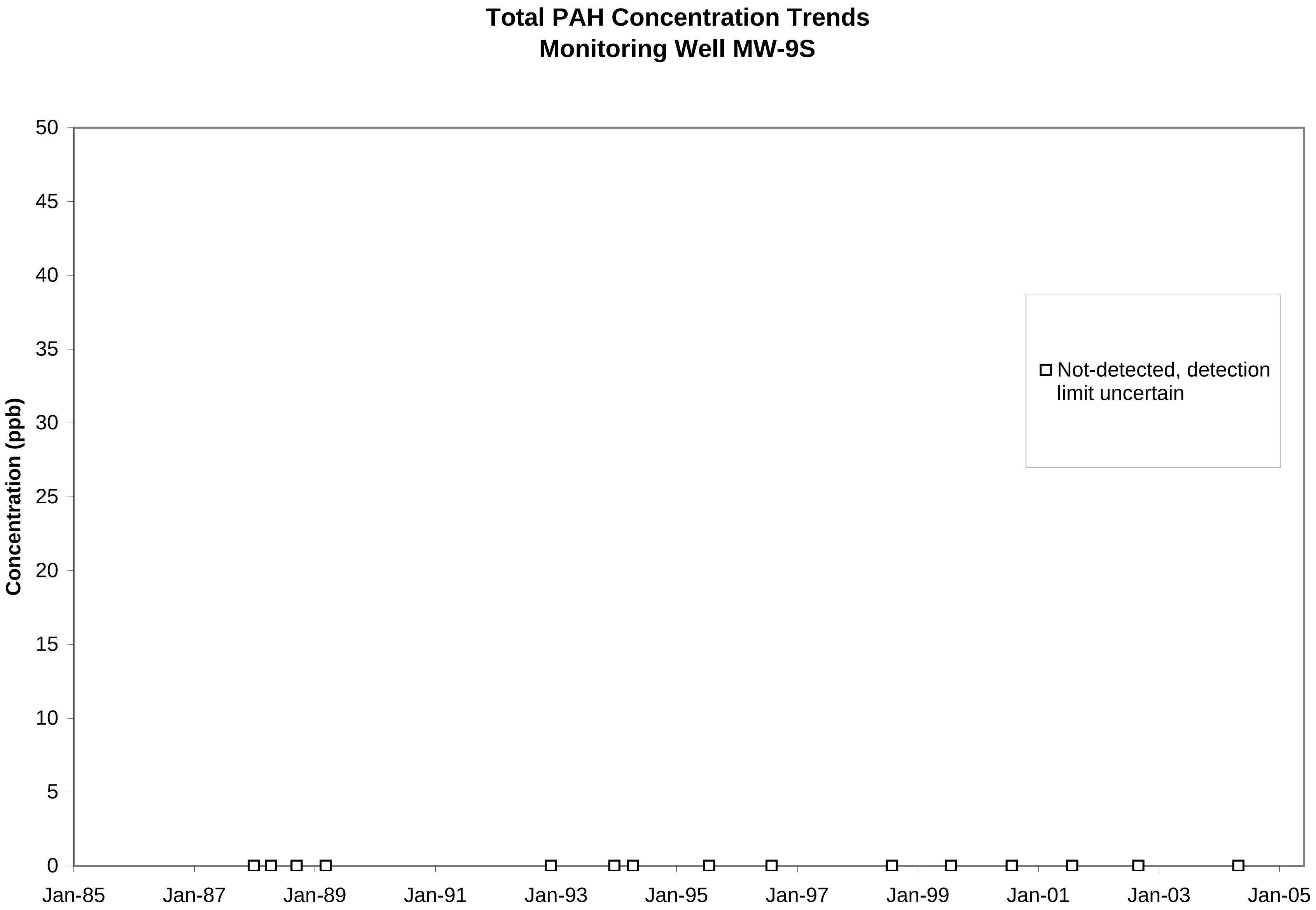


Ethylbenzene Concentration Trends
Monitoring Well MW-9S



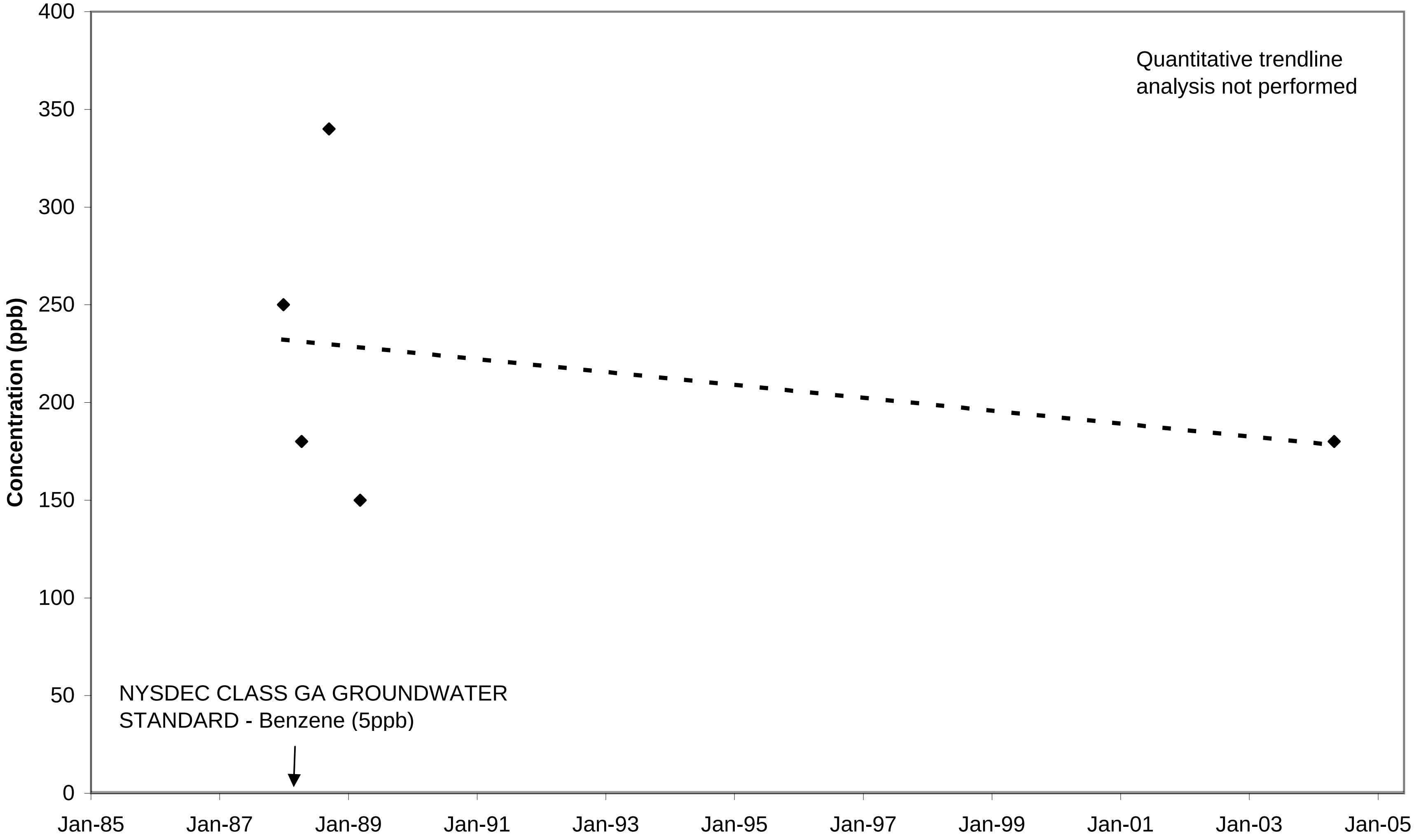
Total Xylene Concentration Trends
Monitoring Well MW-9S



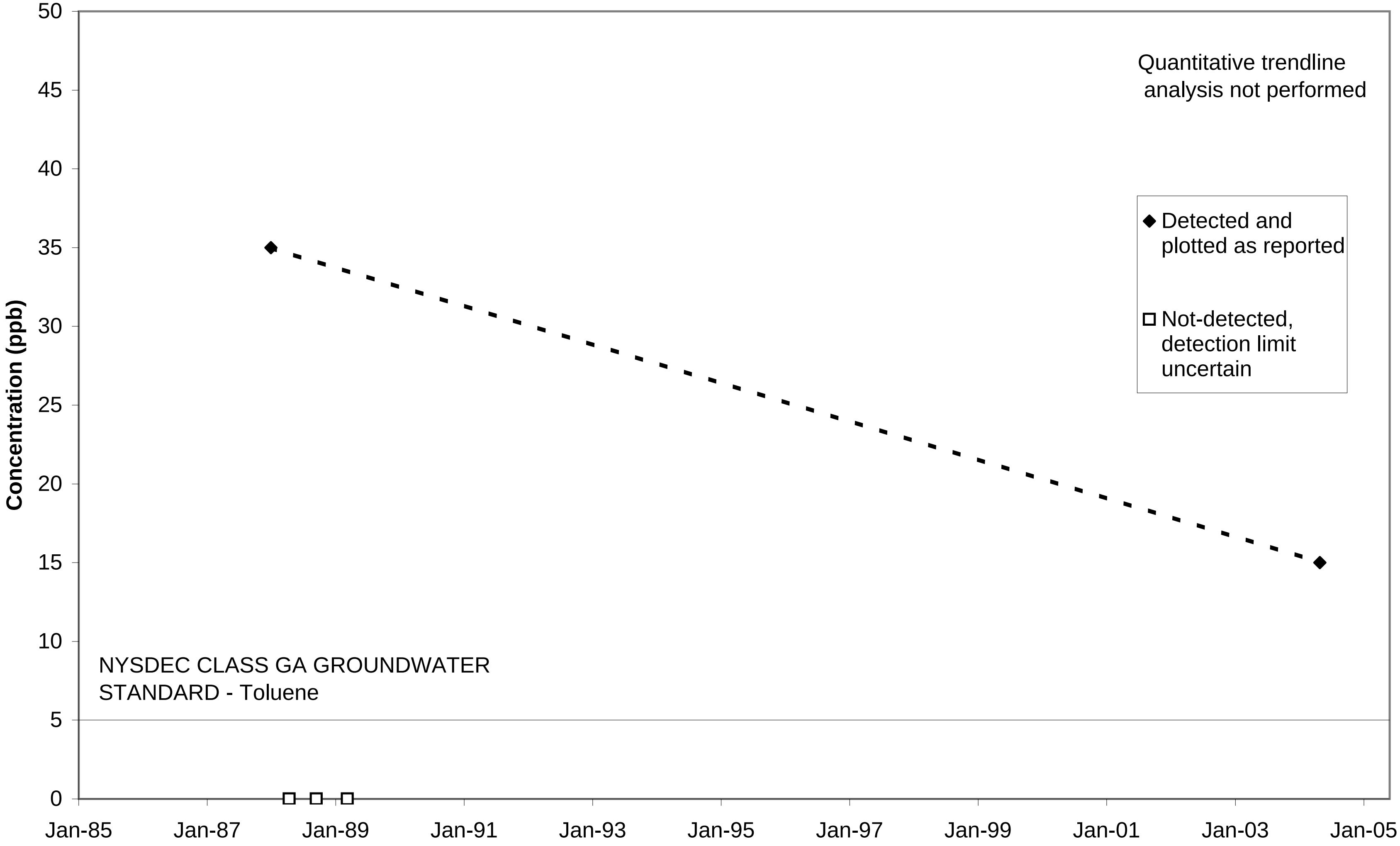


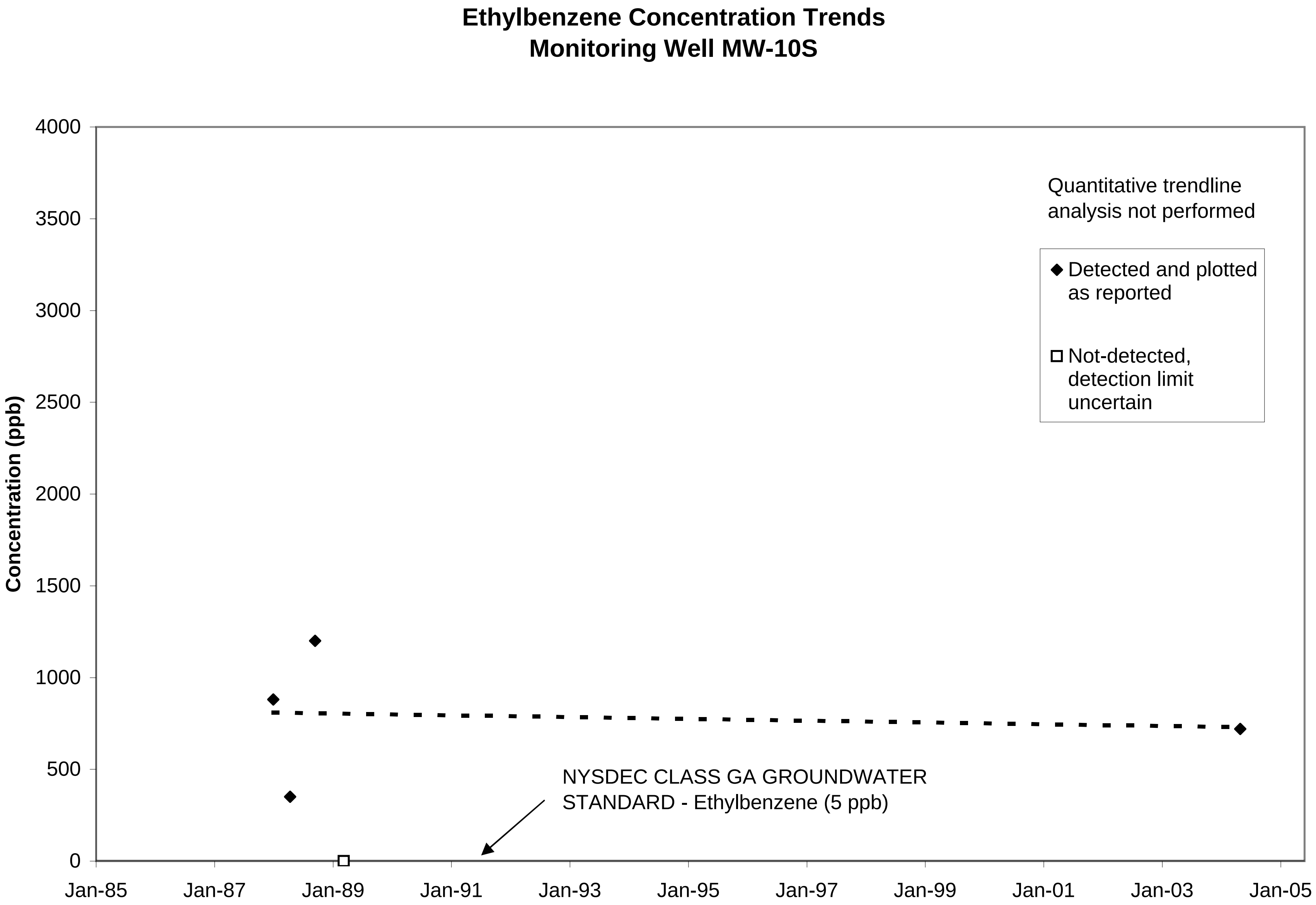
Total PAH Concentration Trends
Monitoring Well MW-9S

Benzene Concentration Trends
Monitoring Well MW-10S

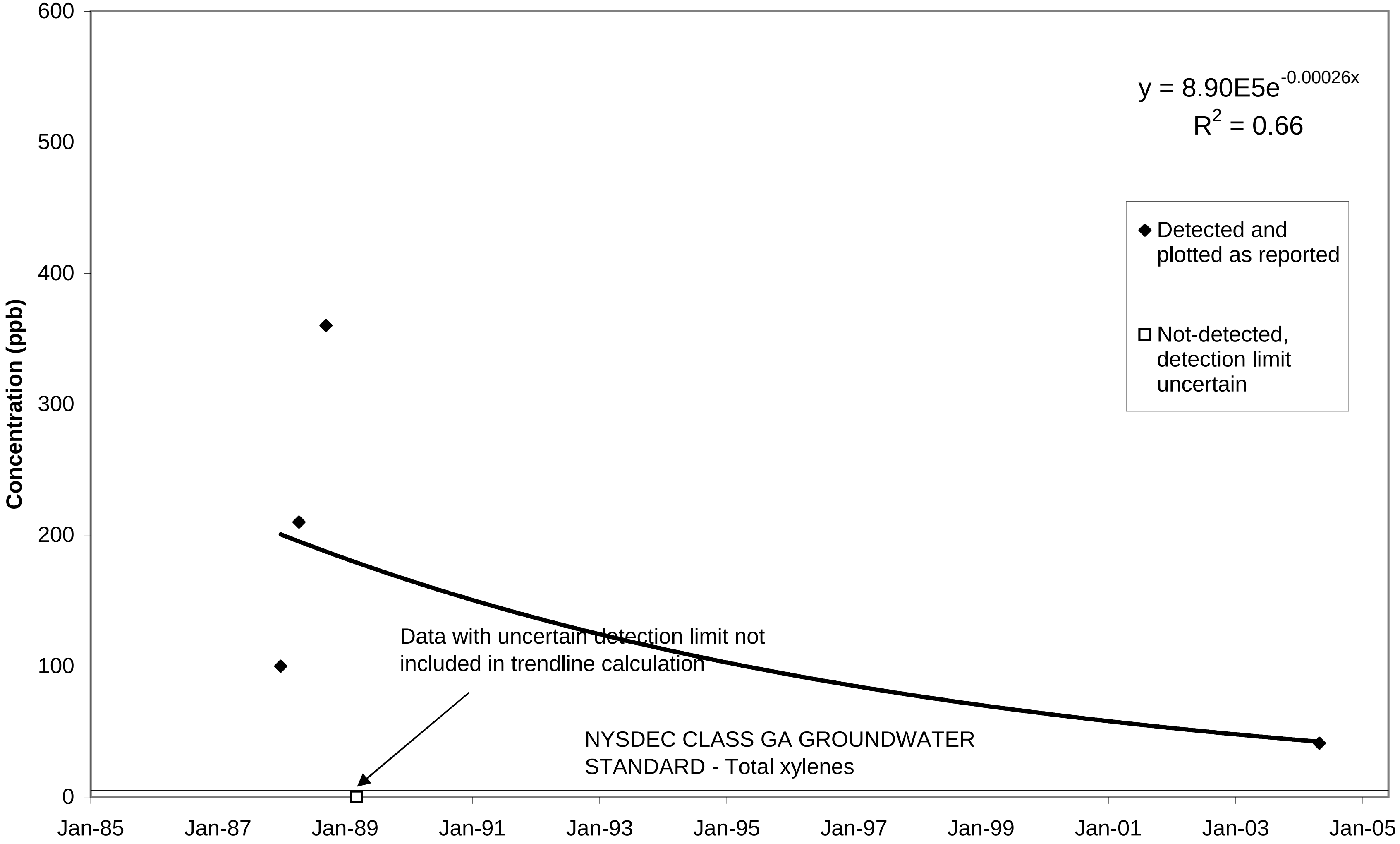


Toluene Concentration Trends
Monitoring Well MW-10S

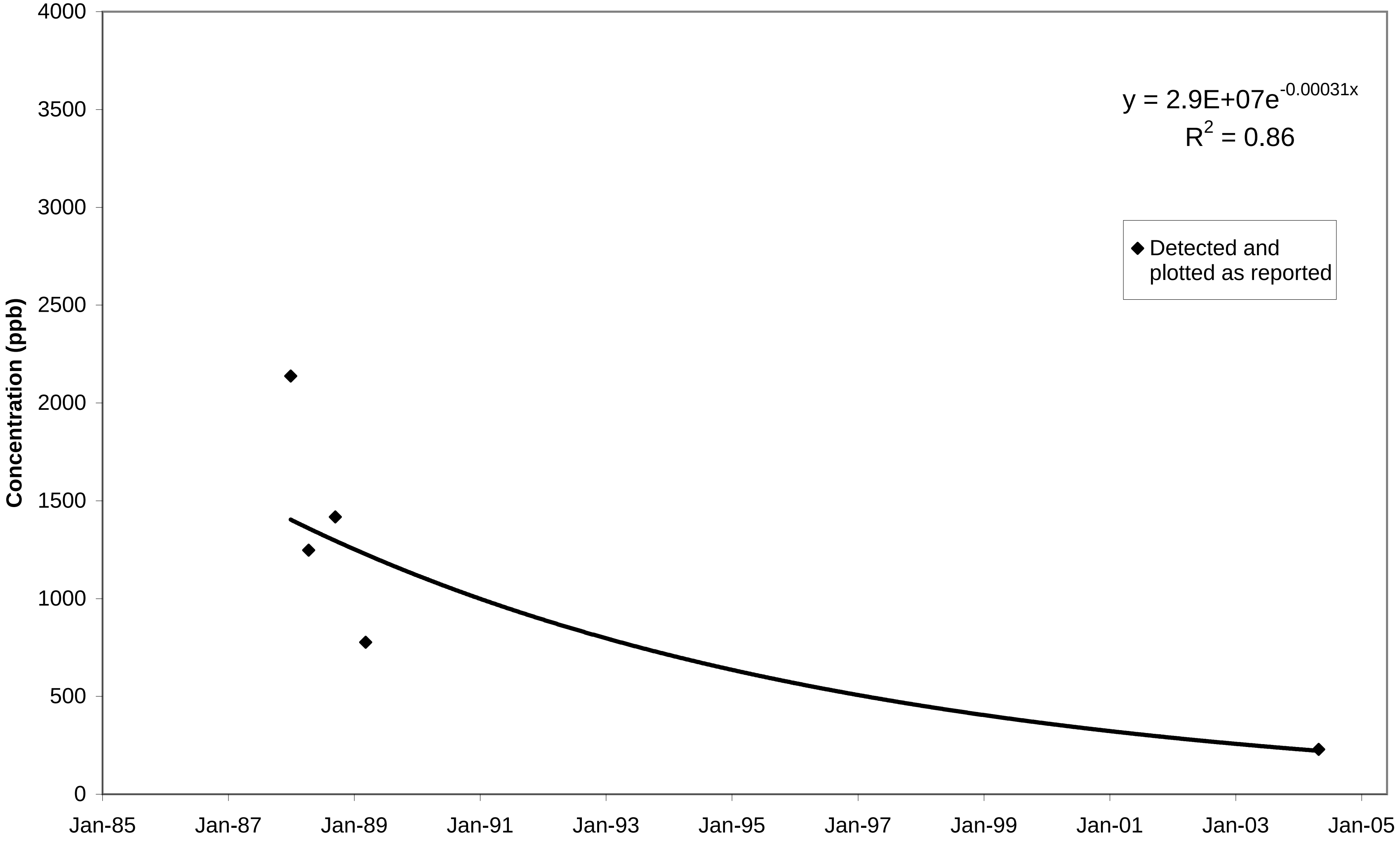



Ethylbenzene Concentration Trends
Monitoring Well MW-10S
Concentration (ppb)
4000
3500
3000
2500
2000
1500
1000
500
0
Jan-85
Jan-87
Jan-89
Jan-91
Jan-93
Jan-95
Jan-97
Jan-99
Jan-01
Jan-03
Jan-05
Quantitative trendline analysis not performed
◆ Detected and plotted as reported
☐ Not-detected, detection limit uncertain
NYSDEC CLASS GA GROUNDWATER STANDARD - Ethylbenzene (5 ppb)

Total Xylenes Concentration Trends
Monitoring Well MW-10S



Total PAH Concentration Trends
Monitoring Well MW-10S



Appendix E

Soil Vapor Sampling Report

BBL®
an ARCADIS company

REPORT

Soil Vapor Sampling Report

Elmira (Madison Avenue)
Former Manufactured Gas Plant Site
Elmira, New York

New York State Electric & Gas Corporation

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an ARCADIS company

Table of Contents

1. Introduction

This report presents the results of soil vapor sampling conducted on properties adjacent to NYSEG’s former manufactured gas plant (MGP) site (the “site”) located on Madison Avenue in Elmira, New York. The soil vapor sampling activities described herein were conducted by BBL, an ARCADIS company (BBL) as an element of the ongoing Remedial Investigation (RI) of the site. The soil vapor sampling included the following:

- Conducting reconnaissance building surveys to evaluate the potential for volatile organic compounds (VOCs), if present in the subsurface, to enter the buildings, and to fine tune locations for soil vapor sampling; and

- Collecting sub-slab soil vapor samples to assess whether site-related VOCs are present in the soil vapor below selected buildings adjacent to the site. These selected buildings consisted of the warehouse/storage building owned by I. D. Booth in the western portion of the site, and the larger of the two Trayer buildings along the southern edge of the site. The locations of the buildings and sampling locations are shown on Figure 1.

The sampling was conducted in accordance with the New York State Department of Environmental Conservation- (NYSDEC) and NYS Department of Health- (NYSDOH) approved Soil Vapor Sampling (SVS) Work Plan dated March 2006. A summary of the soil vapor sampling activities and results is provided below.

2. Soil Vapor Sampling Activities

Representatives from the NYSDOH and BBL performed a building reconnaissance on May 4, 2006 to: (1) observe the layout and construction of the buildings; (2) identify, in general, locations where VOCs (if present in the subsurface) could potentially enter the building; and (3) select sub-slab sampling locations. Figure 1 shows the approximate locations of the final chosen sampling points. Note that these sampling locations are based on field measurements.

Given the relatively large size of the Trayer building, the four sample locations chosen for this building (SV-3 through SV-6) were positioned in areas to provide adequate spatial coverage and to target areas near where MGP-related constituents were previously detected on site in soil and/or groundwater. As shown on Figure 1, sample SV-3 was collected near NAPL monitoring well NMW-0402S, in an area where the underlying groundwater is believed to contain site-related VOCs above Class GA Standards. Sample SV-4 was collected east of SV-3, just outside the limit of groundwater that contains VOCs above Standards. This location was chosen to assess whether potential vapor issues exist near, but outside, areas of VOC-impacted groundwater. Sample SV-5 was collected near monitoring well MW-9S. Although concentrations in groundwater from this well do not exceed groundwater Standards, the extent of VOCs above groundwater Standards is nearby and immediately upgradient from this area.

In the SVS Work Plan, soil vapor sample SV-6 was originally proposed to be installed in Trayer's easternmost (and smaller) building located immediately east of the large elongated building. Based on observations made during the reconnaissance, NYSDOH and BBL agreed that a sample would not be required beneath this smaller building because the building was being used for storage only. Instead, SV-6 was moved into the eastern end of the larger Trayer building in an area occupied by workers.

Two additional sub-slab soil vapor samples (SV-1 and SV-2) were positioned in the warehouse/storage building owned by I. D. Booth in the western portion of the site. These sampling points are located near shallow groundwater that contains concentrations of VOCs above groundwater Standards (near monitoring wells NMW-0401S and MW-3S) and therefore are considered to represent worst-case conditions for this particular building.

BBL collected the sub-slab vapor samples from the Trayer building on Sunday, May 7, 2006 and from the I.D. Booth warehouse on May 8, 2006. The sampling points were installed and samples collected using the procedures detailed in Attachment 2 of the SVS Work Plan. The samples were collected at depths of approximately 8 to 10 inches below the surface of the floor, depending on the thickness of the slab. A visual inspection of the condition of the floor in the area the soil vapor sampling points was documented prior to collecting each sample.

Sub-slab sampling points were installed by first using an electric impact drill and a 5/8-inch drill bit to drill a hole to approximately 2 to 3-inches below the bottom of the slab. A length of Teflon® tubing was then inserted to the bottom of the drilled hole. The annular space around the tubing was sealed with hydrated bentonite to minimize potential short-circuiting of air from above grade.

A tracer gas (helium) was used during sub-slab vapor sampling activities to evaluate whether the vapor samples were influenced by surface air. A 5-gallon plastic pail was placed over the sampling locations, and hydrated bentonite was used to create a seal between the pail and the concrete floor, and around the penetration for the sample tubing (at the top of the pail) forming a shroud around/over the sample point. Prior to sampling, helium was introduced into the shroud through a fitting on the side of the pail. The helium levels in the purge gas and in the shroud (prior to and immediately after sampling) were measured using a helium detector and documented on the field log. This information was used in conjunction with the helium results from the vapor sample (analyzed by Severn Trent Laboratories, Inc. [STL] of Burlington, Vermont) to assess the integrity of the seals (that is, to assess whether the sub-slab sample had been contaminated with air from above the slab).

A portable vacuum pump was used to purge the sample tubing of approximately 2 volumes of air prior to collecting the vapor samples by running the pump at approximately 100 milliliters per minute. The purge vapor was measured for VOCs and helium using a photoionization detector (PID) and helium detector (as discussed above), respectively, prior to collecting the vapor sample. Once it was determined that helium gas was not detected in the purge vapor (hence, no apparent short-circuiting from above grade), a 6-liter passivated stainless steel SUMMA® canister was used to collect the vapor sample. SUMMA® canisters were equipped with flow controllers that regulated the sampling flow rate at approximately 100 milliliters per minute. Each vapor sample was collected over an approximate 2-hour period. A duplicate sample was collected from vapor sampling point SV-6 using a stainless steel “Tee” fitting.

After sampling was completed, the coreholes for the sub-slab vapor sampling were restored using hydraulic cement. The vapor samples were submitted to STL of Knoxville, Tennessee for laboratory analysis in accordance with United States Environmental Protection Agency (USEPA) Compendium Method TO-15, titled “*Determination of VOCs In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)”*. STL-Knoxville is certified by the State of New York to perform air sample analyses. Each sample was analyzed for VOCs included in the laboratory’s standard TO-15 Target Analyte List, plus n-alkanes and VOC tentatively-identified compounds (TICs) to provide additional data (if needed) to help differentiate between potential sources. As previously mentioned, STL’s laboratory in Burlington, Vermont analyzed the samples for helium. Laboratory analytical results were validated by BBL.

3. Sampling Results and Discussion

As discussed above, helium was used as a tracer gas to assess potential infiltration of surface air into the sampling train. Helium was not detected in any of the six sub-slab samples. As such, we conclude that surface air did not infiltrate the sub-slab samples.

The concentrations of the soil vapor VOCs are summarized in Table 1. At the time of the soil vapor evaluation, NYSDOH guidance to interpret soil gas data per se does not exist. Accordingly, NYSDOH guidance was not used in this evaluation. However, to preliminarily assess the potential risk associated with soil vapor beneath the buildings, the analytical results in Table 1 are compared to generic screening levels for target shallow soil vapor concentrations presented in Table 2a of *USEPA's Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (OSWER, November 2002). These screening levels are based on target indoor air concentrations to satisfy a 1 x 10^{-4} prescribed risk level and a target hazard index of 1. This prescribed risk level and target hazard index of 1 were selected because the vapor samples were collected beneath industrial/commercial buildings.

The results were also compared to U.S. Department of Labor, Occupational Safety & Health Administration (OSHA) Permissible Exposure Limits (PELs). PELs were used for comparison because many of the VOCs detected could be related to the current/former building occupant use. It should be noted that PELs are promulgated standards that relate to direct compound exposure in the workplace; the concentrations of the compounds noted herein were measured beneath the building slabs and do not constitute a direct exposure scenario.

Of the 62 compounds analyzed, 41 different compounds were detected. The detected compounds were from a wide variety of compound classes including chlorinated hydrocarbons (e.g., chloroform, bromodichloromethane tetrachloroethene [PCE], trichloroethene [TCE], trichloroethanes), carbon disulfide, Freons (e.g., Freon 11, Freon 12), aromatics (e.g., benzene, ethylbenzene, toluene), and non-aromatics (e.g., n-alkanes, cyclohexane). This finding is not surprising given the fact that the area's current and former land use is multi-industrial.

As discussed in the SRI Report, soils and groundwater in the western portion of the site contain elevated concentrations of benzene, toluene, ethylbenzene, and xylene (BTEX) and polyclyclic aromatic hydrocarbons (PAHs). A forensic evaluation of the analytical results of samples collected in this area attributed the BTEX and PAHs to MGP residuals. As shown in Figures 8 and 9 of the SRI Report, this area appears to be limited to the general area of former gas holders 1 and 2 and the former gas house and extends from the water table to approximately 30 to 40 feet below the water table.

Chlorinated compounds (1,1,1-trichlorethane, 1,1-dichloroethane, and 1,1-dichloroethene) were detected in one monitoring well (MW-3S) in this area at concentrations exceeding the NYSDEC Class GA Standards for these constituents. Chlorinated compounds were also detected in groundwater from other site monitoring wells (MW-1S, MW-2S, MW-4S, and MW-6S), but at concentrations below Class GA Standards. Chlorinated compounds are not known to be associated with former MGP operations.

As also discussed in the SRI Report, soil and groundwater sampled in a separate area in the eastern portion of the site contain both MGP-related compounds and petroleum-related compounds. This area appears to be generally limited to within a few feet of the water table and was not found to extend to beneath Trayer's buildings.

Screening Values

Although 41 VOCs were detected, only three compounds exceeded the USEPA screening criteria   As indicated in Table 1, only three compounds exceeded the indicated USEPA Soil Gas Screening Levels: chloroform in SV-2; and 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene in SV-6. Trace levels of chloroform were detected in groundwater at monitoring well MW-2S which is located approximately 50 feet south and downgradient of SV-2. The chloroform detected in SV-2 could be related to the chloroform in the groundwater at MW-2S; however, chloroform is not likely related to the former MGP.   MGP-related compounds were not detected at MW-2S.

The soil and groundwater samples collected during the SRI were not analyzed for trimethylbenzenes; however, soil samples collected near the SV-6 location (from TP-209, SB-205, and SB-242, located on or near Trayer's property) did not appear to have MGP-related impacts. As discussed in SRI Report, the soil samples collected from TP-209, SB-205, and SB-242 appeared to have a chemical composition consistent with heavy-distillate or middle-distillate oils, probably from different sources than the petroleum impacts observed to the east of the site as noted above. The trimethylbenzenes measured in SV-6 could be a component of the oils observed in TP-209, SB-205 and SB-242.

As indicated on Table 1, none of the compounds detected exceeded their respective OSHA PEL. The PEL for the trimethylbenzenes is almost three orders of magnitude greater than the highest measured concentration (120,000 ug/m^3 vs. 180 ug/m^3). The OSHA PEL for chloroform is more than three orders of magnitude greater than the measured concentration (240,000 ug/ m^3 vs. 230 ug/ m^3).

4. Conclusion

Of the 41 VOCs detected in the soil vapor samples under the ID Booth warehouse and the Trayer building, only three VOCs were measured at levels that exceed potentially applicable screening criteria (i.e., USEPA $1x10^{-4}$ risk levels). The concentrations of these and all the VOCs detected are relatively low, suggesting that the potential for soil vapor intrusion from these compounds is relatively low. As such, further soil vapor intrusion assessment is not recommended for these properties or any of the surrounding properties.

Table

TABLE 1
SUMMARY OF SUB-SLAB SOIL GAS SAMPLE ANALYTICAL RESULTS

NEW YORK STATE ELECTRIC AND GAS
MADISON AVENUE FORMER MGP SITE
ELMIRA, NEW YORK

Sample ID: Date Collected:	PELs (8 hr TWA)	1x10-4 Risk Level	SV-1 05/08/06	SV-2 05/08/06	SV-3 05/07/06	SV-4 05/07/06	SV-5 05/07/06	SV-6 05/07/06
Volatiles								
1,1,1-Trichloroethane	1,900,000	22,000	26	26	1.1 J	7.7 [7.3]	29	6.2 U
1,1,2,2-Tetrachloroethane	35,000	42	2.7 U	2.7 U	1.4 U	1.4 U [3.1 U]	5.5 U	7.8 U
1,1,2-Trichloro-1,2,2-trifluoroethane	7,600,000	300,000	0.49 J	0.47 J	0.55 J	0.48 J [0.48 J]	6.1 U	8.8 U
1,1,2-Trichloroethane	45,000	150	2.2 U	2.2 U	1.1 U	1.1 U [2.5 U]	4.4 U	6.2 U
1,1-Dichloroethane	400,000	5,000	1.6 U	7	0.81 U	0.81 U [1.8 U]	3.2 U	4.6 U
1,1-Dichloroethene	400,000	2,000	1.6 U	1.6 U	0.79 U	0.79 U [1.8 U]	3.2 U	4.5 U
1,2,4-Trichlorobenzene	- -	2,000	15 U	15 U	7.4 U	7.4 U [17 U]	30 U	42 U
1,2,4-Trimethylbenzene	120,000	60	3.6	15	27	42 [45]	2.2 J	**180**
1,2-Dibromoethane (ethylene dibromide)	153,000	2	3.1 U	3.1 U	1.5 U	1.5 U [3.5 U]	6.1 U	8.8 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane	7,000,000	- -	2.8 U	2.8 U	1.4 U	1.4 U [3.1 U]	5.6 U	8 U
1,2-Dichlorobenzene (o)	300,000	2,000	2.4 U	2.4 U	1.2 U	1.2 U [2.7 U]	4.8 U	6.9 U
1,2-Dichloroethane	200,000	700	1.6 U	2.1	0.81 U	0.81 U [1.8 U]	3.2 U	4.6 U
1,2-Dichloroethene (trans)	- -	70,000	1.6 U	1.6 U	0.79 U	0.79 U [1.8 U]	3.2 U	4.5 U
1,2-Dichloropropane	350,000	40	1.8 U	1.8 U	0.92 U	0.92 U [2.1 U]	3.7 U	5.3 U
1,3,5-Trimethylbenzene	120,000	60	2.3	6.1	9.1	12 [12]	3.9 U	**68**
1,3-Butadiene (vinyl ethylene)	- -	8.7	1.1 J	0.86 J	0.48 J	0.23 J [2 U]	1.7 J	6.7
1,3-Dichlorobenzene (m)	- -	1,100	2.4 U	2.4 U	1.2 U	1.2 U [2.7 U]	4.8 U	6.9 U
1,4-Dichlorobenzene (p)	450,000	8,000	2.4 U	2.4 U	1.2 U	1.2 U [2.7 U]	4.8 U	6.9 U
3-Chloropropene (allyl chloride)	- -	- -	1.3 U	1.3 U	0.63 U	0.63 U [1.4 U]	2.5 U	3.6 U
alpha-Methylstyrene	- -	- -	3.9 U	3.9 U	0.77 J	0.38 J [0.37 J]	7.7 U	11 U
Benzene	31,500	310	7.3	23	8.4	8.3 J [6.7 J]	2.6	14
Benzylchloride	5,000	50	4.1 U	4.1 U	0.38 J	0.48 J [4.7 U]	8.3 U	8.8 J
Bromodichloromethane	- -	140	5.9	6.5	2	1.4 [1.1 J]	5.4 U	7.7 U
Bromoform	- -	2,200	4.1 U	4.1 U	2.1 U	2.1 U [4.7 U]	8.3 U	12 U
Bromomethane (methyl bromide)	80,000	50	1.6 U	1.6 U	0.78 U	0.78 U [1.7 U]	3.1 U	4.4 U
Carbon disulfide	9,000,000	7,000	58	1.8 J	2.8	3.1 [3 J]	260	110
Carbon tetrachloride	62,500	160	0.64 J	2.5 U	2.4	0.56 J [0.55 J]	5 U	7.2 U
Chlorobenzene	350,000	600	1.8 U	1.8 U	0.92 U	0.92 U [2.1 U]	3.7 U	5.3 U
Chlorodifluoromethane	- -	500,000	2.4	0.81 J	4.6	1.9 [1.7]	3.7	2.4 J
Chloroethane (ethyl chloride)	2,600,000	100,000	1.1 U	1.1 U	0.53 U	0.53 U [1.2 U]	2.1 U	0.66 J
Chloroform	240,000	110	28	**230**	12	6.8 [6.5]	3.9 U	8.7
Chloromethane (methyl chloride)	346,000	900	2.1 U	2.1 U	1 U	1 U [0.85 J]	4.1 U	20
cis-1,2-Dichloroethylene	790,000	350	1.6 U	1.6 U	0.79 U	0.79 U [1.8 U]	3.2 U	4.5 U
cis-1,3-Dichloropropene	- -	- -	1.8 U	1.8 U	0.91 U	0.91 U [2 U]	3.6 U	5.2 U
Cumene	245,000	4,000	0.58 J	0.82 J	1.4 J	1.7 J [1.8 J]	7.9 U	5.1 J
Cyclohexane	1,050,000	- -	23	11	16	9.5 [7.8]	65	12
Dibromochloromethane	- -	100	0.57 J	3.4 U	1.7 U	0.33 J [3.8 U]	6.8 U	9.7 U
Dichlorodifluoromethane	4,950,000	2,000	2.6	2.5	2.5	2.3 [2.3]	2.8 J	2.7 J
Ethylbenzene	435,000	2,200	3.6	7.5	10	13 [14]	3.5 U	5.4
Hexachlorobutadiene	- -	110	21 U	21 U	11 U	11 U [24 U]	43 U	61 U
Methylene bromide	- -	350	5.7 U	5.7 U	2.8 U	2.8 U [6.4 U]	11 U	16 U
Methylene chloride (dichloromethane)	86,500	5,200	3.5 U	3.5 U	1.7 U	1.7 U [3.9 U]	6.9 U	9.9 U
m-Xylene & p-Xylene	435,000	- -	11	26	38	56 [52]	3.2 J	28
Naphthalene	50,000	30	5.2 U	1.3 J	28	4.3 [2.7 J]	0.73 J	12 J
n-Propylbenzene	- -	1,400	3.9 U	2.4 J	4.2	6.4 [7.5]	7.9 U	11 J
o-Xylene	70,000	70,000	3.9	12	15	19 [20]	1.6 J	15
Styrene	425,000	10,000	1.7 U	1.7 U	0.86	1.1 [1 J]	3.4 U	1.9 J
Tetrachloroethene (PCE)	675,000	810	2.7 U	1.8 J	0.39 J	3.5 [2.6 J]	26	1.2 J
Toluene	750,000	4,000	21	41	37	45 J [36 J]	3.1	18
trans-1,3-Dichloropropene	- -	- -	1.8 U	1.8 U	0.91 U	0.91 U [2 U]	3.6 U	5.2 U
Trichloroethene (TCE)	535,000	22	1.6 J	2.1 U	0.23 J	1.1 U [2.4 U]	4.3 U	6.1 U
Trichlorofluoromethane (Freon 11)	- -	7,000	1.5 J	1.4 J	1.4	1.2 [1.2 J]	1.3 J	1.3 J
Vinyl chloride	- -	280	1 U	1 U	0.51 U	0.51 U [1.2 U]	2 U	2.9 U
Alkanes								
n-Butane	- -	- -	100	60	37	31 [33]	32	23
n-Decane	- -	- -	37	24	39	40 J [22 J]	180	810
n-Dodecane	- -	- -	42	7.9 J	38	56 [21]	48	72
n-Heptane	2,000,000	- -	25	26	32	23 [19]	19	23
n-Hexane	1,800,000	2,000	32	27	25	18 [18]	20	22
n-Octane	2,350,000	- -	18	21	30	25 J [19 J]	11	21
Nonane	- -	- -	23	24	37	34 J [25 J]	40	210
n-Undecane	- -	- -	57	21	53	61 [33]	110	270
Pentane	2,950,000	- -	71	51	32	23 [23]	28	25

See Notes on Page 2.

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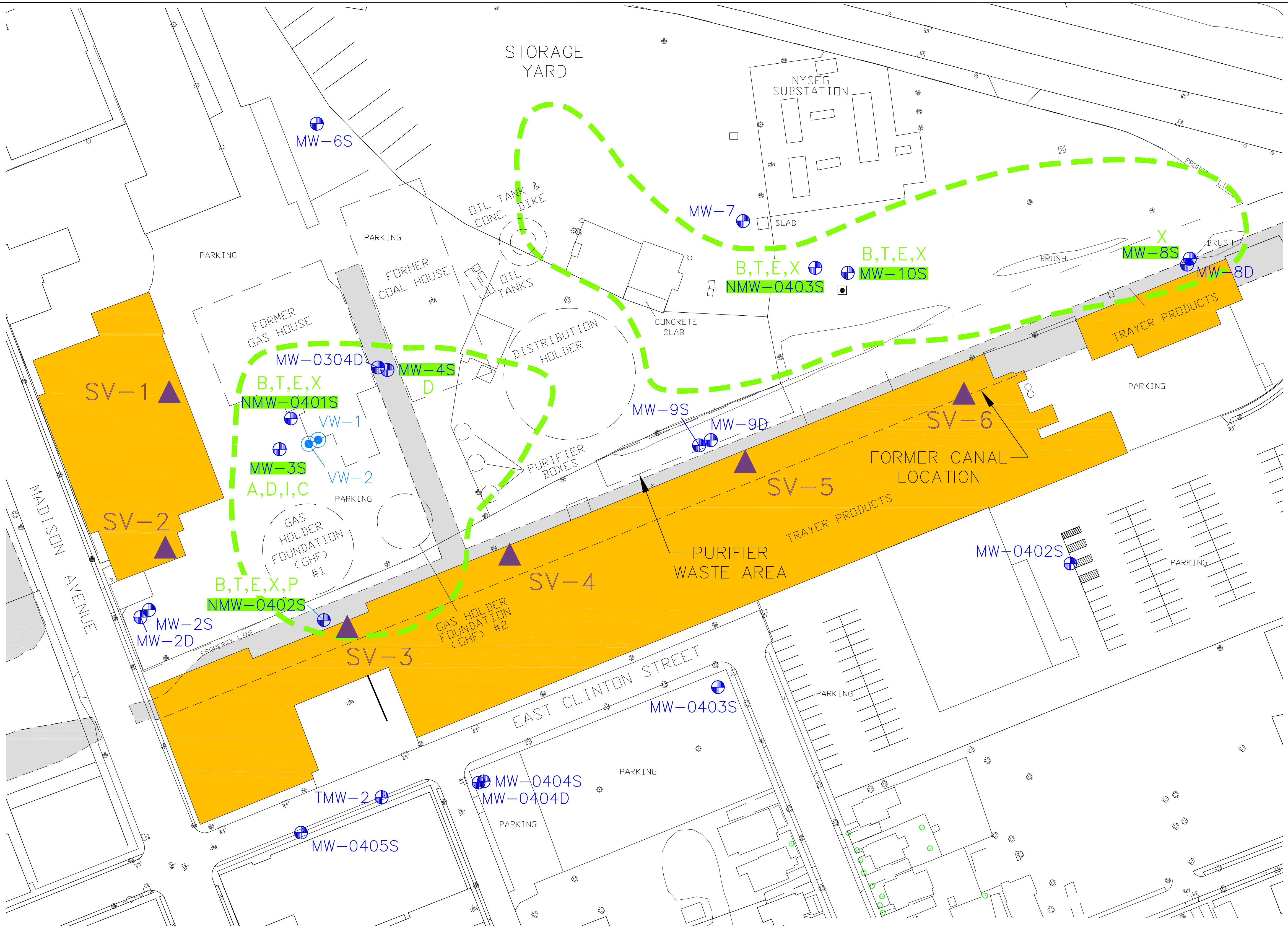
TICs								
Branched Alkanes								
2,3- Dimethylheptane	- -	- -	ND	ND	ND	ND [ND]	ND	ND
2,3-Dimethylpentane	- -	- -	ND	ND	ND	ND [ND]	ND	ND
Butylcyclohexane	- -	- -	ND	ND	ND	ND [ND]	ND	DETECT
Isopentane	- -	- -	DETECT	DETECT	DETECT	DETECT [DETECT]	DETECT	ND
Other								
1,2,3-Trimethylbenzene	- -	- -	ND	ND	ND	ND [ND]	ND	ND
2,2,4-Trimethylpentane	- -	- -	ND	ND	ND	ND [ND]	ND	ND
Indane	- -	- -	ND	ND	ND	ND [ND]	ND	ND
Indene	- -	- -	ND	ND	ND	ND [ND]	ND	ND

Notes

1. Concentrations reported as ug/m3.
2. USEPA soil gas screening levels taken from the OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (2002), Table 2a: Generic Screening Levels and Summary Sheet.
3. PELs from 29 CFR 1910.1000 Tables Z-1 and Z-2.
4. Shading = Constituent exceeds the respective USEPA Soil Gas Screening Level from Table 2a of the Draft Guidance.
5. - - = Criteria not identified for this constituent.

Figure



LEGEND:

▲ APPROXIMATE LOCATION OF SUB-SLAB VAPOR SAMPLING LOCATIONS

MONITORING WELL; SHALLOW (S), DEEP (D), TRAYER WELL (TMW)

● MGP VAULTED WELL

▣ RECHARGE PIT

POWER POLE

UTILITY POLE W/GUY

LIGHT POLE

POST, SIGN

CATCH BASIN

TRAFFIC LIGHT

MANHOLE

🟩 B,T,E,X,C APRIL 2004 GROUNDWATER SAMPLE CONTAINED ONE OR MORE CONSTITUENTS OF CONCERN (BTEX AND PAHs) AT A CONCENTRATION GREATER THAN THE NYSDEC CLASS GA GROUNDWATER STANDARD (TOGS 1,1,1, JUNE 1998). THE LETTER GIVEN REPRESENTS THE COMPOUND(s) THAT EXCEED THEIR RESPECTIVE STANDARD, AS FOLLOWS:

A = 1,1,1-TRICHLOROETHANE
D = 1,1-DICHLOROETHANE
I = 1,1-DICHLOROETHENE
C = CHLOROETHANE
X = XYLENES
B = BENZENE
E = ETHYLBENZENE
T = TOLUENE
P = BENZO(A)PYRENE

INFERRED EXTENT OF SHALLOW GROUNDWATER CONCENTRATIONS ABOVE NYSDEC CLASS GA GROUNDWATER STANDARDS, AS FOLLOWS:

🟧 BUILDINGS TARGETED FOR SOIL VAPOR SAMPLING

NOTES:

1. BASE MAP SUPPLIED BY NYSEG, LATEST REVISION DATED APRIL 2004, AT A SCALE OF 1" = 60'.

2. ALL LOCATIONS ARE APPROXIMATE.

0 50' 100'
GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS
ELMIRA MADISON AVENUE FORMER MGP SITE
SOIL VAPOR SAMPLING REPORT

SUB-SLAB VAPOR SAMPLING LOCATIONS

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

FIGURE
1

X: (NONE)
L: ON=*, OFF=REF*
P: PAGESET/PLT-DL
6/1/06 SYR-85-RCA AMS WLJ
13043002/13043W07.DWG

ELECTRONIC ATTACHMENTS

(data CD)

BBL®
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